Climate change

What we can all do about it

Introduction

We live in a world that's changing all the time. This is natural and normal, and it's been changing for millions of years. But some of our activities are causing certain changes to happen much faster than is natural, and this speed of change is damaging the earth, the atmosphere around it, and all life within them. One of the very damaging things we do is use fossil fuels such as coal, oil and gas to make electricity and to fuel our cars and aeroplanes. When we do this, certain gases are produced called greenhouse gases that pollute the air we breathe and unbalance the make-up of the atmosphere. Large scale animal farming to produce meat for rich country consumers also causes a lot of greenhouse gases. The buildup of these gases in the air causes all sorts of bad reactions. The final outcome is that our world is getting hotter, and this is causing our weather to change as well. Scientists have called this process global warming, and the result is climate change. So in Africa, it's likely some areas will get more rain and more serious storms and floods while other areas in Africa will get less rain and more severe droughts. In some places it's already becoming more difficult to grow food because of floods, droughts and increased temperatures. Coastal areas may go underwater as the ice at the North and South Poles melts and the level of the sea rises. Some people will be forced to leave their homes and communities in search of more hospitable areas so they can make new safe homes, grow their crops and find water. If we look back into history, we can see that climate change is a deeply unjust process. This is because the main sources of this pollution now and in the past are rich countries. Meanwhile Africa, which contributes only about 4% to global greenhouse gas emissions, is expected to be the continent worst affected.

This booklet is all about sharing some ideas on how we can reduce our impacts on the environment and climate, while also helping us cope better with the impacts of climate change. It's designed to give some practical solutions for you to try in your homes, communities, schools, with your friends and families. We hope you will find it useful and you'll be inspired to change the way you live so you have a smaller impact on the world and on other people and creatures living in it, and also to

change some of the things you do so you can be more resilient to the impacts. First of all, we look at ways we can reduce our bad impacts on the world and strengthen our positive ones.

What can we do to reduce our impacts on the world?

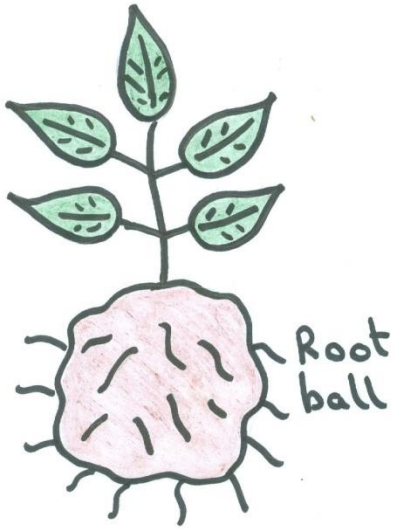
The picture of climate change and the impacts it could have are very worrying. But we need to stay positive. There is much hope. If we act now and we all pull together to stop global warming, we can definitely slow the process and reduce the severity of its impacts.

- **Get informed and inform others: listen, learn, talk and share**

Talking about things is a really good way to encourage action. So let's learn about climate change and talk about how it's affecting us. We can talk with our families, friends, schools and communities. We can form groups in our schools, mosques, churches and communities to plan the actions we can take to help ourselves and each other. We need to think how we can reduce our impacts on climate change and, most importantly for Africa, how we can protect ourselves from the impacts. There are some ideas below to think about to help stop climate change. And then there are some ideas about to help make our lives easier as the world gets hotter and the weather changes.

- **Plant trees!**

Trees have a really good impact on the air we breathe. They absorb carbon dioxide, which is one of the gases causing the world to get hotter, and they're called 'carbon sinks'. So it's really good to plant trees. And it doesn't need to cost us money. Trees just start growing all on their own from seeds that have fallen on the ground. But they don't always grow in a good place: they may be too close to the road or on a path or construction site where they'll get damaged, or too close to a building. So if you're really careful, you can dig it up and move it to a better place. To do this, carefully dig a good sized ball of soil around the roots to protect the roots from damage. Place the seedling in a bag or pot or bowl and carefully carry it to the place you want to move it to. Make sure it's a safe place where it won't get trampled on or damaged by bicycles or vehicles. Perhaps there's a safe place on your school compound, your parents' farm, at a community meeting place or in the grounds of the mosque or church. Dig a hole that's a bit bigger than the root ball, so there's some loose soil around it to easily grow new roots into. You can even put some water into the planting hole, and some compost to provide nutrients for the seedling. When the water has



drained down, you can put the root ball into the hole. Fill the loose soil in around the roots and push the soil down firmly. You can make a basket around it so the seedling is protected from being eaten or trampled on. Remember to water it. You will need to water it daily for a few days when you first move it, but less when it's growing nicely. And you can watch its new leaves grow and grow. You can even try growing trees from seeds. The mango fruit has a big seed inside it, which will grow into a tree if you look after it carefully. Then you can also get healthy food from it. You can also go to the district government's forest department offices and ask for some tree seedlings to plant in your schools and communities. Trees are so useful and so important to the environment and to humans. As we said earlier, they help balance the air we breathe and they remove climate changing gases from the atmosphere. Trees also provide shade and cool air to protect us from the hot sun, and give us many foods and resources too

- **Reduce, reuse, and recycle**

The manufacture of virtually every product results in the production of greenhouse gases. So if we try to **reduce**, **reuse** and **recycle** as much as we can, then we will help reduce greenhouse gas emissions. Think about what you can do:

- We can **reduce** the plastic bags we use by taking a plastic food bowl when we buy takeaway food. Those plastic bags cause nasty pollution when they're being made. They also get in the soil, rivers and oceans when they're dropped on the ground. They choke storm drains and make the flooding worse. And they pollute the air with dangerous toxins when they're discarded and burned. Besides the pollution, the plastic waste in the environment also kills animals: they eat the plastic food wrappers because it smells of food, but they can't digest it. If they eat too much plastic, it kills them. Goats die from eating plastic rubbish they think is food. And many seabirds die from eating plastic they see floating on the ocean that they think is fish. Some of the whales washed up dead on beaches have been full of plastic they have eaten as they filter feed in the oceans.
- Some of us buy a lot of stuff. So for those of us who do buy a lot of stuff, let's think carefully about our real needs and try to **reduce** the amount of things we buy. Other people don't buy much stuff at all, so they don't need to reduce.
- Instead of always buying new, we can **reuse** things we already have, or borrow or hire things, especially for items we won't use very often. We can also give things to other people that we don't need any more, or swap items such as clothes and shoes with our friends

