

# Climate change, from scarcity to conflict

Research report ZOA



Desirée van Kooten, MSc.  
Joël Voordewind, MSc.

## Foreword

There is no question that the consequences of climate change are becoming increasingly tangible, noticeable and visible. This report stresses that the most vulnerable on this earth are the most affected. Once again, they get the bill for the ideals of prosperity and progress that are achieved by exploiting nature and climate.

In 2023 it will be 50 years since ZOA was founded - by a group of people who were touched by the problems in the world. They were driven by a passion for those who suffer and the belief that by taking action we can make a difference. The problems have grown far more complex over the last 50 years. The relationship between climate change and conflict, as it is described in this report, requires an approach that consciously addresses the consequences of climate change. That takes much effort and flexibility, but the examples in the report illustrate that it is possible.

At ZOA, we are still driven by that same passion and belief as 50 years ago. We have learned much and are still learning every day. One of these lessons is the importance of only developing our initiatives in close cooperation and partnership with those for whom our organisation was founded. They experience first-hand what it is like to be confronted with shortage, inequality and conflict. Through these experiences, they developed a degree of insight and resilience that is critical to arriving at interventions that are relevant and effective. Together with them, we are motivated to address the consequences of climate change. With the aim of enabling people to lead a dignified life, in peaceful coexistence with each other.

Edwin Visser, Chief Programme Officer ZOA

June, 2022

## Table of contents

Foreword.....	3
Table of contents .....	4
1. Introduction .....	5
<i>Objectives</i> .....	5
<i>Climate resilience</i> .....	6
2. The consequences of climate change .....	7
<i>Alarm bell</i> .....	7
3. Conflicts amplified by climate change.....	10
<i>Examples of conflict</i> .....	11
<i>Climate change in ZOA’s field of work</i> .....	12
4. Climate resilience: ZOA’s approach.....	14
<i>Disaster Risk Reduction</i> .....	14
Integration DRR into ZOA’s work .....	15
<i>Climate-adaptive methods</i> .....	16
Climate-Smart Agriculture.....	17
Integrated Water Resource Management .....	18
Joint Natural Resource Management .....	18
Green Jobs.....	19
5. Climate-adaptive methods in practice .....	20
<i>ZOA is here in Iraq</i> .....	20
Climate change as a cause of terrorism .....	20
ZOA’s work in Anbar and Nineveh .....	21
After ISIS: The women’s gardens .....	23
<i>ZOA is here in Sudan</i> .....	24
Hyperinflation and conflict.....	24
IWRM and peace in Sudan .....	25
Joint Natural Resource Management and conflict resolution for peace in Darfur .....	25
Peacebuilding and better crops .....	27
<i>ZOA is here in Ethiopia</i> .....	28
Food scarcity in Oromia .....	28
Emergency aid in Oromia.....	28
Green Jobs for a new opportunity .....	29
No life without livestock .....	31
6. Conclusion .....	32
<i>What to do?</i> .....	32
<i>In closing</i> .....	33
7. Reference list .....	34

## 1. Introduction

**Climate change. We are dealing with it all over the world. The earth is warming up as a result of human activity. Increasing greenhouse gas emissions are causing temperatures to rise and rain patterns to change. One region gets wetter, another gets dryer. Extreme rainfall is leading to more floods. Rapidly growing numbers of people are forced to take flight. Sometimes this is in direct response to natural disasters, sometimes it is due to the many conflicts that are caused by climate change. Vulnerable people in fragile states are hit hard by the consequences of climate change.**

Many of the world's most climate-vulnerable countries also suffer from long-term humanitarian crises due to conflict, displacement and economic vulnerability. Climate change amplifies already existing humanitarian crises, with serious consequences for the most vulnerable people, economies and ecosystems, according to the International Institute for Environment and Development.<sup>1</sup> Women, girls and refugees are hit the hardest. People lose their houses and livelihoods through droughts and flooding. As a result, many become displaced. Crops produce as much as before, but the population continues to grow. Growing scarcity forces people to take flight in order to survive.

It is no coincidence that the poorest population groups are the most affected by climate change. They live in the low-quality housing in the most vulnerable places, such as low-lying areas that are flooded first when water levels rise. Furthermore, people who live in poverty often depend on a single source of income. If that is lost due to changing climate conditions, they have little left to live on. That is how extreme weather causes poverty and insecurity to grow. The resources available to vulnerable people to protect themselves against such risks are becoming increasingly exhausted.

### Objectives

The world appears to have now become aware of the problem. International organisations and climate conferences are discussing objectives to combat climate change. The 13<sup>th</sup> goal of the Sustainable Development Goals<sup>2</sup> of the United Nations (UN) calls on governments to combat climate change by lowering emissions of CO<sub>2</sub> and methane, the two leading causes of global warming. Emissions of these greenhouse gases must be reduced by 95 percent by 2050.

In order to achieve these goals, 50 countries made firm commitments during the Climate Change Conference (COP26) in October 2021 in Glasgow.<sup>3</sup> They agreed that the reduction of emissions of greenhouse gases must be accelerated and that the use of coal and subsidies for fossil fuels must be reduced. It was the first time these topics made it into the final text. The countries also agreed to invest in green energy, electric cars and sustainable agriculture. Also, deforestation must be put to an end by 2030. Unfortunately, the topics of reducing the effects of climate and becoming more resilient against them did not get much attention in Glasgow. This is exactly what ZOA is working on.

---

<sup>1</sup> International Institute for Environment and Development, Humanitarian action is part of climate response - but must be early and locally led (2021). Accessed 19 May 2022. <https://www.iied.org/tackling-climate-change-fragile-states-protracted-crisis-situations>

<sup>2</sup> For more information on SDG 13 see <https://unric.org/nl/duurzame-ontwikkelingsdoelstellingen/sdg-13/>

<sup>3</sup> UN Climate Change Conference Glasgow 2021.

## Climate resilience

How can local communities in developing countries increase their resilience and adaptability to the new and unpredictable circumstances? ZOA focuses on addressing the root causes of migration and conflict, by making people resilient to climate change. Therefore, climate resilience is a priority in ZOA's new long-term policies (2023 - 2026).

What are the effects of the warming of the earth that ZOA sees in our field of work? How does climate change amplify conflicts and migration? How can we support vulnerable people who are directly impacted by the negative consequences of climate change? And what role does ZOA play in increasing their resilience and adaptability? These questions are at the heart of this report.

First, the consequences of climate change for people in fragile states are described. Next, the report provides insights into the dire consequences of changing weather conditions in the places where ZOA works. ZOA witnesses these consequences with a heavy heart. Chapter 4 describes how ZOA focuses on adaptive methods to minimise the negative impact of climate change. The last chapter uses three case studies from the field to illustrate how this works in practice. This is followed by the conclusion.



Photo: Drought in Ethiopia

## 2. The consequences of climate change

**Much has already been written, researched and discussed regarding the consequences of climate change. The impact on the global population is enormous, particularly for those who are most vulnerable. The earth is warming due to increasing greenhouse gas emissions. This not only causes dry periods to last longer, it also makes wet periods more intense. For example, the number of heavy storms is increasing. The annual cycle of seasons, with alternating dry and wet periods, is disrupted and becomes unpredictable.**

The Intergovernmental Panel on Climate Change's (IPCC) report *AR6 Climate Change 2021* of the UN<sup>4</sup> lists the worldwide consequences of the rising temperature of the earth:

- More flooding because the sea level is rising
- Food shortages in regions that are becoming drier, resulting in hunger and malnourishment
- Shortage of drinking water and water for irrigation
- Decrease in biodiversity because species of plants and animals go extinct
- Coral reefs threatened with extinction, with negative consequences for fishes and plants
- More forest fires and more deserts
- Chance of more and longer heatwaves, with a particular threat to the elderly and other vulnerable groups.

Poor, tropical regions in particular will suffer from climate change, says the UN. Problems like water shortages, flooding, sickness and meager harvests will emerge. Climate change affects people in very personal ways. People lose their harvest through drought, which may lead to hunger. While one place may have too little water, another place may have too much. Floods can mean that dry or recently saturated soil cannot retain water or that fruitful soil is washed away. Densely populated coastal areas and river deltas in poor countries are particularly vulnerable. It is precisely these countries that do not have the money or the technology to adapt to climate change, according to the IPCC report. Therefore, people are forced to flee. The manner in which they lived and worked in a place for decades has become insecure.

### Alarm bell

The latest IPCC report (2022) sounds the alarm. "If governments worldwide do not tighten up their energy policies by limiting the use of fossil fuels, improving energy efficiency and promoting the use of alternative energy sources, the world will become uninhabitable. It is a question of now or never to limit the warming of the earth to 1.5°C. We are on track for a warming of the earth that is over twice as high as this limit. To prevent an even worse outcome, it is necessary to reduce worldwide emissions of greenhouse gases by 43 percent by 2030," the report says.<sup>5</sup>

The first climate report from the Biden administration, *Report on the Impact of Climate Change on Migration*, says the following: "Extreme weather events and conflict are the top two drivers of forced displacement globally, together responsible for the annual movement of nearly 30 million people from their homes. There is a strong correlation between countries and regions most vulnerable to climate change and those that are fragile and/or

---

<sup>4</sup> Intergovernmental Panel on Climate Change, *Climate Change 2021: Mitigation of Climate Change (2021)*.

