

ETHIOPIA'S CLIMATE CHALLENGES



The situation in Ethiopia is a good example of how climate change affects Africa. The 1.12 million km² country on the Horn of Africa is the twenty-seventh largest country in the world and more than twice the size of Spain. It is one of the world's poorest and least developed countries. In 2009 Ethiopia ranked number 171 of the 182 countries on the UN Human Development Index⁹, which measures a country's development by taking the population's expected lifespan, education level and purchasing power. On the same index, the US ranks at number 13.

The 2007/2008 Human Development Report, published annually by the United Nation's Development Program (UNDP), indicates that forty-six per cent of the population in Ethiopia is malnourished, and that most (77.8%) of the population live on less than two US dollars a day. Approximately eighty-five per cent of Ethiopia's population of 78.14 million¹⁰ live from agriculture. There are potentially 3.7 million hectares of land in Ethiopia which would benefit from irrigation but only four per cent of this is utilized¹¹, so the harvest of small farmers depends entirely on the weather gods. The fields are ploughed using oxen, and both the sowing and harvesting are carried out by hand. Agriculture



PHOTO MIKKEL ØSTERGAARD

accounts for fifty per cent of Ethiopia's gross domestic product and generates ninety per cent of its revenue from exports.¹² Small-holder farmers produce ninety per cent of the total yield of the agricultural sector. Many produce food only for their own consumption.

In a normal harvest year more than seven million Ethiopians receive assistance in the form of food or cash through the Government's Productive Safety Net Programme because they are unable to provide for their families. If there are bad harvests or drought, significantly more than ten million people need help.

Due to Ethiopia's varied landscape the impact of climate change is not uniform across the country. Forty-five per cent of the country is defined as highland, i.e. mountainous areas which are at least 1,500 metres above sea level. Ras Dashen is the country's highest mountain at 4,543 metres. The lowest point in the country is the Danakil depression which lies 120 feet below sea level. The Ethiopian highlands are divided by the Rift Valley which is an extension of the Great East African Rift Valley¹³ which runs through several African countries. The climate in Ethiopia ranges from semi-dry desert in the



PHOTO MIKKEL ØSTERGAARD

lowlands, inhabited by pastoralists, to warm and humid in the south-western part of the country. The average annual rainfall ranges from over 2000mm in the south-west highlands to less than 300mm in the south-eastern and north-eastern lowlands. Temperatures range from less than fifteen degrees Celsius in the highlands to over twenty-five degrees Celsius in the lowlands.

The national program on how Ethiopia can adapt to climate change, NAPA¹⁴, states that repeated droughts, hunger and the recent floods are among the most serious problems affecting millions of Ethiopians almost every year. Changes in climate will only make the situation worse.

Fluctuating rainfall and rising temperatures

Daniel Kassahun, a well-known Ethiopian environmental scientist from the Forum for Social Studies in Addis Ababa, carried out a review in March 2008 of the documented information on climate change in Ethiopia and its possible consequences.¹⁵



Measurements taken from Ethiopian meteorological stations show that the annual volume of rainfall over the past fifty-five years has remained more or less constant when looking at the average for the whole country across the period 1951-2006.¹⁶ However, if one looks at how rainfall is distributed across the country, there is a marked difference: there is a tendency for less rain to fall in the northern part of the country where there is already massive environmental degradation. The same trend can be observed in the south-east and north-east of the country which are both often affected by drought. However, in central Ethiopia where most of the population and the country's livestock are located, and where the soil is severely depleted and degraded, more rain is falling. The western and north-western parts of the country have also received more rain.

Several studies conducted by both development organizations and research institutions support this development. Farmers and pastoralists are experiencing that the rain is becoming more unpredictable - or is failing to appear at all. In some places the rain falls more heavily and the degraded soil is unable to absorb this rain which falls over a shorter period. According to Kassahun, the farmers in the central part of the country have lost up to 150 tons of soil per hectare. The rains wash away the topsoil, which helps to make the soil fertile. In total, Ethiopia loses three billion tons of humus soil annually due to erosion.¹⁷

It is not only the rainfall distribution that has changed in Ethiopia. According to the national program for how Ethiopia can adapt to climate change, it has also become warmer in the last fifty-five years. The minimum temperature has increased by approximately 0.37 degrees Celsius per decade between 1951 and 2006.

The rise in temperature and fluctuations in rainfall create many

problems in Ethiopia. It is hardest for the smallholder farmers, who are totally dependent on the rain falling at the right time and in the right quantities, and for the pastoralists who live in the already drought-stricken areas which are receiving less and less rain. In several places the pastoralists have already switched from cattle to goats and camels, as they are more able to endure the long periods of drought. But what happens when there is not even enough water for camels to survive? There will be no animal left that a pastoralist can tend under the extreme weather conditions predicted.