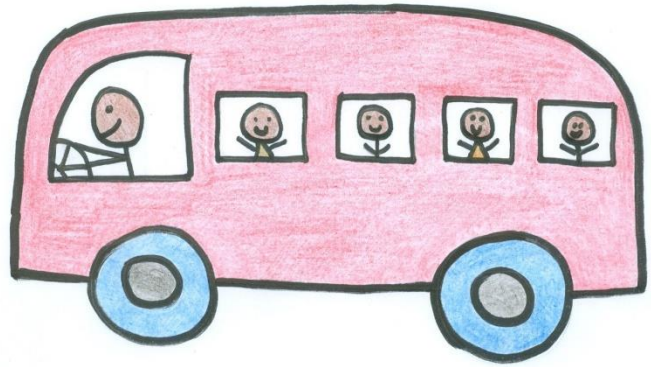
- We can encourage businesses to **reuse**. One thing that some companies in Ghana and Africa are still good at is taking back empty glass bottles and refilling them. But unfortunately plastic bottles are starting to replace the glass ones. Besides the greenhouse gas emissions emitted when they're being made, plastic bottles are also creating a lot of waste that Ghana can't cope with. And if they're burned, they cause toxic pollutants that are poisonous for us to breathe in. So as much as possible, when you buy your pineapple juice (healthy for you!) or malt or fanta or other drinks, buy the ones in the glass bottles so you can return them to be refilled. We need to keep up the demand for the glass bottles so the people who make the drinks will keep on refilling them. The richer countries rarely refill bottles these days, so they create huge volumes of plastic and glass waste. Some countries now recycle a lot of the plastic, but there is still pollution when they are manufactured. If you have no choice other than to buy the plastic bottles, they can be reused by the women who sell red and yellow oil or the local drinks or yogurts or groundnuts.
- Another way we can **reuse** things and **reduce** waste is to take a strong bag with us when we go to the market or shops and remember to take the bag EVERY time we go. Then we don't need to use plastic carrier bags again. In mid-2015, President Mahama said that plastic bags would be banned unless plastic producers can ensure proper disposal of the plastic waste. It's good that he's aware and thinking about it, but there's been no more action and the plastic is still left on the ground. We should pressure our government to implement this ban and follow the lead of Rwanda, Mauritania and Cote d'Ivoire where plastic is already banned. We can also start a school or community project to ban plastic bags at the local level to prove what's possible. The small town of Modbury in the UK was the first town in Britain to ban plastic shopping bags, and this spread to other towns, eventually leading to a cost being imposed on plastic shopping bags across the England which cut their usage by 85% during its first six months. From small local actions, great change can be achieved.

- Many developed countries are well set up to **recycle** most waste. Paper, metal cans, and glass and plastic bottles can all be recycled in the UK, and organic waste is made into compost. In Ghana, these options are not easily available, but some things are being recycled. The plastic sachet pure water bags are one example. So instead of throwing the empty sachets on the ground to choke the storm drains and cause flooding, we can collect them and give them to the pure water sellers for recycling. Also the Accra Compost and Recycling Plant recycles some items of waste. You can find out more about them here: http://acarpghana.com.

- **Other personal actions**

We use electricity every day in our homes, schools, work places and community buildings. Let's think about the electrical appliances we use, and try to save energy by always remembering to switch them off when we're not using them. Be careful to turn off the light and fan when we leave a room. Replace incandescent light bulbs with compact fluorescent bulbs. We can also choose electrical appliances that use less electricity: a fan uses much less than air conditioning, for example.

Does your family have a car? If you do, then try only to use it when it's really necessary. On other trips, try using the bus or trotro, or take a walk if it's not too far. Exercise is healthy for us and will help us all live longer. Riding a bicycle is also really good exercise, and fun too.

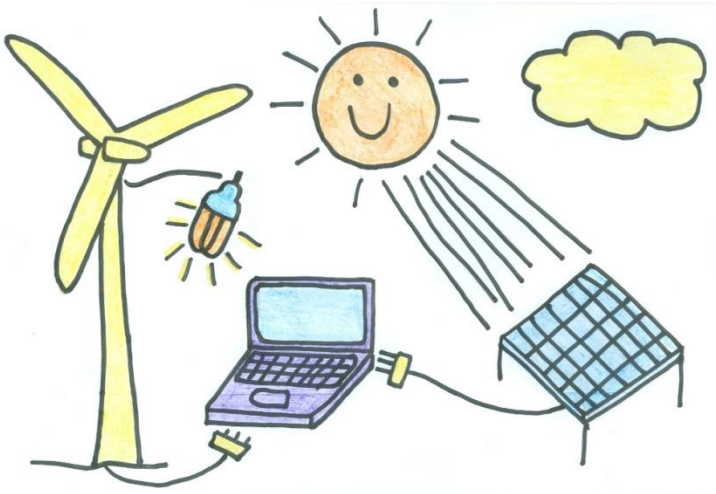


While richer people contribute a lot to climate change with their private cars, flying in aeroplanes, using a lot of electricity with big fridges, freezers, air-conditioning and many other gadgets around their large homes, the contribution of poor people to climate change is very minimal. They don't have cars, don't fly, don't often travel long distances, don't use much electricity because they often don't have fridges or fans or air conditioning, don't purchase lots of things or create lots of waste, and they eat mostly locally produced food instead of imported food. Their main impact is air pollution from using woodfuel and charcoal for cooking, so this is very small. So it's mainly richer people who need to think more carefully about how they can reduce their impact on the climate and the environment.