<sup>5</sup> Intergovernmental Panel on Climate Change, *Climate Change 2022: Mitigation of Climate Change (2022)*.  
[https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_FinalDraft\\_FullReport.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf)

experiencing conflict or violence. Climate-related impacts may further stress vulnerable communities, increasing the risk of conflict and displacement in the absence of effective prevention efforts, and vice versa.”<sup>6</sup>

The report goes on to explain how climate change can cause or exacerbate the scarcity of resources. This can lead directly to conflicts, but also to migration by vulnerable groups that look for safety or livelihoods in another place. Moreover, there is significant overlap between changes in biodiversity and climate change. This can also impact migration and threaten food security and economic security. The displacement of large numbers of people, whether forced or voluntary, brings new groups into contact with each other. This can cause shifts in the balance of power. This can, in turn, generate fears over the scarcity of resources or tensions between previously separated groups. The destabilising effects of climate change have far-reaching consequences on an even larger scale, says the White House report. This is the case whenever climate-related migrations take place within or near densely populated areas or at locations that are important for political or economic stability, such as the coastal regions of many countries.

## Extreme hunger and migration

The report *The Climate Crisis, Migration, and Refugees* warns that extreme, sudden weather conditions, like Cyclone Idai in Mozambique, are occurring more frequently.<sup>7</sup> The storm forced 146,000 people to flee. Moreover, 100,000 houses, 1 million hectares of crops and infrastructure worth 1 billion dollars were destroyed. Severe weather conditions cause international challenges, including large-scale migration due to scarcity; extreme weather conditions particularly in developing countries around the equator; intensification of intrastate and interstate rivalries for food, water and other resources, particularly in the Middle East and North Africa; and more frequent and more serious outbreaks of diseases.

In *The Global Report on Food Crises*, the Global Network Against Food Crises indicates that 113 million people worldwide were facing acute food insecurity in 2018.<sup>8</sup> Acute food insecurity occurs when a person has no possibility to consume sufficient food, which puts their life at immediate risk. This means extreme hunger. Three years later, in 2021, 155 million people were in this situation. Of these, 133,000 people were in such a serious state of starvation that acute help was a matter of life and death. The deteriorating food situation reflects the worsening of humanitarian emergencies in some of the ten biggest food crises, particularly in the Democratic Republic of Congo, Ethiopia, Nigeria, Yemen and Sudan.

According to UNHCR,<sup>9</sup> the deadly mix of conflict, the COVID-19 pandemic, poverty, food insecurity and the climate crisis has made the perilous situation of refugees even worse. Most of them are received in their own regions. In 2021, more than 84 million people fled due to climate disasters, conflicts and violence, according to the UN Refugee Agency. Of these, 35 million were received outside their own national borders. The latest figures show that for the first time over 100 million have fled worldwide, including 59 million who are displaced from their own country. Ongoing conflicts as well as new conflicts, like the one in Ukraine, are causing this increase.<sup>10</sup> This is an unprecedented increase compared to a year earlier. To date, this mobility was mostly within national

---

<sup>6</sup> The White House, *Report on the impact of Climate Change on Migration* (Washington 2021) 7.

<sup>7</sup> John Podesta, *The Climate Crisis, Migration, and Refugees* - Prepared for the 2019 Brookings Blum Roundtable (2021) 1.  
<https://www.brookings.edu/research/the-climate-crisis-migration-and-refugees>

<sup>8</sup> FSIN and Global Network Against Food Crises, *Global Report on Food Crises* (Rome 2021) 14.

<sup>9</sup> UN Refugee Agency.

<sup>10</sup> *Nederlands Dagblad*, “Grimmig record: honderd miljoen vluchtelingen” (23 May 2022).

boundaries, with a growing number of displaced persons and refugees traveling to cities. Most of the people who flee or migrate due to climate effects stay in their country of origin.<sup>11</sup>

The increasing amount of migration worldwide, in connection with climate change, is leading to more migration outside national borders, particularly in cases where climate change is coupled with conflicts and violence.<sup>12</sup> The UNHCR also states that between 2008 and 2016 an average of 21.5 million people per year were displaced due to climate change.<sup>13</sup>

The *Groundswell Report* from 2020 concurs that there was a gigantic increase in the number of climate refugees. The report states that - without any interventions - in 2050 there will be 216 million refugees, particularly in Sub-Saharan Africa, but also in South Asia and Latin America.<sup>14</sup> The International Federation of Red Cross and Red Crescent Societies predicted in 2019 that - without acute interventions - climate change will render 200 million people dependent on humanitarian assistance by 2050.<sup>15</sup> The reports cited above discuss high numbers of expected climate refugees. A further increase in climate change means enormous growth in the number of climate refugees. This is a global problem.



Photo: Refugee camp in Nigeria

<sup>11</sup> UNHCR, *Mid-Year Trends 2021* (2021), 9.

<sup>12</sup> The White House, *Report on the impact of Climate Change on Migration* (Washington 2021) 7.

<sup>13</sup> UNHCR, *Frequently asked questions on climate change and disaster displacement*, (accessed 12 May 2022).

<https://www.unhcr.org/enus/news/latest/2016/11/581f52dc4/frequently-asked-questions-climate-change-disaster-displacement.html>

<sup>14</sup> V. Clement, K. K. Rigaud, A. de Sherbinin, e.a., *Groundswell Part 2 : Acting on Internal Climate Migration* (World Bank, Washington, DC 2021).

<sup>15</sup> The International Federation of Red Cross and Red Crescent Societies, *The Cost of Doing Nothing the Humanitarian Price of Climate Change and How It Can Be Avoided* (2019). <https://reliefweb.int/sites/reliefweb.int/files/resources/2019-IFRC-CODN-EN%20%281%29.pdf>

### 3. Conflicts amplified by climate change

**A sizeable portion of the population in the countries where ZOA works is dependent on farming. Climate change has made the weather unpredictable and the risk of crop failure has increased significantly due to things like irregular starts to the rain season, drought or flooding. Pre-existing problems in these fragile regions - such as a lack of food or water or ethnic tensions - are amplified and exacerbated.**

The impact of climate change on fragile regions is directly reflected in the places where ZOA works. For example, there is ongoing famine in Yemen due to drought and conflict, and extreme drought and corresponding hunger in Ethiopia. Over the past three years, South Sudan has had to deal with repeated destructive flooding. In Colombia, there is a drought and this causes increasing salinisation of groundwater. La Guajira, the desert region in the north of Colombia, is highly sensitive to climate change and has seen long periods of drought coupled with extreme weather conditions. In Acholi, Uganda, young people are unable to conduct subsistence farming due to a lack of technical knowledge, poverty and increased pressure from climate change and changing weather patterns.

In many countries and regions where ZOA works, climate change fuels local and/or national conflicts. Inge Vos, ZOA's expert on Livelihoods & Food Security, says climate change makes it increasingly difficult for crop farmers to support themselves. "Livestock farmers also suffer the direct consequences," she says. "Drought means there are fewer pastures and also less drinking water for the livestock. As a result, too many animals come to the places where there is still food and water, and the pastures there also get overgrazed. This leads to conflicts between crop farmers over the use of ever-scarcer water." She says the lack of water forces livestock farmers, for example in Sudan, to move to other grazing grounds earlier in the year than they used to. "This hurts the harvest because the fields are not yet harvested then," says Vos. "This leads to local conflicts which we have seen in places like Nigeria between the Fulani shepherds and the local farmers. As a result, we see a growing need for conflict prevention and mediation between the settlements and host communities."

Then UN World Food Programme says the climate crisis is a threat multiplier that amplifies conflicts, causes displacement and exacerbates social tensions. In 2020, 30 million people were displaced due to extreme weather conditions, three times more than due to conflicts. According to professor and researcher Vally Koubi,<sup>16</sup> there is a large consensus that climate change contributes to conflicts in certain circumstances and in certain ways. "The literature shows that climatological circumstances cause conflicts in fertile regions: in regions that depend on agriculture and in combination and interaction with other socio-economic and political factors like a low level of economic development and political marginalisation. Climate change can lead to a large number of people fleeing their homes. The influx of large numbers of "climate refugees" will put pressure on the economies of the places that receive them, exacerbating struggles over scarce resources. Migrants and residents may, for example, compete with each other for land, jobs, medical care, education and social services. Moreover, migration due to climate change can lead to conflicts by inflaming ethnic tensions that arise when migrants and residents belong to different ethnic-cultural groups and the arrival of newcomers upsets an already unstable political balance."<sup>17</sup>

<sup>16</sup> Vally Koubi is a Professor (Titular) and Senior Scientist at the Center for Comparative and International Studies (CIS) at the Swiss Federal Institute of Technology Zurich (ETH), and a Professor at the Institute of Economics at the University of Bern, Switzerland.

