



**Marlborough Brandt Group**

*Linking people for a fairer world*

## **Climate Change in The Gambia and the Impact on Development**

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## Executive Summary

This report investigates the perceived and real impact of climate change on The Gambia with a specific focus on the town of Gunjur which has been linked to Marlborough in UK for 33 years.

Through discussions with both community leaders and Gambians in senior posts in both Government and civil society, it is clear that The Gambia is suffering seriously from the impacts of climate change.

The following particular issues were raised by those interviewed:-

1. An increasingly unpredictable rainy season is leading to a detrimental effect on food production in the country, especially rice, with a corresponding dependency on expensive and often unaffordable imported rice whose importation is itself contributing to climate change.
2. Changes to the rains are causing both drought and flash flooding.
3. An increase in the temperature of the Gambia which is consistent with the findings of the UNDP (Sweeney, 2012. UNDP Climate Change Country Profiles: The Gambia).
4. Increasing sea levels have been observed affecting the low-lying country, resulting in current and potential future damage. The effects of sea level rise are perceived to be focused in Banjul the capital city as well as the beaches at the tourist destinations.
5. This is likely to have severe economic impact as the country relies on the seasonal tourist industry which is estimated to make up 20 - 25% of GDP.
6. Deforestation is likely to worsen and exaggerate the impact of climate change on the country through the unsustainable use of firewood reducing the earth's carbon sinks and increased erosion of top soil leading to reduced soil fertility.
7. The local residents of Gunjur noted the most significant impact on fauna to be on livestock malnutrition and a positive impact on the mosquito population causing a reduction in the incidence of malaria. Additionally, the loss of fauna through climate change is observed to have a potential impact on the biodiversity of the country.
8. The residents in the community of Gunjur almost unanimously claimed that they believed climate change to be the will of God; this was not a view held by more educated Gambians who were well aware of the scientific causes and the responsibility by industrialised countries.
9. In terms of what is being done to tackle both the impact of, and the reduction in future climate change, there were two key government initiatives:
  - a. An Early Warning System of impending drought / floods etc
  - b. The Integrated Coastal Zone Management Project.
10. The impact on development is the most important part of the report. Primarily, the impact on food production and the tourist industry have been and are likely to continue to be the worst affected industries for the Gambia.
11. The Gambia's Poverty Reduction Strategy has generally aligned with the Millennium Development Goals and the impact of climate change has slowly and actively prevented the successful achievement

of these goals. This includes slowing of child poverty reduction as well as reducing the likelihood that the goal involving the reduction of disease will be achieved.

In conclusion, the research shows that there is a marked difference in the level of knowledge about climate change between people at a community level and policy makers. There is little understanding of the international responsibility for climate change not least by industrialised countries. Current policies are not sufficient to protect the Gambia from the worsening effects of climate change and more needs to be done to support the country's development.

## **1.0 Introduction**

This study evaluates the perceived impact of climate change on the Gambia and the subsequent impact on the future development of the country.

### **1.1 Background**

The Marlborough Brandt Group [www.mbg.org](http://www.mbg.org) (formed following the publication of the Brandt Report in 1980 <http://www.sharing.org/information-centre/articles/brandt-report>) and the town of Marlborough in Wiltshire have had a 33 year partnership with the Muslim community of Gunjur in The Gambia.

This close relationship between the people of the two communities has been based on the exchange of, to date, some 1700 people, an integrated development programme in Gunjur and the surrounding district and a development education programme in schools in Wiltshire, using the knowledge of The Gambia as a means to bringing a global dimension into the curriculum in those schools.

This longstanding relationship of trust and collaboration and the high reputation in which the Marlborough Brandt Group is held both in Gunjur and more widely in The Gambia, enabled the two researchers, Alice Jones, a student of Geography at Newnham College Cambridge, and Tanglewest Douglas, a sixth form student at Magdalen College School, Oxford, to spend time with community members in Gunjur and with key people in Government and civil society researching the impact of climate change in The Gambia.

This report is based on that research.