Wherever possible, we can buy foods that have been grown in Ghana. Don't buy rice imported Vietnam or other distant places because of the greenhouse gases produced when it's transported over such long distance. Ask for Ghana rice. If you can afford it, buy foods grown in agroecological farming systems, so it's kinder to the environment. Buying food directly from the farmer is even better! There is now a farmers' market in Accra at Link Road, Cantonments, every Saturday where you can buy organic fruit, vegetables, honey and other products directly from the producers. The food is healthy and you get to meet the people who have grown it. Buying local foods instead of imported ones is also hel ps keep money within the country and local communities so it strengthens Ghana's economy and also support our farmers.

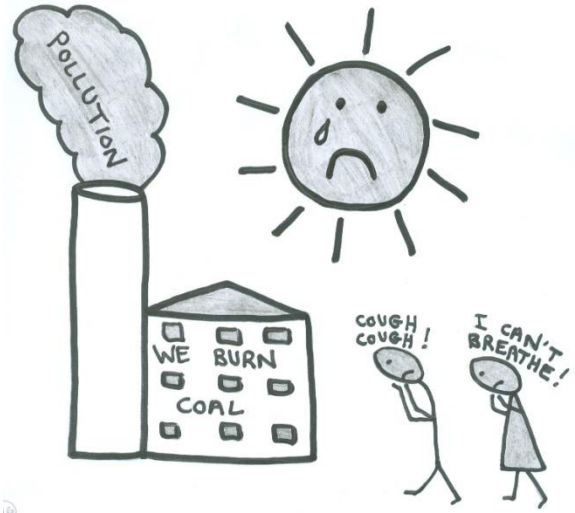
- **Start a campaign and support existing ones run by civil society organisations**

If we hear about new developments in Ghana that could damage the environment or our health, or cause more climate change, we can start a campaign to try and fight against it. We can organize petitions, demonstrations, posters, letter writing and social media (e.g. facebook, twitter)



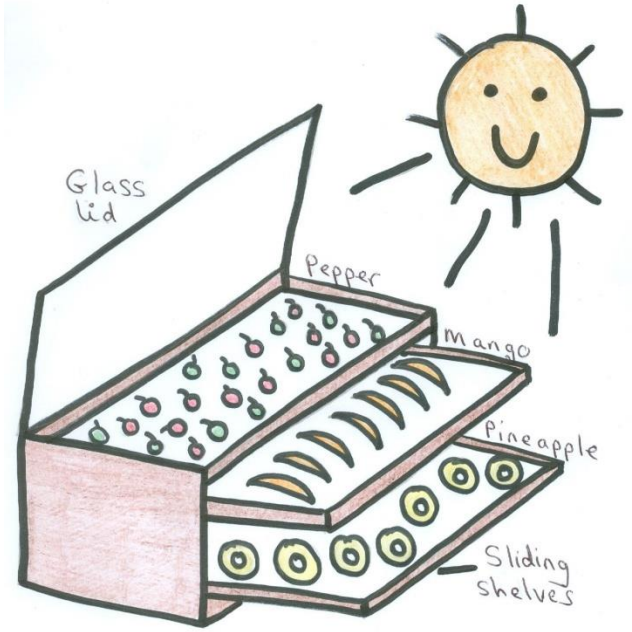
actions in our schools to tell the government we don't want damaging developments. We can ask the government to support and invest in development projects that are good for the environment and don't contribute to climate change. For example, power from the sun is free! And it's also non-polluting. So let's get together and ask the government to give more support to solar power to make our electricity. This is especially good in rural areas as it can be used in small scale decentralized off-grid systems, so communities won't need to wait until they're hooked up to the national grid before they get power. Energy from the wind is also free. (If possible, watch the movie about William who made a wind turbine out of some stuff he found around his village and in the local scrapyard so he could produce electricity for his family, and then expanded it to his village https://vimeo.com/8131094. He's amazing and inspirational. So let's not lose hope). You can try to get some funding for your school or community to get some solar panels on the roof or a wind turbine nearby. If you don't have light at home, then this could help provide light to do your homework. We can also demand more public transport that's reliable, safe, efficient and comfortable so people will be encouraged to use it in place of private cars. We can contact non-governmental organizations (NGOs) to find out if any are launching a campaign on the problem we have found, and give them our support. And we can start environmental clubs in our schools and communities, and organize some actions such as awareness raising and campaign actions.

At the moment (2016), a Chinese company is seeking permission to build a coal fired power station in Ghana's Central Region. It will cost US$ 1.5 billion. Coal is the most polluting source of energy known to humans. The environment minister has said he doesn't think the government is setting up a coal plant and doesn't think a permit will be issued to anyone to set up a coal power plant in Ghana. But this is a weak statement, and came only three weeks after the government's election manifesto was released that included commitment to build the cola power plant. With the options available now to harness clean energy sources, Ghana and the rest of Africa don't need to use coal. They can leapfrog to clean alternatives that are also becoming cheaper all the time. We must tell our government that we want power from solar and wind energy and other clean energy options. Sunshine and wind power are free and clean. They do not damage the environment or the air we breathe. They make clean power to run our fridges, mobile phones, fans, computers, radios, and televisions etc.



- **Start an environmentally friendly business or community project!**

There are so many opportunities to start a green business or local community project to help overcome some of the environmental and social problems we face. Here are a few green ideas for you to think about:



- If you can get access to an area of land locally, you can plant a community forest to produce woodfuel trees, fruits, nuts and moringa. The produce can be shared in the community or sold to make a little money to put back into the project. You could follow in the footsteps of Jadav Molai Payeng, an Indian man who created a forest – now called the Molai Forest – of several thousand trees and where over a hundred elephants and many other wild animals now roam freely.
- Construct community solar food dryers for local produce such as fruits, nuts and vegetables to enable longer term storage. Easy-to-construct models consist of sliding shelves to place the sliced fruits, nuts and vegetables on for drying. The glass lid allows the sun's rays to heat the inside of the solar dryer and dry the food (see pic).
- Community compost collector and maker: collect organic waste from people's homes (fruit and vegetable peelings, leaves, stalks, onion skins etc.) and from the market, chops bars and other places that have organic waste. Then make it into compost that you can give or sell to local farmers and vegetable growers (see more later). The Accra Compost and Recycling Plant Limited (ACARP) in Accra is doing this (http://acarpghana.com/)
- Construct rainwater harvesting and storage systems for communities and farmers (see more details on this later)
- Produce natural soaps and cleaning products using produce harvested from the local environment, and without any chemicals
- Collect and recycle electronic equipment (metals such as copper and gold inside electronic equipment can be reused and recycled)
- Make coconut shell briquettes for burning on fuel efficient stoves
- Get trained by Toyola to make their portable fuel-efficient stoves, or train as an artisan of the clay fuel-efficient stoves in people's homes (i.e. models that are not portable)
- Grow and sell tree seedlings

- If you're a good sales person, you could sell solar lanterns or solar panels
- Construct large-scale efficient charcoal kilns that produce more charcoal using less wood. One design is the Adam-Retort Kiln that reduces emissions and increases efficiency. The raw materials are costly (estimated 1000 euros) but it can be established as a sustainable community project that would work well in the forest areas where wood off cuts can be used for the fuel. You can read about the kiln here: http://www.biocoal.org/3.html
- Make and sell cotton carrier bags to replace the plastic one. They can be made using off-cuts from the dress-makers and designed to suit all people's needs of shape and size.

You can also look around your community and see what environmental problems there are, and think how you could overcome them by designing some innovative solutions. If you come up with something successful, it could make you money in the future, like William and his wind turbine. And please share your ideas and projects with us…we will love to hear about them!

What can we do to prepare ourselves for the impacts of climate change?

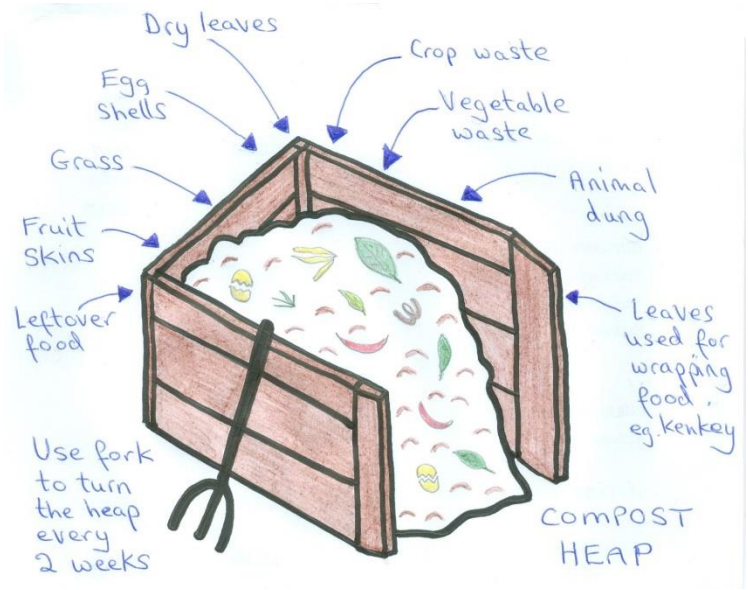
There are so many things we can do in our schools, communities and homes to help us prepare for and adapt to the impacts of climate change. We should start preparing now. We can get together with friends and establish environmental clubs in our schools and communities, and start some local projects. We have put some ideas below. We must especially make sure we support our vulnerable populations such as the elderly, children, disabled, and sick in our communities. We must ensure they always have food and water so they don't suffer.

- **Improve the land, the soil and the local environment**

Plant trees. As we said earlier, trees have a really beneficial impact on the environment and the air that we breathe. We mentioned tree planting earlier as a community project, and we can also ask our teachers if we can have an area of our school compound to plant a small woodlot. As before, we can include some trees that will give us fruits and nuts such as mango and cashews, and the highly nutritious moringa tree. Then the trees will also give us healthy food to eat. We can all bring one tree seedling each to plant, and that way we'll get lots of trees. It's fascinating and rewarding to care for them and watch them grow from a small seedling to a huge tree that towers over us.

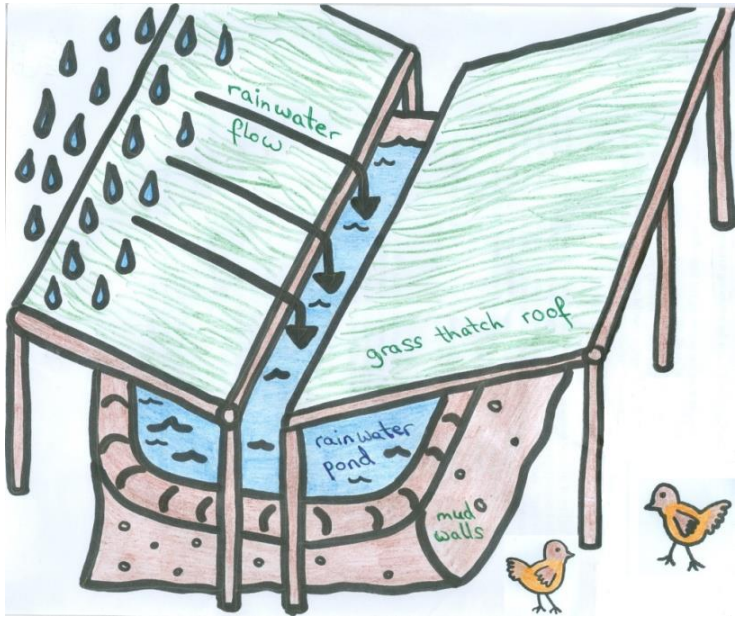
Make vegetable gardens. We can create vegetable gardens at our schools too, and around our homes and on community lands to produce more food and increase family and community food security. This will help us learn how to grow food for the future. We can grow the vegetables without any chemical pesticides or fertilizers so the food is really healthy for us. Putting chemicals on our food is very damaging to our health because they are poisonous. These agri-chemicals also poison animals, wildlife, plants and the soil. Some of them cause cancer, which is a very nasty sickness. If we make a food garden in our school, we can share the vegetables we produce and take them home to cook in soups and stews.