<sup>17</sup> V. Koubi. Annual Review of Political Science, Climate Change and Conflict (2019).  
<https://www.annualreviews.org/doi/pdf/10.1146/annurev-polisci-050317-070830>

## Examples of conflict

ZOA works in 14 countries worldwide in the most vulnerable regions where people take flight due to conflicts and/or natural disasters. In many places where ZOA works war has been waged for years already, like in South Sudan. Joop Teeuwen, who until recently served as ZOA's country director for South Sudan, sees the consequences of climate change becoming ever pronounced in the growing number of food shortages. "According to older South Sudanese people that we speak to, the flooding of 2019/20 and 2020/21 was the worst in 50 years," he says. "The floods are part of the reason for the food shortage because the fertile soil is washed away by the water. Also, seeds and crops are washed away or rendered unusable by all the water. And another cause of food shortages is that many people are too afraid to go out and work their land. It happens often enough that groups of men will steal the harvest."

People do not shy away from violence to feed their families. At the start of 2022, Tom Middendorp published his new book *Klimaatgeneraal – Bouwen aan weerbaarheid* (Climate General: Building up Resilience.)<sup>18</sup> In this book, he explains how climate change and conflict are linked. To a large extent, this matches what ZOA personnel observe in the field. How does climate change exacerbate conflicts or participation in terrorism? Middendorp gives three examples:

**Afghanistan:** Drought and the destruction of irrigation works cause conflicts over water access between different warlords in parts of Afghanistan. Over three-fourths of the population depends on agriculture. Agriculture is crucial for the food security of many Afghans. The draining of ground water in higher areas has direct consequences for the farmland downstream. Middendorp observed this in the village of Chora. Heavy fighting continued for days when the Taliban attacked the village. "After a long and intense battle, the people managed to drive away the Taliban, but that does not mean the problems have disappeared," he writes in *Klimaatgeneraal*. It turned out that tensions subsided only after the people reached agreements about water for drinking and particularly for irrigation. "That removed a breeding ground for the Taliban in that region. They used water scarcity to play people off against each other, as well as to blackmail and recruit," writes Middendorp. He concludes that water shortages cause local conflicts all over Afghanistan and that they serve as a breeding ground for extremism. ZOA has been active with rebuilding projects in Afghanistan for almost 20 years, and the destructive consequences of war are readily apparent.

**Somalia:** The Gulf of Aden suffers from piracy out of Somalia. Due to persistent drought and rising food prices, young people who cannot get work in farming are vulnerable to taking part in piracy. At the same time, large fishing boats from other countries remove large quantities of fish from the Somalian coast. This means, in combination with the lack of a functioning government since 1991 and locust plagues, that the country is suffering from successive famines. According to the UN, 40 percent of the population needs food assistance. Al-Shabaab, the Islamic extremist terrorist group, profits from the famines. Members of this organisation present themselves as aid workers in regions that are not under the control of the government and, thus, obtain support from the local population. Parents have to give up their children to join the fighting. Meanwhile, the protection of international merchant vessels has improved considerably, but the root causes of poverty and terror have not been addressed. Climate change, as it brings more droughts and sometimes major flooding, causes the country to sink further into a swamp of terror and chaos. At the moment, ZOA is not working in Somalia.

**Iraq:** In Iraq, the terrorist groups Al-Qaeda and ISIS did not appear out of thin air. Farming in Iraq has been deteriorating for decades. Under Saddam Hussein, much water was removed for oil production. Farming was neglected. Oil produced 90 percent of government revenues. This also created a breeding ground for young

---

<sup>18</sup> T. Middendorp, *Klimaatgeneraal - Bouwen aan weerbaarheid*. (2022).

people who through persistent drought, neglect of farming, and discrimination against Shiites were susceptible to recruitment by militias. These groups paid them more than what they could earn via farming. Moreover, as fighters they acquired more status. This led to the civil war that forced millions of people to take flight, including 2 million who went abroad. When the Shiites took power, a breeding ground developed on the other side. This time for Sunnis for Al-Qaeda and ISIS. In some places, including the city of Mosul, they were initially welcomed as liberators. Middendorp describes this in his book.<sup>19</sup> “The supporters of ISIS grew partly due to the impact of climate change and water scarcity. When people have no prospects, they are vulnerable to ideologies that offer them hope and a way out and a better future. Terrorist groups take full advantage of this. This is how they succeed in recruiting many people.” ZOA is still active in Iraq with emergency relief and rebuilding, including in the areas of agriculture and the prevention of extremist violence by young people (see chapter 5).

## Climate change in ZOA’s field of work

Inge Vos, ZOA’s expert on Livelihoods & Food Security, makes it clear that conflicts and climate change are bound together in a vicious cycle. She says, “Farming has traditionally been one of the largest sources of employment where a relatively large number of women and young people work. In recent decades, the farming sector has deteriorated. Farmers are dealing with drought, plagues and a shortage of good-quality seeds. There is a lack of expertise for climate adaptability and sustainable farming methods. Farmers still see pesticides as the most important way to combat sicknesses and plagues and to improve soil fertility. As a result of weak supply chains, expired or unregistered pesticides as well as low-quality seeds are sold on the black market. Many information services do not function well because the funds, infrastructure and competent civil servants needed are not available. Farmers are faced with the consequences of climate change. Rain patterns change and become unpredictable, with increasing rainfall intensity and longer periods of drought.”

Both research and concrete examples show that there is a link between climate change, scarcity and increasing conflicts. Drought and water shortage exacerbate conflicts and also amplify them in certain circumstances. As scarcity can exacerbate conflicts, so conflicts can also lead to scarcity. Crop production can suffer as a result of conflicts, particularly as a result of labour unavailability. If farmers are forced to flee, they cannot work the land and crops are not harvested. Conflicts can leave fields that are strewn with unexploded ammunition. There is damage and loss due to plundering and the destruction of silos, storage and crop processing facilities. Seeds and fertilisers are lacking. During times of conflict, government support for the provision of resources, information and financial help all fall away.

---

<sup>19</sup> T. Middendorp, *Klimaatgeneraal - Bouwen aan weerbaarheid*. (2022).



Photo: Flooding in South Sudan



Photo: Drought in Ethiopia

## 4. Climate resilience: ZOA's approach

Farming is in desperate need of reform, particularly in climate sensitive parts of Africa. Investment is needed in crops that are more resilient to shorter growing seasons and drought. Next to this, it is crucial to improve and diversify the population's sources of income. Climate adaptation is essential to making families and communities resilient to current and future, sometimes predictable, changes. ZOA is implementing these innovative climate adjustments and risk mitigation strategies in our programmes.

### Disaster Risk Reduction

Disaster Risk Reduction (DRR) is focused on preventing new or reducing existing risk from disasters and the management of remaining risks. Such steps will contribute to strengthening resilience and thus the implementation of sustainable development. DRR reduces the negative impact of natural disaster by reducing vulnerability and exposure to their effects. Most deaths are caused by disasters that occur in conflict regions and fragile states. Moreover, the impact of a natural disaster on the livelihoods of the population is greater in conflict regions and fragile states. Despite this, international policy frameworks barely provide guidelines for dealing with natural disasters in conflict regions, according to Professor Dorothea Hillhorst.<sup>20</sup> They focus either exclusively on the conflict or exclusively on the natural disaster. The 16<sup>th</sup> goal of the Sustainable Development Goals of the UN is the only policy goal that acknowledges that natural disasters and conflicts exacerbate each other. In the meantime, new initiatives have been launched for an integrated approach to DRR in conflict regions. One example is the *Global Platform for DRR* in Geneva in 2019.<sup>21</sup>

Three principles are central to DRR

**Preparedness:** Governments, emergency aid and rebuilding organisations, communities and individuals stand ready with knowledge and capacity development. The goal is to be able to anticipate, react to and recover from the effects of possible future or current disasters as effectively as possible.

**Mitigation:** The limiting or minimising of negative consequences of a dangerous event. The adverse consequences of dangers often cannot be avoided altogether, but the worst of them can be limited by various strategies and actions. In the context of climate change, mitigation can be explained as the reduction of emissions of greenhouse gases as the source of climate change.

**Prevention:** Actions and measures to prevent new or pre-existing risks of disaster. Preventative measures can also be taken during or after a dangerous event or disaster to prevent secondary consequences like water contamination.<sup>22</sup>

As an emergency aid and rebuilding organisation, ZOA recognises the importance of implementing DRR initiatives. ZOA aims to support people who suffer due to armed conflicts or natural disasters and is committed to bringing real, tangible and lasting change for the people affected. Preventing disasters in the conflict-affected regions where ZOA works reinforces the need for an integrated approach to DRR in the projects.

---

<sup>20</sup> D. Hillhorst, *MOOC: Disaster Risk Reduction and humanitarian aid in conflict settings*, Erasmus University Rotterdam (Rotterdam 2020).  
<https://www.coursera.org/learn/whendisastermeetsconflict>

<sup>21</sup> See footnote 19.

<sup>22</sup> ZOA, *Disaster Risk Reduction Position Paper* (2021) 4.

## Integration DRR into ZOA's work

DRR principles are incorporated into the various sectors in which ZOA is active. For example, in the food-safety sector, ZOA focuses on strengthening communities and setting up savings groups, with a clear focus on Climate Smart Agriculture in the agricultural sector. ZOA also supports sustainable strategies and practices for the management of natural resources such as land, water and soil management, protection of biodiversity, energy efficiency and security of property rights. ZOA also adopts a DRR approach when it comes to providing shelter, for example, by making Build Back Better possible for communities affected by natural disasters, such as building earthquake-resistant homes in Indonesia.