### **1.2 Aims**

This report aims to uncover the difference between the knowledge and understanding of the general Gambian community, with that of Gambians in positions of authority who have the ability to implement change in the country. The report analyses the knowledge of both groups in a number of aspects of climate change. These are wide-ranging but include rain change observations, sea level rise and perceived causes of climate change. In particular, the report looks at rice production throughout, this being the staple ingredient in the Gambian diet.

The current policies in place will also be described in order to evaluate what is being done to prevent climate change as well as reacting to the current impacts. This will highlight whether existing policies are enough or if more drastic measures are needed. Priorities will be given as to what the greatest impact of climate change has been. This will allow a programme of change to be suggested, including what top-down approaches could be implemented by the national government in order to tackle the worst effects of climate change as well as potential community level changes.

Importantly, through demonstrating the extreme negative impacts of climate change on The Gambia, this should encourage people in the UK and in the industrialised world to take steps to reducing their own contribution to

climate change. This is to prevent smaller and less developed countries, which are less able to help themselves, from receiving the brunt of the lifestyles of the industrialised world.

The way of life in the UK amongst other OECD countries and Newly Industrialised Countries (NICs) should be considered unsustainable and unjust given that the worst consequences are being felt in countries which have contributed less, in for example Sub-Saharan Africa, and parts of Asia.

### **1.3 Methodology**

The research for this report was focused entirely within The Gambia. The information was collected through informal interview. The information for the grass roots level research was focused in the Kombo South region of The Gambia and was conducted primarily, but not exclusively, within the town of Gunjur population 25,000. Through speaking to members of the community, both those in positions of authority in the town (such as the Imam and the Alikali) and local residents, general opinions, beliefs and understandings were gained. Interviews with Gambians in senior positions in Government and civil society took the research further afield as interviews were conducted at the Department of State for Fisheries, Water Resources & National Assembly Matters with Mr. Tijang Bojang (Minister for water) and with Kebba Cham, the federation director at Child Fund (an international NGO).

## **2.0 Grass Roots Research**

### **2.1 Rain Change Observations**

It became clear through interview that changes to the rain were considered to be dramatic; unanimously the residents of Gunjur claimed rainfall had reduced both in quantity and duration across their lifetime. Specific observations include the drying up of rivers during the dry season which means drought periods are now more common. Not only is there less rain during the rainy season, the length of the rainy season has also reduced.

Alhagie Lamin Touray, Chair of the Supreme Islamic Council and a resident of Gunjur proffers that the rainy season used to begin in June, but now the rains routinely do not arrive until July or even August. The consistency with which the local residents spoke on the subject of changes to the rain patterns is convincing. Indeed, the observations agree with precipitation data collected by the IPCC in 2007, the 1980s and 1990s were much drier compared to the period 1920-1960.

This reduction in the rainfall to the Gambia means that the rain the country receives during the rainy season is considered to be 'insufficient' according to the Alikali (Mayor) of Gunjur. Local people in Gunjur agreed that changes to the rains have had a dramatic impact on their livelihoods (this will be explored further in later sections: 2.2, 3.2 and 4.1).

### **2.2 Effect on Food Production**

The impact of the lack of rains on food production is considered to be the most important aspect of climate change for the local residents.

The Imam of Gunjur states that most of the Gambia and indeed the community of Gunjur itself used to be entirely self-sufficient in terms of rice production. One rainy season would provide enough rain to fuel three rice harvests, however now they will be lucky to get enough rice from one crop to feed the family for a year. This is despite the increasing use of fertilisers in the rice fields.

The residents claim that they used to have to wait to plant their rice seeds as they would drown if planted at the start of the rainy season, now even if the rice is planted with the first rain the crop can fail from insufficient rain.

It used to be considered a great shame on your family honour to have to buy rice as most families were able to survive on their own crops with some rice surplus to sell. Now, the families of Gunjur rely almost entirely on imports from Brazil and India. This acts as a destructive cycle, as reduction in the rains due to climate change reduces the Gambia's ability to produce rice so imports are needed. The importing of rice into the country leads to the transportation of rice which further worsens climate change and its subsequent impact, for example further reducing the rain to the Gambia.

This shift away from self-sufficiency has led to a dependence on the importing of rice which is obviously more expensive than purchasing home-grown rice. The price of one bag of rice rose from 7 dalasis to 1300 dalasis over the last 50 years. This shocking change has led to a reduction in disposable income of the community, so it is now difficult for some families to send children to school.