In the central part of the country more rain will mean

FARMERS AND PASTORALISTS FEEL THE CLIMATE CHANGE

In autumn 2008 DanChurchAid investigated whether the farmers and pastoralists in four of the organization's work areas in Ethiopia have experienced that the climate has changed. Through focusgroupinterviewsandquestionnaires of a total of eighty-six households drawn from two counties in the Amhara Region in the Ethiopian highlands and two counties in the lowlands in the Oromiya Region, a very clear picture emerged of how people are experiencing climate change: 94.75% of respondents believe that the temperature has risen over the years; 93.25% believe that it no longer rains as often as before and that rain patterns have changed.

People in all four counties have experienced that there is less water for both humans and animals. Rivers, streams and traditional wells have run dry over a number of years. The respondents associate the development with changes

in rainfall patterns and the intensity of the rain. The people's observations were confirmed by public employees in agriculture, water and health departments.

RAINY SEASONS ARE CHANGING

The short rain, Belg, which used to come from late February to mid May depending on location, instead arrives now in June and doesn't stay for long. This change has happened since 2005 in the two counties in the Amhara Region where peasants live by agriculture.

The long rainy season, Kiremt, which normally begins in June and ends in September/October has also changed. It starts later, stops earlier – and is more intense.

"There isn't much rain in the long rainy season anymore. In the past trees grew very easily, but today they don't grow at all," says 55-year-old farmer Adefiris Yilma, who lives with his 9-year-old

further erosion of the soil and lower crop yields for smallholder farmers. The extra rainfall that the depleted soil is unable to retain can also affect water levels in rivers leading to flooding in the more low-lying areas. According to the authorities, floods in 2006 cost the lives of more than six hundred people with two hundred and fifty people reported missing. Over twenty thousand people were driven from their homes and thousands of livestock drowned.

A survey carried out by a leading national environmental organization, Forum for Environment, shows that the frequency and intensity of floods has increased in Ethiopia, particularly in the last thirty years.

daughter in Mida Woremo County – one of the two counties surveyed in the Amhara Region.

Changes in rainfall patterns have resulted in longer periods of drought, causing a reduction in food production for both humans and animals. In Kokossa, in the Oromiya Region in the lowlands, people have experienced drought and shortage of pasture for animals since 2006. The number of cattle has fallen and therefore even more people in the two counties surveyed in Oromiya Region are having to seek aid.

"New and strange diseases have arisen in our area because rainfall patterns have changed. It is drought that makes our animals vulnerable to disease," says 67-year-old Bure Bulbulo from Kokossa County.

In Kokossa, groundwater used to be found three feet down. People must now bore right down to forty-five feet to find

water. The lack of rain and higher temperatures also mean a smaller harvest of the local crop, enset. More children are now malnourished.

"When I compare the situation today with before, the climate has changed. This area was very productive in the past. Climate change has affected my family for the last six years," says Bure Bulbulo.

In order to survive, the family have had to sell everything they owned. Today Bure Bulbulo earns money by fetching water and selling it for a few birr. His two eldest sons have left the area to find work.

"We haven't been able to save any of our food for the bad times because we never have any food to spare," said Bure Bulbulo, who says that the area is now affected by drought every second year.

SOURCE MILLION BEKELE, RURAL POOR'S PERCEPTIONS OF THE TRENDS AND RELATIONS OF CLIMATE CHANGE, HUNGER AND POVERTY, DANChurchaid, 2008

Environmental scientist Daniel Kassahun notes that climate change can affect how long the farmers have to grow their crops. There is already a great demand for improved seed which is more drought resistant, and for seeds which mature faster as the rains have become more unpredictable and shorter in some places. In addition, warmer weather provides better growing conditions for pests and other diseases that attack crops and destroy the farmers' harvests.

Gloomy outlook

On the first floor of a rundown building in the centre of Addis Ababa sits Gebru Jember, acting head of Ethiopia's National Meteorological Institute Research Department. On his computer he shows me the different graphs that illustrate how the climate has changed in Ethiopia. I ask him whether there is anything new in the trends. Haven't the rainy seasons always been unstable, and hasn't Ethiopia always had droughts? He concedes that rainy times vary - particularly the Belg rain which arrives in the spring months - but the rain has, nevertheless, become much more unpredictable.

"Just one failed rainy season will have implications for small farmers who can't feed their own family for a whole year," he explains.

Different crops have a set maturation period and require a certain amount of rain during this period to give the best yield, he enlarges. If the rain starts later, is more intense or of shorter duration, the farmers have problems.

Gebru Jember says that as the temperature increases, extreme weather events become more frequent.