Within the WASH sector (water, sanitation and hygiene), ZOA integrates DRR. For example, we do this by encouraging good hygiene practices, such as washing hands with soap to prevent the spread of diseases. In addition, latrines are being built to reduce the risk of a cholera outbreak, among other things. Through stronger health and the prevention of diseases, people are better protected and more resilient. Water can also be an opportunity for people to work together and is therefore an important tool for conflict prevention and peacebuilding. Peacebuilding clearly illustrates that natural disasters and climate change contribute to water and land conflicts. In this context, we are building capacity to deal with conflicts. Conflict has been shown to increase vulnerability to dangers from natural disasters. In addition to these sectors, ZOA is also working on establishing land rights, which limits disagreement and conflict over land ownership. Efforts are also being made to provide education and vocational training in which people learn how to recognise the signs of a disaster and initiate preventative measures.<sup>23</sup>

Including disaster-risk reduction as an integral part of projects offers ZOA a holistic and organic approach. The mitigation of the risk of disasters in different sectors can be enhanced this way through an integrated approach. This can make interventions more successful and sustainable. Some population groups are particularly hard hit during disasters due to physical, social, cultural, economic or legal barriers. DRR activities should be highly inclusive and calibrated to the way certain groups are affected, but they should also bear in mind that each group can contribute its own specific experiences and skills.<sup>24</sup>



Photo: Training in Iraq

<sup>23</sup> ZOA, Disaster Risk Reduction Position Paper (2021) 9-11.

<sup>24</sup> For more information about DRR, See ZOA's Disaster Risk Reduction Position Paper.

## Climate-adaptive methods

Various methods have been developed to respond to changes in living environments and the limitations that result from the negative consequences of climate change. In this report, we highlight four different methods that ZOA works with, the benefits of which are readily apparent:

- **Climate Smart Agriculture (CSA):** Changing the climate gradually requires adjustments in agriculture and livestock. Climate Smart Agriculture is an integrated approach to managing landscapes - crops, livestock, forests and fisheries - through which the interrelated challenges of food security and climate change are addressed.<sup>25</sup>
- **Integrated Water Resource Management (IWRM):** How can water use, in areas where water is scarce, be conducted more effectively by supporting relevant stakeholders? How can they come up with a water-management plan for their area together? This approach minimises water-related conflicts and increases resilience to climate change.<sup>26</sup>
- **Joint Natural Resource Management:** This approach is also known as “Prevention and Resolution of Natural Resource Based Conflicts.” Particularly in areas with a history of conflicts due to natural resources such as land and water, it is important to bring different groups together to make agreements about the use of land and water. Attention is given not only to conflicts in the past, but also to shared interests for the future.
- **Green Jobs:** Green Jobs involves the creation of direct employment in various sectors of the economy and also through related activities, thereby reducing the environmental impact of those sectors and activities, ultimately bringing them to sustainable levels. This includes decent jobs that contribute to reducing energy and resource consumption, decarbonising the economy, protecting and restoring ecosystems and biodiversity. At the same time, they help minimise the production of waste and pollution.<sup>27</sup>

By focusing on these methods, ZOA is not bringing an end to climate change. However, ZOA is helping to minimise the degree of its negative impact. It is important for people to be resilient and solution-oriented. In this way they can continue to earn their livelihood. The following sections of this chapter take a closer look at the above-mentioned adaptive methods for mitigating the negative consequences of climate change in vulnerable regions.

---

<sup>25</sup> World Bank, Climate Smart Agriculture (2021). Accessed 19 May 2022.

<https://www.worldbank.org/en/topic/climate-smart-agriculture>

<sup>26</sup> ZOA, IWRM and Peace - The contribution of the Integrated Water Resource Management approach to conflict reduction and peace - the case of the Rural Water for Sudan project (2021).

<sup>27</sup> A. Jarvis, A. Varma and J. Ram, Assessing green jobs potential in developing countries A practitioner’s guide (Geneva, 2011).

[https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms\\_153458.pdf](https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_153458.pdf)

## Climate-Smart Agriculture

Climate-Smart Agriculture (CSA) is defined by the World Bank as an integrated approach to managing land - cropland, livestock, forests and fisheries - that addresses the interrelated challenges of food security and increasing climate change. CSA has three intended outcomes:

1. **Increased productivity:** To produce more and better food to improve food security and boost incomes. This will primarily benefit the 75 percent of the world's poorest population who live in rural areas and are largely dependent on farming.
2. **Increasing resilience:** To reduce vulnerability to drought, pests, disease and other climate-related risks and shocks. At the same time, efforts are being made to improve growth and adaptability in the face of long-term stress factors, such as shorter seasons and erratic weather patterns.
3. **Lower emissions:** To aim for lower emissions per calorie or kilogramme of food produced, prevent agricultural deforestation and find ways to absorb carbon from the atmosphere.

Although CSA builds on existing knowledge, technologies and principles of sustainable agriculture, it differs in several ways. First, there is an explicit focus on tackling climate change. Second, CSA systematically takes into account the trade-offs between productivity, flexibility and moderation. Finally, CSA can lay hold of new financing options to close the investment gap.<sup>28</sup>

ZOA offers training courses (CSA-T) in countries such as Liberia, Iraq and Uganda on climate-resilient agricultural techniques. For example, with crop rotation, different crops are planted every year on a certain plot of land, so that the soil is not depleted. Green manures can also be used: plants that enrich the soil. Drip irrigation is a drop-by-drop, highly targeted method of irrigation via hoses on the ground, which saves water. Agroforestry is a cultivation system that combines trees and agriculture on the same piece of land to improve biodiversity and soil fertility. People also get access to seeds that are more drought resistant. An example is ZOA's CSA-T in Iraq (Anbar) for returning refugees (see chapter 5). Another approach to CSA-T is the Participatory Integrated Planning method, also known as the PIP method. The PIP method is an inclusive, bottom-up approach that was developed by Wageningen University that engages people in environmental conservation and sustainable change.<sup>29</sup> In East Africa, this approach has motivated thousands of farmers to tackle land degradation and invest in their land. On the basis of their PIP, the integrated household farming plan, these farming families become agents of change, determined to make their vision a reality. They want a more resilient farm as the foundation of a more sustainable future. The PIP method can also be applied in areas with high levels of poverty and conflict and where the consequences of climate change are clearly present. This is manifested in landslides, deforestation and increased pressure on natural resources due to increasing numbers of refugees. With the PIP method, a small project team can reach a large number of farmers with behavioural change and the associated direct impact on land management. The result is a chain reaction in which nearby farmers often end up copying successful approaches.

---

<sup>28</sup> World Bank (2021).

<sup>29</sup> "De PIP-aanpak: het fundament voor duurzame verandering." Accessed 19 May 2022.

<https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksinstituten/Environmental-Research/Programmas/Duurzaam-landgebruik/Duurzame-landbouwproductiesystemen/De-PIP-aanpak-het-fundament-voor-duurzame-verandering.htm>

## Integrated Water Resource Management

Integrated Water Resource Management (IWRM) is applied in places like DR Congo and Sudan. Its purpose is to assist all parties concerned in a region in the efficient use of water. This ensures that arable farmers and livestock farmers, men and women, the government and the market are represented in committees. This involves, among other things, the retention, canalisation and storage of rainwater during heavy rainfall, via the construction of irrigation canals, large water basins and the repair of sewers, particularly in large cities. This also prevents conflicts. With IWRM, all parties get involved to build understanding of water use. This is done by setting up water committees. When water management works well, it has a positive effect on livelihoods. Sustainable water use means more opportunities for vegetable gardens, arable farming and animal husbandry. This strengthens the communities. This method also provides openings for conversations about hygiene practices, which can help prevent the spread of disease via water.

The implementation of the IWRM approach has four stages

1. Preparation: insight into the water catchment area, the social and political context and water-related tensions; raising awareness of the importance of IWRM among the various stakeholders
2. Establishing a Water Resources Management Committee (WRMC) at water catchment level
3. Developing a Water Resources Management Plan (WRMP) for the catchment, based on a water-balance analysis and a dedicated planning process by the WRMC
4. Ongoing implementation of the WRMP and management of water resources.

These four phases are accompanied by continuous monitoring and evaluation, taking into account the voices of the community and practitioners (NGO and government), in the assessing and adjusting of the IWRM implementation process. IWRM is not a blueprint, but a process in which the social, political, economic and hydrological context for each situation must be taken into consideration.<sup>30</sup>

The IWRM approach is an extended and demanding process, but it is critical in situations where water is scarce and acts as a source of conflict. The IWRM approach contributes to making water infrastructure more sustainable, as it supports communal ownership and considers the availability of water both currently and in the future. This prevents conflicts. It also brings together different groups that did not work together before. Experience with joint planning and management has contributed to greater mutual understanding and social cohesion.