Rice production was not only a source of food, but acted as a source of income for many families. However, now they are unable to earn enough money to sustain their families for a year. This is not only true of rice production but all agricultural sellers, for example there has been a reduction in the quantity of mangoes produced so the people cannot earn a sufficient wage to live on. The Nyansimba (women's leader) claims that the greatest sadness is the ignorance of most of the residents of Gunjur as their priority is simply how to feed their families.

### 2.3 Temperature Change

The residents of Gunjur all agree that the temperatures have increased across their lifetimes. This change has mainly been seen during the rainy season where temperatures are now unbearable. Alhagie Lamin Touray has noticed that cool periods have now ceased and the country is now consistently hot. The Alikali spoke of the 1971 drought in the country which promoted a fear that is now widely believed: the Sahara desert is getting closer to the Gambia.

According to the UNDP, the average temperature in the Gambia has increased by 0.21 degrees Celsius per decade since 1960. This persistent temperature change is dramatic and it is unsurprising that it has been noticed by local residents.

### 2.4 Sea Level Rise

Older residents of Gunjur have observed that the sea is now 0.5km nearer to the centre of town than when they were young. The edging of the sea inland has resulted in the disruption of some small settlements. The Alikali comments that he is concerned about the future of Gunjur as it is gradually becoming a more coastal town. Primarily, he is concerned that the people of Gunjur will be forced to relocate further away from the sea. This is also a concern as the fishing industry in Gunjur provides employment through fish smoking.

A resident who lives just outside Gunjur, nearer to the coast observed that the town of Kartong (population 12,000) is at risk of disappearing very soon.

### 2.5 Deforestation

This is labelled by the residents as a big problem. The primary source of heat for cooking is firewood which is cut from local forests. This is known by the residents to be unsustainable but they are not aware of any alternative source of fuel which is affordable to them. The Imam was aware that the deforestation is causing the exposure of

the top soil which is then more readily eroded. This reduces the soil fertility and makes it more difficult to grow crops.

### **2.6 Impact on Fauna**

The impact on fauna is most notable in changes to insects. The Imam of Gunjur comments that the increased temperature during the rainy season has allowed for more flies to breed which results in the destruction of crops, especially in the Fayunku women's garden. Despite this, the reduction in rainfall has actually led to a reduction in the size of the mosquito population and helped to reduce the incidence of malaria. This is because there are less pools of stagnant water which act as breeding grounds for the mosquitos.

Due to the lack of crops and increasing aridity of the Gambia, the Nyansimba notes that animals are beginning to become more brazen in approaching fields and gardens in a search for food. Animals such as goats and cows now break through fences and destroy the crops. In addition to this, the rivers running dry works to deny the cows of a water supply and so the cows now approach the wells and will drink from the buckets that people have collected. The residents now have to avoid this from occurring as the cows can injure young girls collecting the water from the wells.

### **2.7 Perceived Causes of Climate Change**

Almost exclusively, the residents of Gunjur and its surrounding area considered that it is the will of God that changes have occurred in the climate. The Imam claimed that God had not sent rain which therefore causes the temperature to increase as there is less water to absorb the heat, causing the increasing temperatures. The Nyansimba also agreed that the sole reason for climate change was God. An exception to the general consensus was the burning of plastics causing the sun to become stronger. Only very few members of the community such as the Alikali (Mayor) noted that whilst the majority of people consider it is God's will, the UK, USA and China also play a role in reducing the rainfall in the Gambia. Despite this, the mechanism as to how the actions of the developed world cause changes to their climate is entirely unknown.

### **2.8 Summary**

It became increasingly clear throughout discussions with residents of the Kombo South region of the Gambia that at a grass roots level, climate change is having a dramatic impact. The changes, primarily to the rains, are having remarkable consequences on the daily lives of the average person. These changes are genuinely working to increase the rate of malnourishment and disease as rice needs to be imported, resulting in a higher cost. A gradual appreciation of the implications of these changes on the residents is occurring whereby they realise something needs to be done. However, due to life conditions, lack of information and funds, people are struggling to formulate a response to the changing climate. Meanwhile, the reasons behind the changes are almost exclusively attributed to God, potentially making it difficult for the people to understand how to respond and counter the negative impacts.