"Droughts and floods in Ethiopia are nothing new, but it is the frequency that is important. Back in the fifties we had a drought once every ten years. Then it became once every seven years, once every five years, and now we have a drought every second to third year," says Gebru Jember.

Drought-stricken areas will be more frequently affected by

drought in the future. Arid and semi-arid areas in Ethiopia's lowlands will also expand, reckons Gebru Jember.

Moreover, flooding will also occur more frequently in areas already prone to flooding.

"We get maybe 100mm rainfall in one day. This will result in flash floods and destroy agricultural production."

The changing climate doesn't only have implications for the people of Ethiopia. It also affects the country's many natural resources, which the people are dependent on for survival. According to Daniel Kassahun, the increase in temperature has consequences for Ethiopia's many ecosystems. Important wetlands which have a key function in relation to preventing soil erosion, water storage, refilling groundwater layers and reducing flooding in low-lying areas, will be vulnerable when the temperature rises. Ethiopia's wetlands cover about two per cent of the country and are mainly in the south-west, where several rivers originate. As temperatures rise, more and more water evaporates from the wetlands, whose existence is thereby threatened, argues Kassahun.

Adequate studies of how climate change will affect Ethiopia's rich water resources have yet to be carried out. There are four major rivers in Ethiopia: the Blue Nile, the Omo, the Awash and the Wabe Shebelle. There are twelve reservoirs. Most rivers flowing from these reservoirs cross borders. According to Daniel Kassahun, climate change will lead to water shortages which, in the case of the river

HIGHER TEMPERATURES AND MORE RAIN

>> According to a projection based on the IPCC's moderate scenario A1B, the annual average temperature in Ethiopia will increase by 0.9–1.1 degrees Celsius by 2030, and by 2.7–3.4 degrees Celsius by 2080, relative to the 1961–1990 mean.

>> The amount of rain will increase by 0.1–6.1% by 2030 and by 0.3–18.9% by 2080, relative to the 1961–1990 mean.

SOURCE CLIMATE CHANGE NATIONAL ADAPTATION PROGRAMME OF ACTION (NAPA) OF ETHIOPIA, MINISTRY OF WATER RESOURCES, NATIONAL METEOROLOGICAL AGENCY, ADDIS ABABA ETHIOPIA, JUNE 2007

Awash, mean that it will lose between ten and thirty-three per cent of its volume. Several lakes in the main Rift Valley have also shrunk, in part due to climate change according to Kassahun.

Ethiopian mountain ecosystems are also affected by climate change. Plants and animals that can only live in these areas may vanish if temperatures continue to rise. Up to seventy-five per cent of Ethiopian species are in danger of migrating because of climate change, Kassahun writes. However, a warmer climate will also make it possible to grow crops in the highlands, crops previously unable to survive in the frost and cold.

Poverty and population growth make the situation worse

Many factors in Ethiopia are contributing to the deterioration of the local climate and making the population ever more vulnerable to global and regional climate change. Widespread poverty is undoubtedly one of the principal causes.

"While the cause of most disasters is related to climate, unrestricted human activity and poverty have contributed to destroying the environment and aggravating the situation," acknowledged the Ethiopian authorities in the National Adaptation Programme of Action (NAPA).

Ethiopia has lost ninety per cent of its original forest during the last fifty years. Today the forest covers less than three per cent of the country, so the soil has become more vulnerable to erosion.¹⁸ People cut down the forest to create more farmland and to harvest firewood for cooking. Ethiopia's explosive population growth is an important factor aggravating the situation. If population growth continues at the same pace, Ethiopia's current population of 78.14 million people will double by 2035! Population growth will put pressure on the already degraded soil, and marginal plots will be brought into use. Pastoralists will lose grazing for animals because large areas will be seized for traditional farming or to accommodate expanding cities.

The drive from the Ethiopian capital Addis Ababa to Kone, where Kassa's family lives, illustrates the challenges climate change is

imposing on people in a poor country like Ethiopia. In the capital city, located at an altitude of 2,400 metres, there is a marked development underway. The country's impressive growth was at 11.6% GDP in constant prices in 2007/08 according to the National Bank.¹⁹ You can hear the noise from new construction sites everywhere; new hotels and offices are springing up like mushrooms. From my window at home, even on a Sunday, I can see people climbing around on the homemade scaffoldings of wooden poles that surround building works like cobwebs.

Around churches in particular, and the large shopping centres on Bole Road you meet beggars with all sorts of disabilities. One young man can only move forward by using his arms. His legs are shrunken - or perhaps they never developed. They are like two small dead stumps that trail behind his body when he moves. Mothers with young children in their arms stand with pleading eyes, hoping to get a little money. They look searchingly through the windows of the cars waiting in line. The many beggars mingle with the crowds of smart young Ethiopians and business people frequenting the many cafés where they are served macchiato and home-made cakes.