## Joint Natural Resource Management

Joint Natural Resource Management includes prevention and resolution of conflicts over natural resources. “In many vulnerable regions, water and land play an important role in triggering conflicts,” explains Corita Corbijn, Peacebuilding sector specialist at ZOA. “In areas with a history of conflicts over land and water, it is very important to recognise the interests of the different parties, farmers, ranchers and local citizens. This recognition is essential to help bring them closer together. From there, work can be done on making agreements about the use of natural resources such as land and water. We call this conflict prevention. This is one of the focus areas of ZOA’s peace building policy: addressing land and water conflicts. Moreover, in the peace committees, we work in a peaceful manner, through mutual dialogue, to resolve and prevent conflicts over land or water. This helps prevent disagreements from escalating and needing to be referred to the government or court.”

---

<sup>30</sup> ZOA, IWRM and Peace - The contribution of the Integrated Water Resource Management approach to conflict reduction and peace - the case of the Rural Water for Sudan project (2021).

## Green Jobs

In other cases, direct employment is needed in various sectors of the economy and through related activities, thereby reducing the environmental impact of those sectors and activities, ultimately bringing them to sustainable levels. That means jobs are created that are less burdensome or not burdensome at all on the environment, are less dependent on weather conditions and which produce products that contribute to climate sustainability.<sup>31</sup> Green Jobs, for example, focuses on promoting innovative and more efficient technologies in various production chains. Due to climate change, it often happens that farmers can no longer live on the yield of their land. By creating these new jobs and offering retraining programmes, people will once again have a chance to earn their own income. This might mean planting forests, connecting various electrically powered machines to solar energy or making wood stoves with a longer duration of burning.

By focusing on things like innovation in the firewood and charcoal supply chain, people can earn an income in a new way. This approach enables people to avoid deforestation and reduce its negative environmental impacts, while still earning an income from biomass fuels. People are trained in making and using “Casamance Ovens,” which are used for making charcoal. Charcoal is then made by slowly burning logs under an earthen mound. When the wood burns, less air escapes and less fuel is wasted. Fuel-saving stoves have also been made, in which wood and charcoal have a longer heating time and produce less smoke, benefiting health and air quality. Also, charcoal is being replaced by briquettes.<sup>32</sup>



Photo: Solar-powered water pump in Uganda

<sup>31</sup> A. Jarvis, A. Varma and J. Ram (2011).

<sup>32</sup> ZOAC project description “UGD2202 - Green Energy West Nile - Biomass.”

## 5. Climate-adaptive methods in practice

Many countries where ZOA works have problems that resulted from climate change: water scarcity, flooding and prolonged drought. This impacts the people who build a life in these regions. This often leads to a lack of irrigation possibilities for agriculture or conflicts due to scarcity of water or grazing land. This chapter shows what ZOA does on the basis of concrete cases.

1. **Iraq:** Anbar and Nineveh and Climate Smart Agriculture
2. **Sudan:** Darfur and Joint Natural Resource Management, conflict resolution and livelihood support
3. **Ethiopia:** Oromia and Green jobs

### ZOA is here in Iraq

Could climate change be one of the factors fueling the creation of violent terrorist groups? There are examples from recent conflicts that illustrate the dangers of climate change which can include the possibility of armed conflict and terrorism. This threat is directly related to the negative consequences that climate change has on people's ability to support themselves. People, such as farmers and fishermen, who depend on the availability of natural resources are particularly affected.

#### Climate change as a cause of terrorism

The climate problem became apparent in Iraq in 2006 and 2007, when droughts caused by global warming hit western Iraq, mainly in Nineveh and Anbar. Civilians in northern Iraq are suffering the consequence of climate change and recurring droughts. The drought affects all local producers as 95 percent of farmers in the region depend on rainfall for irrigation. Livestock production is strongly linked to local crop production. Agricultural infrastructures have become obsolete after years of neglect or they were destroyed during wars. When the area was under the control of Islamic State (ISIS), almost all agricultural activities stopped and livestock was stolen. To date, most farmers are still suffering under this crisis as most of their agricultural assets and livestock have been stolen or destroyed. Thousands of young people were rendered unemployed. Seeing no other option, they fell prey to terrorist groups Al-Qaeda and later ISIS.

The biggest environmental concern in Iraq is severe water scarcity: a problem that is expected to get even worse as the result of decreasing rainfall. Today, Iraq is almost completely dependent on neighbouring Turkey and Iran for water. The upper reaches of the Euphrates and Tigris rivers are increasingly dammed, which means that less and less water is available for agriculture in the lower reaches. The situation is exacerbated by the state's inability to guarantee basic services to the population and to restore and maintain irrigation facilities. Farmers who do not get rain on their land for several years in a row can lose not only their access to food, but also their entire source of income. Thus, the well-being of their family can become very precarious. In the case of Iraq, years of drought and ongoing political instability have created a situation in which terrorist groups are able to exploit desperate people seeking an income.

The importance of water in this region became apparent in 2014, when ISIS took control of more than a third of Iraq's territory. Control over water reserves and infrastructure was a crucial way for the terrorist group to turn the conflict in its favor. After all, they controlled large parts of the Tigris and Euphrates rivers that supply water downstream, including to Iraq's capital, Baghdad. ISIS also sought to gain control of several major dams: infrastructure on which entire regions of Iraq depend for access to water and which have proved critical during past conflicts. ISIS was able to use the crisis to its advantage by providing food and cash payments to families

affected by extreme weather events in exchange for their support. Pre-existing tensions between communities were exacerbated by limited access to necessary resources, growing ethnic and religious divisions and the encouragement of more people to join the organisation.

The effects of climate change can lead to conflict, as in Iraq. It is also important to keep in mind that the factors involved in the creation of these terror groups can be reduced. For example, it is important to make countries more resilient to the consequences of climate change through preventive measures. Better cooperation between neighbouring countries is also essential to ensuring balanced access to resources. International actors can provide support by focusing on local programmes for sustainable resource management. At the same time, they can support the organisations responsible for providing the population with necessary services. The formation of violent groups is not inevitable. It can be prevented at least partially with good planning and international support.

### ZOA's work in Anbar and Nineveh<sup>33</sup>

In the Iraqi province of Anbar, ZOA focuses on training in Climate Smart Agriculture (CSA) in collaboration with the organisations Nuffic and HollandDoor. The aim of the project is to increase the knowledge and skills of government officials and farmers in Anbar. The local population realises there is a great need for proactive drought-risk management and implementation. The entire community experiences the risks of continued drought, but the farmers who own small fields and are completely dependent on crop production are impacted more severely.<sup>34</sup>

In the Anbar governate, CSA has introduced a new concept for local farmers and professionals active in the agricultural sector. According to ZOA's Assessment (July 2019), the strategy of the Iraqi Ministry of Agriculture focuses on environmentally friendly technologies, but these strategies do not trickle down due to the limited capacity of the relevant departments. In this ZOA project, professionals trained local workers in CSA and approaches to irrigation to educate smallholder farmers so they can work to rebuild the agricultural sector in Anbar. Female agricultural advisers and entrepreneurs are also being trained in the region.<sup>35</sup>

Anbar is facing the aftermath of the conflict with ISIS. Thousands of farming families have been displaced. Families are now returning to their areas of origin. Many men have been killed or imprisoned, thus many farming households are currently run by women. It is essential that these women receive guidance and training in farming techniques. Not only for their own income and food security, but also for the future of Iraq's agricultural sector. Due to cultural norms, there are barriers to the joint training of men and women. This led to a request from both the female farmers themselves and the local department of Agriculture and Water Resources in Anbar to initiate a training of trainers (ToT) for exclusively female trainers. These women are equipped with information and skills that can help them educate the women farmers.

With these two specific training projects, ZOA is increasing the knowledge of male and female trainers from two government departments, namely Agriculture and Irrigation, and of local professionals working in both regions. With the two projects, ZOA equips dozens of trainers with knowledge, skills and understanding of climate-smart agriculture (CSA) and irrigation. As a result, hundreds of farmers in this region are reached and they can once again earn a living.

<sup>33</sup> Dr. W. Y. Aziz, S. Cornelius, Dr. N. A. Issa, V. Yalda, Understanding Drought Related Risks, Evaluating adopted coping strategies by the locals of Al Hamdaniya District, Ninawa, Iraq. (ZOA, 2021) 16.

<sup>34</sup> ZOA project description "IRQ2021 - Nuffic - Enhancing knowledge and skills extension workers and farmers in Anbar."

<sup>35</sup> ZOA project description "IRQ2033 - Nuffic - CSA Training of Female Extension Staff & Business Professionals in Anbar."

In Al Hamdaniya, near Mosul in the Nineveh Governate, many families are returning now that the war is over. Houses, orchards, wells and other property have been destroyed or stolen. Drought makes it difficult for people to work on their land. ZOA supports the returning population by setting up vegetable gardens. This gives them improved access to food.<sup>36</sup> ZOA focuses particularly on women, who are mainly responsible for their family's food supply. Women's groups are trained in CSA practices and poultry management. The women receive the necessary materials to plant their vegetable gardens, also known as "women's gardens." This allows them to provide food security and income. In addition, the project provides technical support through an agronomist and a veterinarian. To ensure the sustainability of the project, local companies will be linked to the women's groups to create a poultry market chain at the micro level. ZOA will also collaborate with local leaders (Mukhtars), the Iraqi government's Department of Agriculture and Livestock, local poultry companies and other market players. This ensures the success of the project.



Photo: Growing animal feed with water-saving techniques in Iraq

<sup>36</sup> ZOA project description "IRQ2034 - BMZ - Gender Focused CSA and Backyard Poultry."