Make compost heaps. We can make compost from organic waste and use it to fertilise the soil and help our trees and crops produce more food. Any parts of a fruit or vegetable that we cut off – such as pineapple or orange skins, vegetables stalks and onion skins – can be used to make compost. We can also put leftover food that we don't eat into the compost, and even the leaves used to wrap kenkey or waakyi. Fruit, vegetables and cooked food that's got spoiled and won't be eaten can all be composted. The weeds that your parents pull out from their farms and grass cuttings can also go into the compost. Leaves fallen from the trees can also be added. We can visit other households, shops, fruit sellers, markets and chop bars with a wheelbarrow or a bucket and collect their organic leftovers such as vegetable leaves and fruit peelings. Anything that is organic waste and won't be eaten by goats or chickens or other livestock animals can be added to the compost. But we shouldn't put in leftover meat or fish because it will attract animals into the compost heap.



When we have collected the organic waste, we pile it together and mix it up. We can also add animal dung if we keep animals in a compound or in an enclosure and it's easy to collect. We need to turn the pile of compost every two weeks to mix it up because it gets hot in the middle where it's breaking down faster, so we need to mix it all up thoroughly. After a few weeks, it should be broken down enough to mix into the soil underneath the seeds and crops when we plant them. The compost adds nutrients and makes the soil healthy again, helping the crops to grow. This is better than using fertilizers to feed the soil. Organic waste should never be burned with our garbage or thrown into the rubbish bins for Zoom Lion to take away. It's much too valuable. We can create the compost heaps near our homes and schools or on community lands. This will make a nice community project to organize together, but you can also do it individually and sell the compost locally, like the ACARP.

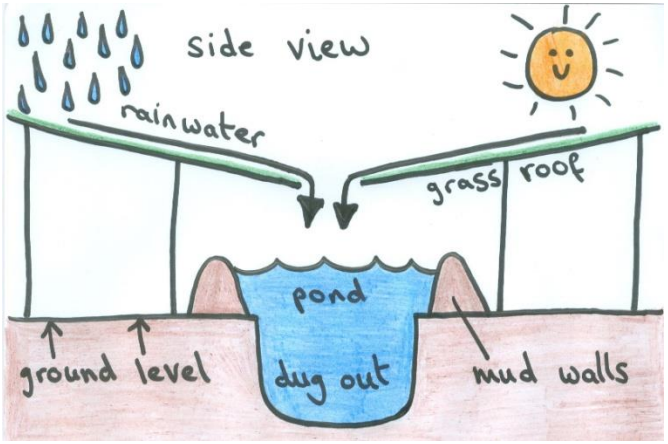
Collect and store rainwater on a small scale. We should also build systems to harvest and store rainwater so it doesn't all run away to the rivers and the sea. We need to save the water to irrigate our vegetables gardens, tree seedlings and farms to strengthen food security, as well as for washing clothes and hands. One of the easiest small scale systems is to collect and store the rain that falls onto the roofs of our homes, schools and community buildings. This can be done with gutters made by cutting up old roofing sheets and joining end to end, or cutting plastic bottles cut in half and joining them end to end, and then fixing these as gutters around the lowest parts of the roofs. We can then make another gutter to channel the water down from the roof gutters into a water container. Possible options for the containers include a big water barrel, or a big hole dug in the ground and lined with clay or plastic so the water won't leak out; a polytank; or a structure built with blocks and cement. We should cover the water container with a lid so the sun doesn't evaporate the water we've collected.



Collect and store rainwater on a bigger scale. To store larger quantities of rainwater, we can build dams with ponds at locations around our communities where a lot of water flows when it rains. Then we catch the water and store it in the pond or reservoir before it all runs past our communities and away to the sea. Diverting the water into storage will also help reduce flooding. Another design is to dig a pond, line it with clay to make it waterproof, and raise the edges up with adobe mud walls using the earth we dig out. We can put an inverted grass thatched roof over the top that's at least double the area of the pond, and with a gap down the middle. This will catch the rainwater from a wider area and channel it into the pond through the gap in the middle of the roof (see the drawing and also the side view diagram below). The roof also protects the water from evaporation by the sun. This design uses only locally available free materials, and has no need for guttering and pipes because the roof is inverted, and so it is less costly to construct.

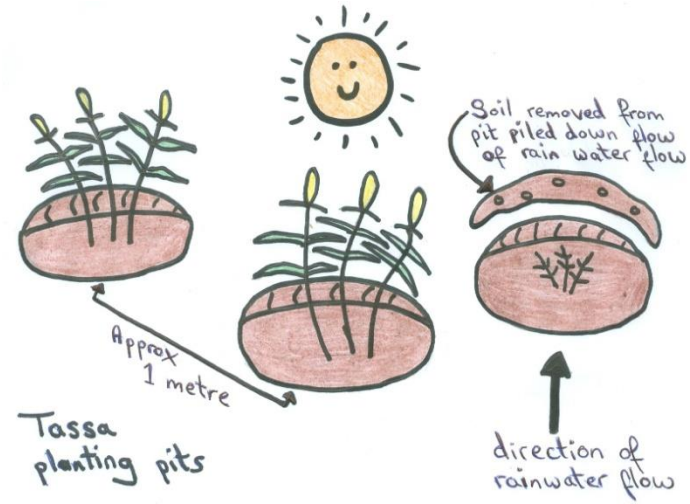
- **Adapting our farming systems to climate change**

Ghana's subsistence farmers, most of whom are women, produce nearly all the food we eat in Ghana. They are the backbone of our food security. We would be very hungry without them because they have the necessary skills and knowledge to produce our food. So they are very important to all of us and we must support them to adapt to climate change. We can't rely on food imports as an alternative because they are becoming more and more expensive.