The knowledge of the changes to the climate is helpful due to the need for the residents to appreciate these changes because of the impact on agriculture. However, there is no understanding of the reasons for the changes and how best to respond to them. The town of Gunjur is concerned with these changes but their perception is that there is little they can do about it; a general feeling of powerlessness was present.

It is evident that the development of Gunjur is hampered significantly by climate change due to the increasing price of food which directs capital away from potential improvement as it is survival just for fulfilling basic survival needs.

### **3.0 Observations by Gambians in Senior positions in Government and Civil Society**

#### **3.1 Rain Change Observations**

The rainy season has changed in two regards, not only is the rain less frequent within the rainy season, but the season is now on average one month shorter than it was fifty years ago. This causes severe drought during the dry season as less water can be naturally stored. Kebba Cham notes the rain becoming more erratic. During the rainy season there are longer periods without rain which cause drought whilst sudden heavy downpours can lead to flash flooding as the ground is unable to absorb the water. This can lead to issues of access and can cut off small communities from main roads and food supplies. The irregularities in the rainy season makes planning for Gambians more difficult as the rains become more and more unpredictable.

#### **3.2 Effect on Food Production**

The reduction in precipitation and the increasing temperature have led to an overall reduction in the harvest in the Gambia. Over the last 30 years the rice production has reduced so much that very little home-grown rice is now consumed. Changes to rice production are synonymous with ground-nut production. The reducing soil moisture content does not favour the crop and therefore the harvest is unsuccessful. Tijang Bojang comments on the mango crop; all the fruit ripens at the same time rather than at staggered times. This leads to a waste of the crop as it cannot be sold or consumed quickly enough.

The reduction in the harvest of the rice has led to 90% of the rice that is consumed in the Gambia being imported from e.g. Thailand, India, Taiwan and Brazil. The introduction of foreign rice has led to a rising cost; a variety of changing prices over the past 50 years were quoted and all were similar to the 7 dalasis to 1300 dalasis as estimated by the residents of Gunjur. The consequence of importing rice is understood in terms of food miles and a further cause of climate change.

There have not been any studies on how these changes have affected the diet of the population of the Gambia; however it is speculated that the diet now includes more processed food. Home-grown rice is now only consumed on special occasions such as naming ceremonies, indicating the cultural significance and family pride associated with the growing of the crop.

There is an appreciation of the other factors that are affecting the reducing rice production. A key cause is the rural-urban shift that is occurring globally, meaning there are fewer people to work the land and grow the crops. Further to this, the rapid population growth is resulting in more mouths to feed with fewer crops. In The Gambia the population has risen from 400,000 to 1.8 million in the past 50 years, a more than fourfold increase.

Kebba Cham claims that there has been a failure in public education about the both the causes of the changes to the climate and what can be done to react to the new climate. Despite this Tijang Bojang spoke about 'Vision2016' which includes a programme to reduce reliance on imports through increasing rice production once again, primarily in the Upper River region of the country.

#### **3.3 Temperature Change**

Tijang Bojang noted that there had been a temperature change of 0.3 degrees Celsius recently. This was echoed by others who noticed that there had been a general increase in temperature; however, this was especially seen in the rainy season. A 3.9 degree Celsius increase can be expected by 2200 if a 'business as usual' approach is adopted to climate change.

Despite the overall increase in average temperatures, there have also been more periods of increased and unexpected cool. Therefore, the climate in Gambia has become more unpredictable and extreme at both the hot and cool ends of the spectrum.

### 3.4 Sea Level Rise

Each year more and more beach is disappearing; this is likely to have a future detrimental impact on tourism which Kebba Cham worries could ruin the seasonal industry in Kartong. He also comments on the threat to Banjul (the capital city) as the buildings are likely to be at risk due to their proximity to the coast and the lack of sea defences. The city planners should begin to locate their resource elsewhere as it is estimated that within 50 years the city will begin to be submerged. There are also no funds set aside or future plans to install sea defences.