### After ISIS: The women's gardens

Joël Voordewind, ZOA's special ambassador and co-author of this report, visited the Women's Gardens in Iraq. He says, "Black flags are flying everywhere along the side of the road and we pass several checkpoints with armed soldiers. 'Belt and sunglasses off, and open the window!', the local ZOA employee says, otherwise they will immediately see that you are a foreigner. Obviously, this is Shia territory. I visit a small village near Mosul and see the bullet holes in the houses. There has been heavy fighting here between Shiites and the Sunni terror reign of ISIS. This area was the stronghold of ISIS between 2014 and 2017. Women were only allowed to leave their homes in full veil, if absolutely necessary. That meant they couldn't work the land and it was even more difficult to survive.

In the past two years, hardly any rain has fallen in the region, which meant that 70 percent of the harvest was lost. It also rained too little this year. I meet Ira, who proudly shows the vegetable garden at her house, where she grows vegetables and herbs for her own use. She says she is happy with ZOA's help for her women's garden. She had training in how to grow vegetables and put up fences so the stray animals can't eat her crop before she can. She also got a water tank so she can water her garden. When I ask how she survived the ISIS era, she still says somewhat suspiciously: "difficult." Later I speak to more women in a closed room. They say with a loud voice that they are happy with ZOA's help and that they finally have hope for a better future. They strike me as powerful women who know what they want. Some of their husbands did not survive the war, and so the women support each other.

Solomon, ZOA's agricultural specialist, is also proud to show his new project: "Growing green fodder for sheep in containers without soil, with only a little bit of water. The women are satisfied with this, even though the project is in an experimental phase. The initial results are encouraging. They are encouraged that with so little water, so much food can be produced for animals. They greet me warmly when I leave. I am impressed by the resilience of these women, who have endured so much violence and misery in recent years."

## ZOA is here in Sudan

ZOA has been working in Sudan since 2004. The country was under a dictatorship for more than thirty years. In 2019, the population rioted, resulting in a transitional government. At the moment, the country is restless again. In October 2021, a military coup d'état took place, followed by mass protests. Sudan has been ruled by the military authorities ever since, and protesters are opposed to this. They are now organising demonstrations to call on the military to reverse the recent takeover and hand the country over to a civilian government. The ongoing protests and blocking of roads are hurting traffic and disrupting local markets. If this continues, it will have long-lasting negative effects on the economy. The situation could lead to the emergence of a counter-revolution, which would cause the overall situation to deteriorate even further.

### Hyperinflation and conflict

Sudan has been in an economic recession since 2018. The transitional government's programme aims to achieve economic stability through a series of ambitious economic reforms. However, these measures have also had significant negative consequences: inflation averaged 359.1 percent in 2021. In December 2021, basic food prices were 70 to 80 percent higher than the year before and almost four times higher than the five-year average. The prices of bread and gas have risen sharply throughout 2021.<sup>37</sup>

Meanwhile, drought threatens millions of hectares of farmland. Climate change plays a major role in this. There are also severe floods in other areas. Soil quality is under pressure because scarcity of land means it is rarely given the opportunity to lie fallow. Logging causes deforestation. Sudan experienced historic floods in August and September 2020, coinciding with the start of the coronavirus pandemic. This resulted in a challenging humanitarian context, with hindered access to target communities. In northern and eastern Darfur, flash floods led to the collapse of hundreds of houses, 29,028 livestock deaths and 114,330 hectares of arable land being damaged. According to the governor of North Darfur, 39 people died as a result of the flooding.

In 2021, Sudan continued to experience yearly flooding, in part due to heavy rains across Sudan's Nile basin. Heavy rains, flash floods and high tides swept away dozens of people, hundreds of livestock and houses, farms and even entire villages. More than 92,000 people in Sudan have been affected since the start of the rain season. About 13,400 houses were damaged, 5,000 houses were destroyed and public facilities and farmland were damaged. It rained too little in North Darfur in 2021. Thus, the harvest was affected by dry periods. This has led to water scarcity and a shortage of food and grazing land for livestock. As a result, the rural communities in North Darfur are increasingly moving from the countryside to the city in search of ways to earn an income.

Because land and water are scarce, conflicts arise between farmers and livestock farmers. Livestock farmers are moving their herds ever closer to agricultural land. The animals eat the crops, damage the soil and drink water intended for irrigation. The conflicts regularly lead to escalations involving violence. The security situation in Darfur is escalating through a mix of causes, including the withdrawal of UNAMID,<sup>38</sup> the fragile transition and deepening economic crisis which is hindering progress in the country. In 2020, tribal conflicts worsened across North, South and West Darfur and this continued into 2021. This is evidenced by the high number of displaced persons arriving in Shangil Tobaya, Kutum and Tawila in North Darfur.<sup>39</sup>

---

<sup>37</sup> ZOA project report "SDN1049 - Sustainable Peace & Resilience in Darfur."

<sup>38</sup> The United Nations Hybrid Operation in Darfur, a joint peacekeeping operation by the African Union and the UN in the Sudanese region of Darfur, ended its mandate 31 December 2020.

<sup>39</sup> See footnote 36.

Local and regional authorities are not always able to prevent situations from getting out of hand. But there are also conflicts at the national level, for example, between Sudan and Ethiopia over the use of the water from the Blue Nile. Despite these challenges, Sudan serves as host to refugees who have escaped violence in neighbouring countries. The largest group of refugees consists of South Sudanese: about 840,000. At the end of 2020, there was also a significant flow of refugees from Ethiopia to Sudan: more than 48,000. Refugees live all over the country. About 70 percent live outside camps in villages, towns and settlements. The majority suffers from severe poverty in regions where host communities are already struggling. About a quarter of all the people in Sudan - around 9.8 million - suffer from hunger.<sup>40</sup> One in six Sudanese children is malnourished. In the context of Darfur, there is a clear correlation between climate change, scarcity and a deterioration of the economy and conflict. Different factors come together to create a complex situation where cause and effect are intertwined. Resilience is extremely important for a Sudanese person to be able cope with these situations.

### IWRM and peace in Sudan

The ZOA paper *IWRM and Peace* describes the contribution of the Integrated Water Resource Management (IWRM) approach to conflict reduction and peace in the rural project Aqua for Sudan.<sup>41</sup> The scarcity of water leads to conflicts between different water users. Many of the conflicts are between farmers and ranchers over access to water sources and over damage to agricultural fields by livestock on their way to those water sources. These water-related conflicts lead to a great deal of mistrust between the different ethnic groups, resulting in fear, violence, loss of life and displacement. These feelings of hatred and fierce competition over water can easily be misused for the self-interest of outside parties. When water projects are carried out without taking this context into account - without conflict sensitivity - the interventions can cause harm or further conflict. Insufficient knowledge of the different user groups and their conflict history and power relations can also lead to the exclusion of specific groups from decision-making and committees. This can then easily provoke more water-related conflicts. Ultimately, such conflicts will undermine the original goal of improving access to water.

By supporting the relevant stakeholders in the joint development of an IWRM plan for their area, conflicts related to water and water infrastructure can be minimised. In this way, resilience to climate change can be increased. The IWRM approach has proven to be very effective at conflict resolution. In rural Sudan, for example, it has both reduced conflict and prevented conflicts from arising. The approach has even contributed to greater mutual understanding and social cohesion between different groups of water users from different ethnic backgrounds and different forms of livelihoods.

### Joint Natural Resource Management and conflict resolution for peace in Darfur

To support farmers, livestock farmers and vulnerable families in the complex context in Darfur, ZOA carried out activities to equip them with the skills and capacity to resolve and prevent conflicts in their communities. ZOA is committed to Joint Natural Resource Management and Conflict Resolution<sup>42</sup> in various ways:

1. **Increasing the capacity of communities at the local level to resolve conflicts. This strengthens the conditions needed for a society that is peaceful and has solidarity. ZOA does this by setting up peace committees for reconciliation (PCRs) and natural resource management committees (NRMCS) in the project areas. Committee members receive extensive training on conflict management and conflict resolution methods.**

<sup>40</sup> FSIN and Global Network Against Food Crises (2021).

<sup>41</sup> ZOA IWRM and Peace (2021).

<sup>42</sup> ZOA project report "SDN1049."

They work with community leaders and local government agencies to mitigate and resolve conflicts such as seasonal conflicts between farmers and nomads, land disputes, and thefts. During monitoring visits, beneficiaries have indicated that they have regained confidence in their leaders and committees to solve internal problems so that time and money no longer need to be wasted on lawsuits. These committees are trusted and valued by the community because members of the communities have positive experiences with them. This has given them confidence in the management of the natural resources on which the community depends, including water resources, the migration route and the distribution and storage of tree seedlings.