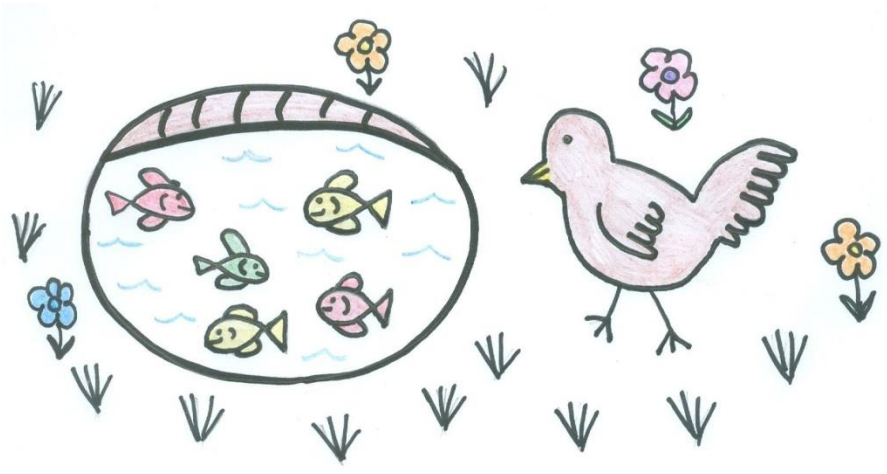
There are lots of things farmers can do to adapt to climate change, but they will also need support from the government and from their communities. Here are some actions our farmers can take to help them adapt, and we can also support them with some of these.

- As we explained earlier, composting the vegetable, fruit, food (leftovers), and farm waste and adding it to the soil will improve soil fertility, water retention capacity and texture. We can help with this by either making the compost or by saving and collecting the organic waste to give to our farmers.
- Systems to improve farmers' access to irrigation water. We can help with their construction:
- Rainwater harvesting and storage systems using small dams and ponds with roofs to catch more rain
- Hand-dug wells
- Planting crop varieties that are more tolerant of heat, droughts and floods. Farmers have been developing their own seeds for millennia by selective breeding to produce crops that flourish in the local environment and climate. Agricultural research institutes also develop seeds, but it is very important they work in cooperation with local farmers to ensure they focus on farmer-preferred indigenous seed varieties of their food security crops. The types of seeds farmers need are early maturing varieties, short season, and those that are tolerant of heat, floods and droughts.
- Use traditional methods of conserving soil and water: for example the *tassa* method used in Niger, which is essentially a system of hand-dug pits that farmers plant their crops in. The pits retain the water so it can infiltrate better and won't all run away. The pits also help conserve the soil by protecting it from erosion.



- Implement agroforestry techniques. This system of planting trees with crops has many benefits: it increases food security and health by producing a greater diversity of crops; it reduces water runoff and soil erosion thereby helping retain water, topsoil, organic matter and soil nutrients; and it improves soil fertility
- No-till or reduced-till agriculture: tilling or ploughing the soil damages it through soil compaction, soil erosion, loss of organic matter, and death of the helpful creatures that live in the soil such as earthworms. No-till or reduced-till agriculture does not disturb the soil in this way. It has many benefits: it increases water infiltration and retention of organic matter; it increases the cycling of nutrients in the soil; it protects the beneficial creatures living in the soil and supports them to flourish more easily; and it reduces erosion, increases the fertility and makes soils more resilient.

- Diversify into alternative livelihood options such as poultry, guinea fowl and grasscutter rearing, snail farming, bee keeping, or aquaculture in the ponds created by rainwater harvesting. All these options diversify local food sources, strengthen food and nutrition security, and diversify farmers' livelihoods
- Protect fertile topsoil against erosion by wind and rain. Some protective mechanisms include: planting cover crops (which also add nitrates to the soil if they are leguminous cover crops such as clover, beans and peas), planting trees, and digging trenches to divert runoff away from the fields and into a storage area.
- Use mulching: i.e. placing organic matter such as leaves, crop stalks, or broken up coconut husks on the soil surface between the crop plants to protect the topsoil and stop moisture being evaporated so easily. This also adds more nutrients to the soil when the mulch breaks down and mixes in.
- Develop community seed banks: to start one, every farmer contributes a few seeds and tubers of each type of crop when they harvest, and these are stored in the community seed banks. The seeds need to be kept in dry airtight containers and carefully labeled. The seed banks then provide a store of planting materials (seeds and tubers) for farmers to use if floods or droughts destroy



their crops and they don't have any seeds saved for the next season's planting. The farmers can ask to withdraw seeds from the bank and replace them at their next harvest. Farmers can also share and exchange seeds with neighbouring communities. The seed banks also protect indigenous and traditional crop varieties from being displaced by the seeds and crops produced by large foreign agri-corporations that are only interested in making profits from our farmers

- Process the crops to add value and prolong their storability. This will reduce post-harvest losses and strengthen community food security. One way we can do this is to use solar-drying techniques. Farmers often dry their produce on the ground. But if we build a simple large-scale solar food-dryer for the community, then the drying is more efficient and faster, and so we can process more crops. We can easily build these using glass sheets and some pieces of wood (see diagram earlier).
- We can organise farmer, processor and consumer cooperatives to give mutual support to one another through advice and discussions, to buy inputs, to sell excess produce, to share equipment and tools, and to buy, process and market foods on a cooperative basis.

- **Adapt our homes and farms to the flood waters**

- In some countries where flooding is becoming more frequent, rural communities are raising their small homes up on top of concrete plinths (made of soil, stones and concrete) so they are above the highest level of the flood waters. They make a covered area for their animals next to the home, also raised on the plinth, so that they are also protected from rising floodwaters and heavy rains. When the waters recede, the damage to their homes and livestock should be minimal. Another way is to raise them up on stilts so the floodwaters flow under the house instead of right through it.
- Coastal communities in Bangladesh that experience frequent flooding of their farmlands, which delays crop planting, have developed floating vegetable gardens to cope with the problem. These are made from locally available materials that float on top of the floodwaters. There they start the vegetable seedlings growing, ready to plant on to their farmlands when the floodwaters recede.