Tijang Bojang commented on the danger of sea level rise to the River Gambia which bisects the country. As the ocean rises due to thermal expansion and melting ice caps/glaciers, saline water moves further inland up the River Gambia. This displaces fresh water and has severe agricultural impact as rice cannot grow in saline water. This means that women need to use their own precious fresh water to irrigate the rice paddies which is expensive and endangers their livelihood.

### 3.5 Deforestation

Deforestation for short term gain of firewood is a big problem in the Gambia and is occurring at an unsustainable rate. The cutting down of the 'virgin country' magnifies the impact of climate change as it allows erosion of the top soil from winds and the heavy rains and flash floods which reduce soil fertility. This works to cause desertification of the terrain in the Gambia which reduces its agricultural yield.

Another important consequence of deforestation is the loss of a carbon sink and the release of carbon dioxide into the environment as the resource is burned. Tijang Bojang comments on the global significance of this as the Gambia contributes to the increased greenhouse effect with the carbon dioxide increasing the temperature of the atmosphere.

### 3.6 Impact on Fauna

The impact of climate change has been pronounced, both on terrestrial and marine fauna. The turtle nesting season has been disturbed, they now don't come out of the water until one month late (June/July), and this year were not seen until August. As saline water moves East, up the River Gambia fish are unable to survive and are therefore forced to migrate. Freshwater fish used to be more abundant but their ranges have narrowed to only occupy more specific niches.

On land, deforestation is leading to the loss of flora and hence habitat is lost. This results in forced migration of species and potential loss of biodiversity. There is now less grass due to the lack of rain, this has a negative impact on grazing animals.

### 3.7 Perceived Causes of Climate Change

Kebba Cham labels consumerism as a key reason for climate change, however comments on a general lack of understanding of the actual scientific reasoning at a community level. Especially there is a lack of comprehension

about how climate change is caused and how actions reverberate on an international scale. The population needs to understand that the whole world is contributing to climate change and we need to all work to fight against its impacts on behalf of the developing world.

Kebba Cham is clear that the 'western world' cannot be solely blamed for the climate change in the Gambia as we all play a role; every country is significant. He considers it a waste of energy and resource to point fingers and blame. Rather, efforts should be focused on tackling the worst problems and preventing further damage. Kebba Cham believes that every country should focus on protecting itself, whilst Tijang Bojang disagrees and says there is a shared responsibility for all countries to take steps to protect the world. He says that as the effects of climate change are not usually felt where the damage is being caused, we need to work together to tackle the problem.

### 3.8 Global Voice of The Gambia

The Gambia has a presence at most international conventions where they can speak about the problems they face. The national climate change community assesses the impact and passes this on to the international fora. The Gambia is a hub for climate change across Africa as a continent and therefore has a fair amount of weight behind it at international stages where they are given the opportunity to speak.

### 3.9 What Has Been Done

Tijang Bojang spoke at length about the two programmes that the Ministry for Water is running.

**1. The Early Warning System (EWS)** tackles the problem of farmers being unable to prepare for planting and harvesting due to erratic rains e.g. drought versus flash flooding. The programme aims to improve access to information for the farmers as the meteorological data collected using improved technology is disseminated. This allows farmers to know and understand when to expect rain so they are more able to plan when they plant crops. The transmitting of the information and their comprehension of it is the main challenge of the programme. Although the EWS mainly uses radio and telephone, the need to use local languages provides a substantial barrier.

**2. The Integrated Coastal Zone Management Project**, which is run by the Global Climate Change Alliances Project and is EU funded. This is relevant and important as the large coastal and river zones of the country mean much of Gambia's income and livelihood will be affected by sea level rise. This includes coastal towns being given advice as to resettlement and alternative forms of income generation. With 1m of sea level rise, 92km<sup>2</sup> of land mass will be lost, threatening the entire city of Banjul.

The inclusion of climate change into the national school curriculum is being developed. This is to allow for an increased understanding of the cause and effect of climate change; with the aim of the general population becoming more aware of how their actions reverberate on a global level.