2. **Increasing the capacity at the local level to sustainably manage and protect natural resources, including land and water, to prevent damage to the environment.** During monitoring visits, community members confirmed that conflicts related to the natural resources in the target areas have been reduced. The conflict between farmers and nomads was the biggest problem facing these communities, but this is being resolved by the NRM committees. Moreover, households in project areas are adopting eco-friendly energy technology as the women are trained in how to make fuel-efficient stoves. They use peanuts, sugar cane and animal remains as fuel instead of wood that requires felling trees. In addition, the communities are planting trees to restore the environment.
3. **Improving livelihoods through increased crop yields, sustainable agricultural productivity and improved animal health.** This is apparent from two things. First, farmers' agricultural production has increased after training on improved farming techniques through field schools and model farms. Examples of these techniques include: tillage at the right time, spacing, pest control, etc. It has been observed that more farmers are implementing better techniques on their farms as they have introduced tractors and house plows that help them expand the area planted, save time and increase their yield. The farmers in Um Makhareek in North Darfur say that with the correct application of agricultural techniques, they were able to harvest much larger quantities of peanuts for the first time. Second, livestock production has increased by raising awareness among herders, who, in addition to raising animals, have turned to farming to meet the needs of their livestock. With the proceeds they can now buy the medicines their animals need. The community veterinarians trained by the Ministry of Animal Resources contribute to this by organising vaccination campaigns.

The project activities also support collaboration by the community to conserve natural resources and improve their management. This also boosts the livelihoods of the beneficiaries. The demarcation of the herding routes around the village of Hejljija in East Darfur is an important contribution by ZOA to reducing the recurring conflicts between farmers and shepherds in the state. ZOA made it possible to delineate an animal migration corridor of approximately 30 kilometres, located within agricultural land, to give the animals a route that leads them away from the fields. This demarcation is being constructed by the government of East Darfur, supported by the local peacebuilding committee formed in Hejljija and trained by ZOA.

ZOA facilitates the formation of peacebuilding committees in the target areas. Each committee has 15 members, including farmers and livestock farmers. There are five women on each committee. According to the head of Hejljija's peacebuilding committee, Yagoub Hassan, the demarcation contributes to an increase in livestock farming and a reduction in conflict between farmers and shepherds. Yoma Hamuda, an active committee member, confirms that the presence of her female colleagues on the committee ensures that women participate in dealing with problems in the community. "Prior to the formation of the committee, our contribution to public issues such as land demarcation was absent or at least extremely limited," she says. "The situation is different now, because we participate in all the activities carried out by the peacebuilding committee and the committee's decisions."



### **Peacebuilding and better crops**

Idris is one of the many people who is very happy with ZOA's model farm in Umm Makhareeg village, in Darfur, Sudan. He explains: "I have been a farmer all my life, but I only knew traditional agriculture. ZOA trains us in agricultural methods using new technologies, and teaches us how to prepare the land, select the best crops, sow, fertilise, water and harvest." The participating farmers are trained in sowing sesame, beans and maize. Idris never thought he could grow these crops on their soil type, but on the model farm the farmers see that this is possible. Idris continues: "We always sowed crops in a large area and we put a large amount of seed in each hole. We also left a space of one to two metres between each crop, but now we are applying what we learned from the model farm, such as the distance and the correct amount of seed to plant. The farmers in my village and I were afraid to grow beans because of the soil type, but now I have planted an entire Mukhamas with beans." Idris notices that people who travel past the model farm also go on to apply the agricultural methods they see there. This will improve their harvest as well.

## ZOA is here in Ethiopia

Ethiopia is a country full of complex problems. Most notable is the battle between the government army and TPLF (Tigray People's Liberation Front) in Tigray, northern Ethiopia. Many lives are lost there. Hundreds of thousands of people from this region have been displaced. They have fled from violence, rape and looting. They had to leave everything behind, sometimes in a hurry. The supply of food and other life-saving resources is very limited. Millions of people in Tigray can barely survive due to a lack of food and water.

Next to this, Ethiopia has over 2.7 million displaced persons and almost a million refugees from neighbouring countries like Sudan, South Sudan, Eritrea and Somalia. They are all on the run from conflict and scarcity. Despite Ethiopia's openness to refugees, this puts pressure on social relations due in part to the greater demand for agricultural land and water supplies – which are already scarce.

The very poor country ranks 173 out of 189 on the Human Development Index (2020). A quarter of the population lives below the poverty line. There are few opportunities for refugees to earn an income. The country is vulnerable to drought, floods and outbreaks of infectious diseases. Logging for firewood is destroying an already fragile ecosystem. Clean drinking water is scarce. These problems come on top of the COVID-19 pandemic and a locust plague. Each region has its own challenges where humanitarian aid is essential and often life-saving. ZOA has been working in Ethiopia since 1993. Because of our experience and the results we produce, we are a valued partner of the government, the United Nations and other aid organisations. This long-term involvement helps earn the trust of communities in which ZOA works.

### Food scarcity in Oromia

Food insecurity in Oromia is high, especially in Ethiopia's East Hararghe, which has been hardest hit by the ongoing famine. At least 640,065 people face critical water shortages, which also impacts their food security. At least 989,484 people are in urgent need of food aid and 444,000 are facing chronic food insecurity.<sup>43</sup> Partly due to climate change, rainfall amounts are small and irregular. This was followed in 2020 by the largest locust outbreak in living memory. The swarms consisted of hundreds of millions of desert locusts, which can travel around 150 kilometres a day, destroying anything green in their path. The COVID-19 pandemic had a major impact on the economy and caused uncertainty. Moreover, many existing sources of water are damaged, either due to neglect or conflict.

Poor hygiene and sanitation are a major risk for indigenous refugees, returning refugees and host communities. As a result, they are exposed to various waterborne diseases. This makes them even more vulnerable. Women and girls are forced to walk 6 to 8 hours to fetch water. In this way, they are exposed to all kinds of risks including attacks by wild animals, gender-based violence and a higher-than-normal workload. This also prevents girls from accessing essential education.

### Emergency aid in Oromia

In Oromia, ZOA targets affected communities by: providing cash and basic emergency supplies, such as household kitchen sets, blankets, and buckets and jerry cans, as well as supplies to meet the specific needs of women and girls. ZOA also supports the construction and maintenance of safe water supply systems and sanitary facilities. In addition, communities are educated about good hygiene practices to prevent the spread of disease and they are taught new skills. This creates more job opportunities for young people and vulnerable families.

---

<sup>43</sup> Disaster Risk Management Offices (DRMO) - East Hararghe coordination meeting minutes-13 July 2021.

As a form of emergency aid, delivering water by truck is a short-term way to provide life-saving aid. This is used in periods of drought and to compensate for interruptions in the water supply. To combat the acute shortage of drinking water, ZOA adheres to the national WASH cluster guidelines and provides a minimum of five litres per person per day: the minimum amount of water needed for survival and basic hygiene in emergency situations. The water is transported by truck from water points in Fadis town, which are located 35 to 50 km from the distribution point of Kebele. This means more than 5,000 households have clean water at their disposal. However, this is not a sustainable solution.

ZOA is therefore also committed to repairing water wells: a necessary intervention to provide many households with water. For example, the Elkallu water point supplies 6,000 people with water. These activities are supported as much as possible with hygiene education to prevent waterborne diseases such as cholera.<sup>44</sup>

### Green Jobs for a new opportunity

The Horn of Africa sees a great deal of conflict, accompanied by continuous flows of migrants and refugees. Migration is driven by factors like politics, ethnicity and religion, oppression and persecution, civil wars and conflicts between states and climate crises with poverty and scarcity. This drives displacement in search of more opportunities for a better life. Since climate-related crises can exacerbate pre-existing social and ethnic tensions, the risk of civil unrest and even armed conflict increases. Climate change hits the poorest and most vulnerable communities hardest. Refugee camps in Ethiopia are no exception. Most refugees end up in camps in the most underdeveloped regions, which have bad weather conditions, poor infrastructure, few opportunities and much poverty and other stress factors.

To improve living conditions in the camps and the host communities, ZOA is committed to creating opportunities for people to earn a living. Efforts are also made to strengthen local capacity building and improve access to basic services by using energy services. Improving basic services such as healthcare, education, safety and cooking for the host communities and refugees is crucial to ensuring a livable environment. This is made possible by connecting the community to solar power. ZOA does this by installing street lighting and constructing solar collectors for homes. Normally, basic services run on electricity, which is produced by diesel-powered generators. In a community of 50,000 people, this causes a great deal of pollution. In other cases, there are no power supplies at all. This creates insecurity and inefficiency.

The focus on capacity building and the creation of opportunities to earn a living enables the refugees and host communities to undertake income-generating activities. Lampposts are placed along roads, but also in sensitive places where it is dark or near latrines. This improves safety. Refugees and local residents are deployed and trained to install and maintain these facilities. This creates jobs that contribute to livelihoods and an eco-friendly way of generating energy.

---

<sup>44</sup> ZOA project description, "ETH2203 - FoCo - Drought Response Oromia."



Photos: Tree nursery in Ethiopia





### **No life without livestock**

Fatuma Abdullah (30), mother of Taslima and Musbita and wife of Sefi Abdullah from Jido Gari village, Oromia, Ethiopia, says she has nothing. “We can no longer harvest anything from our own land. The drought is enormous. Our cows hardly have anything to drink, and there is no more grass to graze. Selling a cow on the market is no longer possible either. We had ten cows, but five have already died. I’m afraid we’re going to lose the last five, too. Then I can no longer give our children milk.”