These are some of the actions we can take ourselves. But we can't overcome the climate crisis only at the local level. We also need action from our leaders at the national and international levels to ensure nation states take action together to reduce greenhouse gas emissions and fight against climate change.

What's being done by governments at the international level to tackle the climate change problem?

Have you heard about the COP climate change meetings? They are held every year: in 2015 it was held in Paris, France, and 2016 in Marrakech, Morocco, so you may have heard about it in the news. The COP – Conference of Parties – is the supreme decision-making body of the 1992 United Nations Framework Convention on Climate Change (UNFCCC). This convention is an international environmental treaty that came into force in 1994. Its objective is to "stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner". All states that are party to this convention are represented at the COP, which meets every year to discuss progress and the way forward. Ghana is a signatory to the UNFCCC. In 2015, the objective of COP21 was, for the first time in 20 years of UN negotiations, to achieve a legally binding and universal agreement on climate from all the nations of the world. An agreement was reached, but it was not strong and there was much disappointment especially from countries most endangered by climate change (e.g. island countries) and from civil society organisations around the world campaigning on behalf of poorer countries, the environment and wildlife. Indeed with the fossil fuel industry heavily involved in climate talks, and their corporations being left out of any legally binding requirement to take action while signatory countries are held accountable by their voluntary commitment, the fossil fuel industry has not been impacted at all by the Paris Agreement. And the agreement itself does not even mention fossil fuels.

The COP negotiations are marked by the power of developed countries and their climate polluting industries, while poorer countries lack power, capacity and a voice. Their struggles with capacity are because so many parallel meetings run concurrently during the COP, so countries with small delegations cannot attend them all. Thus their voices go unheard and their needs unmet because the meetings will continue even in their absence. Corporates and fossil fuel lobby groups wield huge power, and it's not right they are even at the COP: their only interest is in maintaining the status quo. The demands of poorer countries and civil society for strong action on climate change are weakened or drowned out by the demands of powerful rich countries and their corporations. Both fear that deep cuts in their greenhouse gas emissions will damage their economies and profits. But action on climate change can do the opposite: it can boost the economy by creating new opportunities for green businesses and jobs. Solar energy production is one example, wind generation is another.

The 2015 Paris agreement

The Paris Agreement, adopted at the COP21 meeting in Paris in December 2015, was signed by representatives of 175 Parties (174 countries and the EU) to the United Nations Framework Convention on Climate Change (UNFCCC) on 22 April 2016 – International Mother Earth Day – 2016 at the UN Headquarters in New York. The ceremony constituted the largest number of world leaders in history to sign an international agreement in one day. At the ceremony, the UNFCCC Executive Secretary, Christiana Figueres, stated that "*We cannot deliver sustainable development without tackling climate change, and we cannot tackle climate change without addressing the root causes of poverty, inequality and unsustainable development patterns*". Despite the urgency of climate change and the need to act fast if we are to stop catastrophic global warming, the Paris Agreement is disappointingly weak.

Prior to the Paris meeting, countries were required to make voluntary pledges, called Intended Nationally Determined Contributions (INDCs), that set out what each country plans to do about climate change after 2020. Following the Paris meeting, many civil society organizations got together to do a review (Civil Society Review, 2015) of the pledged INDCs to evaluate how far they will go towards really stopping global warming. Civil society groups, especially in developed countries, called on their governments to contribute fairly when preparing their greenhouse gas emissions reduction commitments. However, many governments retaliated by saying they have the 'right' to decide voluntarily what they will do towards reducing global warming. The Civil Society Review believes this resulted in very unequal levels of commitment and effort from different countries. The fair way to do it would be to account for the differences through history: i.e. that some countries have been pumping greenhouse gases into the atmosphere for many more years and in much greater quantities than others. Besides this, richer countries also have greater capacity – because of their wealth, development, and access to technologies – to mitigate their climate change impacts. So, besides doing more to cut their greenhouse gas emissions, they must also support poorer countries with finance and technologies to help them develop in ways that are clean and environmentally friendly. But rich countries are always concerned with how this 'fair approach' will undermine their own economic development and their corporations' profits. They're also concerned about how much it will cost them to give this financial and technology support to developing countries. So their commitments are always limited.

The Civil Society Review looked at each country's historical emissions levels, and then at their current capacity to take action and to support others' actions. Using these calculations it then worked out what would be the fair share for each country to contribute towards reducing

greenhouse gas emissions. It then looked at each country's INDCs to see how far their promises really did contribute a 'fair share' of effort towards keeping global warming below 1.5 ^{O}C, or 2 ^{O}C at the very most. The results were disappointing. They found that pledges made by wealthier countries fall way short of their fair share in tackling climate change. Meanwhile the poorer countries' pledges either exceed or broadly meet their fair shares. Overall, the pledges from all the countries are not enough to keep global warming below dangerous levels. Developed countries are to blame because they are doing too little. So while signatories celebrated the signing of the Paris Agreement, there really was nothing to cheer about. They have disappointed us yet again.

We demand more action from developed countries, including:

1) Increase financial support to developing countries for adaptation to climate change, and compensation for loss and damage, as well fulfill past promises of financial support;
2) Commit to technical and financial support to developing countries for low carbon development and clean energy production, most especially renewables such as solar and wind power;
3) Commit to emissions cuts based on common but differentiated responsibilities, according to countries' current and historical responsibilities and capacities; and make those cuts at source and not through carbon markets
4) Ban the fossil fuel industry from attending any future UNFCCC COP meetings; and
5) Keep fossil fuels in the ground.

What is Ghana doing?

Ghana's contribution to greenhouse gas emissions is currently very small compared to countries such as the USA, Russia and China. Ghana (and Africa) has the opportunity to keep these emissions low by leapfrogging dirty developments such as coal fired power stations, and jumping straight to clean environmentally friendly technologies. At the 2015 India-Africa Summit, President Mahama himself stated that "It is unacceptable and indeed a shame that many of the countries with the highest utilization of solar power are located in temperate climates that have a relatively much lower level of insolation than India and Africa". Solar energy is becoming cheaper by the day. India, a country that has its own coal resources, has found solar power is now cheaper than coal power. That means cheaper electricity for everyone in homes and businesses. Solar also creates a lot of jobs for both production and installation of the solar panels.