A steady stream of blue Ladas, ready for the scrapheap, rattle along the worn roads, but there are also newer Chinese cars on the street, and large SUVs belonging to the many development organizations and UN officials working in the capital. I've even spotted a Hummer, the world's worst gas-guzzler, which sped off on one of the Chinese-built bypass roads that wind around the capital's slums.

It's obvious that Addis Ababa is a great city in a developing country - especially when the road past our office is blocked by herds of cattle which are being driven to the slaughterhouse further along the street. All traffic stops but the traffic police do nothing. Donkeys and sheep on the pavement or in the road is not an unusual sight in the capital. A few kilometres outside of Addis Ababa the poverty becomes conspicuous.

The stream of cars thins out and is replaced by what looks like

DESPERATE PASTORALISTS



PHOTO MALENE HAAKANSSON

Autumn 2008. I'm visiting the Dawe Kechen district in Ethiopia's southern Oromiya Region. In the past few years there has been very little or no rain in the district. Animals die every year but when I visit it's particularly bad. Local authorities tell me that animals are dying either from starvation or because they are so weakened that they are unable to tolerate the weather changes when the rainy season begins.

In the local school in the village of Meo you can clearly see when families in the region have food. The school only has pupils in the autumn when the rain falls.

a migration: people on their way to and from work on foot because they can't afford to pay the few birr that it costs to take one of the blue minibuses. The capital's colourful buildings with several stories are replaced by simply built, two-room houses with tin roofs. These, in turn, give way to mud huts with thatched roofs the farther you drive from the capital. The road, which at first was asphalt, becomes a gravel road, then asphalt and then gravel again, depending on how far the Chinese contractors have got in improving the road as it winds its way up through the mountains.

The vast majority of the steep mountain slopes are used for agriculture, although the soil quickly becomes degraded when trees and shrubs are cut down. In several places you can see green terraces

"The number of pupils drops from one hundred and twenty-three to between fifty and eighty in the dry season," says head teacher Shelema Bekele from Meo village elementary school.

Families in the region typically move with their animals to the river Weyh, which is six hours walk from Meo. The river lies in a deep ravine but is the only option for finding water for both animals and humans. During the rainy season, which can last for a few days, the people, who are desperate with thirst after waiting so long, drink water from puddles and polluted water holes.

While I am there residents in Dawe Kechen district receive both emergency aid and help from Ethiopia's Safety Net – the aid reaches far out to those who have need of it.

I visit a herding family of seven who have lost all their livestock except for one cow and two goats. Not far from the family hut are the remains of the family's last cow, which died of hunger. The stench is unbearable. Even though all that remains are bones, flies buzz merrily around the carcass. The only remaining cow stands in the family's field. Ribs protrude under the slack, thin skin. It is only a matter of time before it, too, succumbs.

Although the dry, red soil is not suited to growing crops, the father, Mamud, has tried anyway. With a rod he shows me how he has made holes in the ground, holes into which he has thrown the grain which his family has received as aid.

which look almost as though they have been inserted between the brown rocks. The terraces help to stop soil erosion when the rain starts.

In the valleys the farmers have harvested tef, the grain Ethiopians use to make their national food, injera. The harvest is transported home by anything that has two or four legs. Men and women carry haystacks on their backs, so large that their faces almost disappear in the hay. Donkeys, and even camels, are used to bring the harvest in. Sorghum, which is a kind of millet, stands tall and straight in the fields. The harvest is so important to the farmers that they have placed their own children as living scarecrows on a platform, set on a pole, in the middle of the field. From this vantage

point the children throw stones at the birds and other animals that want to scavenge the precious crop.

The road continues up through the mountains. In several places the mountains are devoid of anything green. Trees and shrubs have been cut down and the barren land left desolate. We are entering the Wollo district which is Ethiopia's infamous hunger area. We are at an elevation of 2,470 metres in the town of Dessie. The last part of the way up to Kone winds, snakelike, up a steep cliff. Old buses cough their way slowly up the road.

Smiling, weathered faces meet us at the top. The children wave. It is completely flat with rocks dotted about everywhere. The round huts are no longer built of mud but of stones stacked on top of each other. My colleague in the car says that these houses are ice cold inside. Wherever the rocks have left a little room for it, farmers have ploughed the soil, even though it is riddled with stones. The small fields are of all shapes and kinds. On the parched, yellow grasslands goats, sheep and cattle strain to get the last blade of grass. From the main road we turn towards Kone where the soil appears a little better. There are fewer stones and it is planted with tall eucalyptus trees along the road.