Fatuma continues: “Before the drought, I put a cow in front of the plow to prepare our field for sowing. I milked my cows and fed my children with the milk. I went to the market and sold an ox to buy medicine for my other cows, but the cows died anyway. Now I have lost my strong ox and my cows. My family is hungry. We have no food for today. We are trying to grow some vegetables, but we don’t really know how to do that.”

ZOA helps families like Fatuma’s with special seeds and agricultural training. Without this help, their lives will become increasingly miserable, possibly resulting in severe malnutrition or starvation. Or they might be forced to move to another place in hopes of finding food there.

## 6. Conclusion

How does climate change amplify migration and conflict? How can vulnerable people who are directly affected by the negative consequences of climate change receive support? What role does ZOA play in strengthening their resilience and adaptability? These questions were the focus of this report.

The reports and figures mentioned above show that climate change has a huge impact, especially on the poorest in the world. Without intervention, this will only get worse in the future. We are now on the way to global warming that is more than twice the limit of 1.5°C compared to 25 years ago. To avoid an even worse outcome, global greenhouse gas emissions must be reduced by 43 percent by 2030, according to the IPCC.<sup>45</sup> Politicians alone cannot solve this problem. Aid organisations, along with the major multilateral institutions, should take drastic steps to assist the most vulnerable - to help them survive and become climate resilient.

The current dramatic effects of climate change are already visible on a large scale. There are more floods due to rising sea levels; there are food shortages in drier areas, resulting in hunger and malnutrition; there are shortages of drinking water and water for irrigation in drier areas; there is a decline in biodiversity due to the extinction of animal and plant species. The oceans are acidifying, putting coral reefs at risk of dying, which would harm fish and plants. There will be more forest fires and more deserts and there is also a chance of more and longer heat waves.

Farmers are hit hard by more droughts and flooding. This can cause them to lose their homes and livelihoods, and many become displaced. The seasons become unpredictable; this hinders arable farmers from getting a good harvest. Livestock farmers are also experiencing the impact of a changing climate. They must move on more quickly to new grazing land. This increase in migration often leads to conflicts, but people within existing communities are also more likely to find themselves in each other's way because of scarcity. More people are using precious diminishing natural resources. People need new opportunities to earn a living. If such opportunities are not available, people become receptive to joining terrorist organisations that do offer those opportunities. Climate change can lead to scarcity; scarcity in turn leads to conflict. Situations like the ones in Afghanistan, Sudan and Iraq illustrate this.

Migration is also increasing due to scarcity: initially to the major cities, but also between countries. According to UNHCR, 100 million people are currently displaced due to climate disasters, conflict and violence, more than 35 million of them across national borders. The *Groundswell Report*<sup>46</sup> predicts that without interventions there will be at least 216 million refugees by 2050. The largest increase is due to people who are displaced as a result of climate change.

### What to do?

Most people do not want to migrate, but they are forced to flee because they are not safe or cannot support themselves in the place where they live. ZOA is committed to increasing the resilience of these vulnerable groups. This is done by using climate-adaptive methods. These methods help people maintain their livelihoods, despite the changed circumstances due to climate change. ZOA helps people deal with shortages caused by drought. This is done by deploying Climate Smart Agriculture, but also by bringing people into dialogue with each other and making agreements about the division of land and water with the help of peace committees and other forms of

---

<sup>45</sup> The Intergovernmental Panel on Climate Change (2022).

<sup>46</sup> V. Clement, K. K. Rigaud, A. de Sherbinin, e.a. (2021).

conflict prevention and resolution (Joint Natural Resource Management). In addition, ZOA uses Integrated Water Resource Management to handle water carefully in regions suffering water scarcity. With Green Jobs, ZOA offers people alternative ways of earning a living outside agriculture and livestock, while also using eco-friendly innovation.

By using these methods in ZOA's programmes, we see that people are finding hope again, because they can start down a new path. By using new seeds, farmers are impacted less by unpredictable rainfall. They work together more, which helps ensure water scarcity no longer leads to conflict.

This document is by no means comprehensive. ZOA employees see examples of scarcity, migration and conflict on a daily basis in their field of work. Often this is the result of a complex mix of factors, of which climate change is one of the demonstrable ingredients. There are also countless examples of hope because people were helped to adapt to a changed environment.

To be able to adapt to the changing climate, it is very important that people are resilient and solution-oriented. They can only do this if governments take responsibility and facilitate climate adaptive policy, together with local and international NGOs, such as ZOA. This is the only way to prevent people from fleeing or coming into conflict with each other due to lack of livelihood.

## **In closing**

Every citizen has a responsibility when it comes climate resilience. Climate change and its dramatic consequences are forcing everyone to take act now. ZOA will focus on this in the future. In the coming years, ZOA's programmes will be focused on and tested for creating climate resilience. ZOA will have to work in a climate neutral way, both in the field and as an organisation.

If a global turnaround is not started now, the earth will become uninhabitable for many people. It is now or never.

## 7. Reference list

- Dr. W. Y. Aziz, S. Cornelius, Dr. N. A. Issa, V. Yalda, Understanding Drought Related Risks, Evaluating adopted coping strategies by the locals of Al Hamdaniya District, Ninawa, Iraq. (ZOA 2021) 16.
- V. Clement, K. K. Rigaud, A. de Sherbinin, e.a., Groundswell Part 2 : Acting on Internal Climate Migration. (World Bank, Washington, DC 2021).
- Disaster Risk Management Offices (DRMO) - East Hararghe coordination meeting minutes, 13 July 2021.
- D. Hilhorst, MOOC: Disaster Risk Reduction and humanitarian aid in conflict settings, Erasmus University Rotterdam. (Rotterdam 2020).  
<https://www.coursera.org/learn/whendisastermeetsconflict>
- FSIN and Global Network Against Food Crises, Global Report on Food Crises (Rome 2021) 14.
- International Federation of the Red Cross and Red Crescent Societies, The Cost of Doing Nothing the Humanitarian Price of Climate Change and How It Can Be Avoided (2019).  
<https://reliefweb.int/sites/reliefweb.int/files/resources/2019-IFRC-CODN-EN%20%281%29.pdf>
- International Institute for Environment and Development, Humanitarian action is part of climate response – but must be early and locally led (2021). Accessed 19 May 2022.  
<https://www.iied.org/tackling-climate-change-fragile-states-protracted-crisis-situations>
- Intergovernmental panel on climate change, Climate Change 2021 Mitigation of Climate Change (2021).
- Intergovernmental panel on climate change, Climate Change 2022 Mitigation of Climate Change (2022).  
[https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_FinalDraft\\_FullReport.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf)
- A. Jarvis, A. Varma and J. Ram, Assessing green jobs potential in developing countries A practitioner’s guide (Geneva, 2011).  
[https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms\\_153458.pdf](https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_153458.pdf)
- V. Koubi. Annual Review of Political Science, Climate Change and Conflict (2019).  
<https://www.annualreviews.org/doi/pdf/10.1146/annurev-polisci-050317-070830>
- T. Middendorp, Klimaatgeneraal – Bouwen aan weerbaarheid. (2022).
- Nederlands Dagblad, “Grimmig record: honderd miljoen vluchtelingen” (23 mei 2022).
- John Podesta, The climate crisis, migration, and refugees - Prepared for the 2019 Brookings Blum Roundtable (2021) 1.  
<https://www.brookings.edu/research/the-climate-crisis-migration-and-refugees>
- UNHCR, Mid-Year Trends Report 2021 (2021) 9.

UNHCR, Frequently asked questions on climate change and disaster displacement (2016). Accessed 12 May 2022.  
<https://www.unhcr.org/news/latest/2016/11/581f52dc4/frequently-asked-questions-climate-change-disaster-displacement.html>

The White House, Report on the impact of Climate Change on Migration (Washington 2021) 7.

World Bank, Climate Smart Agriculture (2021). Accessed 19 May 2022.  
<https://www.worldbank.org/en/topic/climate-smart-agriculture>

ZOA, “Disaster Risk Reduction Position Paper” (2021).

ZOA, “IWRM and Peace - The contribution of the Integrated Water Resource Management approach to conflict reduction and peace – the case of the Rural Water for Sudan project” (2021).

ZOA project description “ETH2203 - FoCo - Drought Response Oromia.”

ZOA project description “IRQ2021 - Nuffic - Enhancing knowledge and skills extension workers and farmers in Anbar.”

ZOA project description “IRQ2033 - Nuffic - CSA Training of Female Extension Staff & Business Professionals in Anbar.”

ZOA project description “IRQ2034 - BMZ - Gender Focused CSA and Backyard Poultry.”

ZOA project description “UGD2202 - Green Energy West Nile - Biomass.”

ZOA project report “SDN1049 - Sustainable Peace & Resilience in Darfur.”

With special thanks for their contributions to: Harm Bouta (sector specialist WASH), Corita Corbijn (sector specialist Peacebuilding), Inge Vos (sector specialist Livelihoods & Food Security), Anneke Bolt (editorial), Liselotte Mikkers (coordination) and Lieuwe de Jong (photography).

**ZOA**

Postbus 4130  
7320 AC Apeldoorn  
Nederland

T +31 (0)55 366 33 39  
E [info@zoa.ngo](mailto:info@zoa.ngo)

[www.zoa-international.com/climateresilience](http://www.zoa-international.com/climateresilience)