ChildFund (previously Christian Children's Fund) is running an EU funded programme based on educating the population of the Gambia. In this, the communities are asked to create a focus group to learn about how to reduce climate change (both their contribution and managing the effects). The groups are encouraged to speak on local radio so they can pass on the message to the local populations. In addition to this, ChildFund has applied to the American Embassy for money to promote and teach local communities about the benefits of using a 'noffly' stove which uses less firewood and produces a hotter cooking environment. This is therefore more sustainable, deforestation is reduced, which lowers the destruction of a carbon sink as well as being a cheaper alternative in the long run for the population.

Gambians with a higher degree of education believe that appropriate legislation could reduce emissions from the country and protect the residents from the global impacts. Whilst they are beginning to educate the local populations, there are only a few active controls on logging and deforestation being implemented which is considered to be insufficient.

### **3.10 Suggestions For the Future**

Kebba Cham suggests that the city planners should avoid building near the coast, even though the most development in urban areas of Banjul and Serrekunda (and tourist areas) are within 3km from the coast.

The planting of malina trees (which are more sustainable for use as fire-wood trees due to their quick growth period) could reduce the current impact of fire-wood use on the environment. There are also programmes such as that of 'Green-tech Gambia'; they have developed 'briquettes' made from ground-nut shells which burn cleanly, cost less, store easily and reduce the cooking time. This would not only have benefits for the environment by protecting the carbon sinks, but also reduce the time that people spend collecting fire-wood.

Tijang Bojang suggests that instead, renewable energy sources should be the focus of the Gambia moving forward, he can envisage an entirely solar powered Gambia. Indeed, he also states that more support should be given to developing countries as climate change is a global issue and therefore needs to be tackled collectively.

### **3.11 Summary**

It became absolutely clear through the discussions that the Gambia is in an increasingly vulnerable position. The impact of climate change is large and is having very real impacts on the population. The impacts are mainly felt in the rainy season however the repercussions in terms of effect on the harvest mean that climate change is a permanent problem for the Gambia which is only likely to deepen.

The research highlighted that the legislation that is currently in place is not only insufficient, but also easily bypassed due to the possibility of bribery. It is clear that further measures are needed if the Gambia is going to be able to react to the worsening impacts of climate change as well as working to reduce their own carbon footprint.

The current programme of education rather than legislation is clearly not dramatic enough as discovered in the grass roots level research. The communities do appear to have some awareness of climate change and its impacts, but do not have the resources to actively change their lifestyles for the better. The breach between the two groups interviewed in terms of knowledge is definitely present however not to the same degree that it potentially once was. Given the finite resources of the Gambian national assembly, instead of continuing to educate, the government should prioritise programmes such as the briquettes made from ground-nut shells and afforestation to allow the communities to act.

The ability of developing countries to help themselves through climate change is reduced by a lack of funding and knowledge, especially at the grass roots level. While the Gambia is not dependent on the developed countries to reduce climate change, it would be beneficial to aid them with their actions towards the global effort. In reality, this small country has little impact on the global climate and suffers from the consequences of the lives of others; therefore, any actions should be part of a global strategy.

## **4.0 Impact on Development**

### **4.1 Food Production**

The impact on the variable rainy season has reduced the ability of the communities to grow their own food which has resulted in the increasing need to import rice. This costs dramatically more and therefore is likely to promote instances of malnourishment and starvation. This will increase the infant mortality rate and will work to reduce the life expectancy of the Gambia. Additionally, malnutrition will reduce the ability of the population to recover from diseases such as tuberculosis and malaria. The erratic rains also means that food such as mangoes ripen simultaneously and therefore cannot be sold quickly enough so capital generation is focused and insufficient.

The saline water moving up the River Gambia and the erratic rains causes the destruction of an ancient livelihood of rice growing in the region. Therefore, it can be seen that climate change is not only having physical effects on food production but is also eroding a culture.

The lack of rains and increasing temperatures mean that women are now unable to grow as much vegetables for sale at local markets. On visiting the Fayunku Gardens, in Gunjur, it was clear that the women resented the changes to the climate as it prevented the women from having the high yields they are used to. This reduces the income of the women and therefore prevents the generation of wealth for e.g. their children's schooling and medicines.

There can be no doubt that climate change in the Gambia is having severe socio-economic ramifications that are simply working to hamper and even reverse any development of the country towards an economically brighter future.

### **4.2 Tourism Industry**

Despite being primarily seasonal, the tourism industry in the Gambia creates a wealth of employment opportunity and alternative capital generation from the increasingly unreliable agricultural industry. The tourism industry is larger than just those employed in hotels; the introduction and growth of restaurants, bars and leisure activities such as boat trips and birdwatching all contribute to making the Gambia a less destitute country. It was of course very badly hit during the ebola crisis, despite the absence of the virus in The Gambia and surrounding Senegal, having a devastating effect on the Gambian economy.

As sea level rises, the tourist industry is further threatened as the beaches disappear and the coastal environment becomes increasingly hostile. Further to this, as the sea level rises, the hotels and other coastal buildings are likely to become damaged which will cost the industry dearly. As the temperatures rise, tourists are likely to be put off and may decide to holiday elsewhere. This would work to further increase the already high rate of unemployment in the country and may increase the rising trend of young Gambians taking the dangerous 'back-way' to Europe and adding to the problems of migration.

### **4.3 Millennium Development Goals and the Poverty Reduction Strategy**

The Poverty Reduction Strategy (PRSP) provides a framework for working to reduce the rates of absolute poverty within the Gambia with the aim of meeting the Millennium Development Goals (MDGs) in the next five years. The key principles of PRSP parallel with the MDGs, for example: 1. Create a policy enabling environment for economic growth and subsequent poverty reduction 2. Increase the capacity and yield of the productive sectors such as agriculture, fish and tourism (MDG 1) 3. Improve the structure and execution of basic social services i.e. health (MDG 4, 5, and 6) and education (MDG2) 4. Increase and improve local governance and decentralization, and 5. Include issues related to gender (MDG 3), youth, population, HIV/AIDS (MDG 6), nutrition, and the environment (MDG 7) in the development process.

Climate change has begun and will continue to undermine Gambia's economic development by primarily increasing poverty and is likely to delay or even entirely prevent the successful fulfilling of both the PRSP and MDGs.

Particularly, the lack of any dramatic reaction to increasingly erratic rains, sea level rise and the salination of the River Gambia will reduce the likelihood of achieving MDG 1 (eradicating extreme poverty and hunger), MDG 6 (combating HIV/AIDS, malaria and other diseases) and MDG 7 (ensuring environmental sustainability).

## **5.0 Conclusion**

The research presented in this report has shown that there is a division between the level of knowledge about climate change at a community level and those who are more educated and/ or able to promote change.

Despite this, most of the systems implemented are to increase the education of the communities. This indicates that the programme is not drastic enough and needs to be enforced to a higher degree; this indicates the difficulty of access and information dissemination in the Gambia. Potentially, this only highlights the need for the government to redirect funds from education about climate change and begin legislating towards reducing the Gambia's impact on the enhanced greenhouse effect.

Despite the government's best intentions, the rural populations such as Gunjur are misinformed. Additionally, it is important to note that even if the communities were aware of steps they could take to reduce climate change, they would be unable to afford to implement such changes. Climate change is simply not a high priority for the communities as the high poverty rates mean the focus of the general population is paying for food and fire-wood. It has been argued that the Gambia should not make climate change a priority as its focus should be on the development of the country, reducing malnourishment and increasing literacy rates, not recognising the close relationship between these objectives and climate change.

The perceived impact of climate change is generally accurate and consistent across the two groups of people interviewed. It is clear that the most dramatic impact of climate change is that the rainy season has become shorter causing the issues which threaten the livelihood and food source of the residents of Gunjur. In the long term, the impacts of sea level rise are likely to prove the most costly for the country as infrastructure will be damaged and the tourist industry will suffer.

The Gambia is suffering from the impacts of climate change despite their own minimal contribution to the atmospheric changes. The difficulties faced by the Gambia in tackling these problems include a lack of funds, accessibility and communication. It is clear that if the current rate of change continues, the Gambia will only struggle more to react and even maintain health standards; most likely the development of the Gambia will be hampered. It is imperative that the UK (and other more developed countries) begin to take more positive steps to reduce their impact on the environment to protect less able countries such as the Gambia.

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