Recognizing Ghana's huge and largely unutilized renewable energy potential, the government plans to increase the use of renewable energy sources to 10% of the country's energy by 2020 (excluding large hydro and woodfuels). It also plans for 30% rural electrification from renewable energy by 2020 (IEA, 2010). The government established a Renewable Energy Law and a Renewable Energy Fund to support this push. Some progress is being made. The UK company Blue Energy is constructing a 155-megawatt (MW) solar photovoltaic (PV) power plant at Nzema near

the village of Aiwiaso in the Western Region. It will be the world's fourth biggest PV plant in operation today, and the biggest in Africa. It will cost US$ 350-400 million, will increase Ghana's electricity capacity by 6%, and will contribute 20% of Ghana's target of generating 10% of its electricity from renewable sources. It should be fully operational by 2017. It will have 630,000 individual solar PV panels. It will also contribute to local job creation, providing around 200 permanent jobs and a further 500 during the construction phase. Besides the Blue Energy development, a 20 MW solar PV plant owned by a Chinese company has just come online at Gomoa Onyadze in the Central Region. When in full operation, this can provide electricity to 20,000 homes. There are other projects underway as part of Ghana's 'Scaling-up Renewable Energy Programme', but progress is disappointingly slow.

Overshadowing these positive developments in the energy sector, however, is the possibility of a huge 700 MW coal fired power station being built by a Chinese company in the Central Region, at a cost of US$ 1.5 billion. This power station plans to import coal – the dirtiest fuel known to humans – from South Africa and ship it in to a new port to be built especially for that purpose. If the permit is granted for construction, it will burn something like 2 million tons of coal each year, and cause massive amounts of CO2 production. It will also have very damaging health impacts on the nearby communities, such as lung damage, asthma, damage to brains and nervous systems, strokes and heart attacks. Air pollution from particles of unburned coal is estimated to cause 800,000 premature deaths in the world every year. Communities living close to where the coal is mined will also suffer health impacts. Meanwhile solar energy production is clean and uses a free source of energy – the heat of the sun. The coal power station will undermine all the positive progress made with the solar PV power plants. It will also reverse Ghana's progress in meeting her goal of 10% energy sourced from renewables by 2020, which is very disappointing.

We urge the Ghana government to work closely with the Africa Renewable Energy Initiative (AREI), the Africa-owned and led action plan for people-centred renewable energy policy solutions to address climate change and access to energy for all Africans by 2030. The two main goals of the AREI are:

- To help achieve sustainable development, enhance human well-being, and support sound economic development by ensuring universal access to sufficient amounts of clean, appropriate and affordable energy.
- To help African countries leapfrog towards renewable energy systems that support their low-carbon development strategies while enhancing economic and energy security.

In reaching these goals, the AREI is guided by the following principles:

- Contributing to achieving sustainable development in Africa by scaling up and accelerating the deployment and funding of renewable energy in Africa;
- Addressing the entire African continent and benefitting all African countries;

- Boosting intra-regional and international cooperation and promoting and supporting only those activities and projects that are agreed by all countries concerned and impacted;
- Promoting a wide range of renewable energy technologies – in particular solar; wind; pico-, micro-, small- and medium-scale hydro; modern biomass; geothermal; and marine – provided they are socially and environmentally appropriate, gender sensitive and in line with these guiding principles; and
- Advancing the full range of renewable electricity applications (from grid-connected to mini-grids to small stand-alone systems) and other forms of renewable energy – with particular consideration being paid to applications that meet the needs of poor people.

The AREI is a positive initiative that can support Ghana and Africa to ensure safe, affordable and sustainable energy for all people, and encourage low carbon development for climate change mitigation.

Final note…

The movement demanding justice and action on climate change is growing as civil society realizes how it cuts across and impacts on every sphere of human life and the environment. The support for action to stop climate change continues to expand. Our governments and corporations must surely one day listen to the demands of civil society as representative voices of the majority of people. So for now we must increase the pressure to make our governments do what's right for us as their citizens. We must support campaigns that demand tougher action from our governments, deeper commitments for cutting polluting greenhouse gases, and more support from rich countries to poorer countries for low carbon development and climate change mitigation. And press our government to promote and invest more in renewable energies such as solar and wind power.

We can also act on a personal level and work with our schools, families, friends and communities to help stop climate change and act kindly towards the environment. There are so many things we can do at home, in the community and at work. We can: be careful how we use natural resources and how much waste we create; reuse, reduce and recycle as much as possible; be careful with how much energy we use and turn off electrical gadgets when we're not using them; minimise our use of plastic bags and bottles; use public transport or walk or cycle as much as

possible; compost our kitchen and food waste; harvest and store rainwater from the rooftops; and plant trees all over the community. We can think about training in an environmentally friendly job in the future, or start up an environmental community project or a green business. There are so many ways we can improve the environment and reduce our negative impacts. Most of all, we must remember that we share this world with many other people and other creatures, so we must never be greedy.

We must also look out for people in our communities who are less able than ourselves to cope, such as the elderly, the very poor, the sick and disabled, pregnant women or women with children, all who may all have difficulty evacuating to a safe place in times of floods, or have difficulty feeding themselves in times of drought or some other disaster. We should always look out for other people around us so we make our communities strong.

If we're going to beat the climate change challenge, then we need to start acting right NOW! Above all, we must all try to stay positive about what we can do to stop the climate changing any more. And keep working at it. Every little effort helps toward the change.

Further information

ACARP: Accra Composting and Recycling Plant: http://acarpghana.com/

Blue Energy website: http://www.blue-energyco.com/

Civil Society Review (2015) *Fair Shares: A civil society equity review of INDCs*. Civil Society Review, November 2015. The full report and summary are both available online here: http://civilsocietyreview.org/

IISD: Climate Change Policy and Practice. 175 Parties Sign Paris Agreement, 15 Ratify Agreement on Earth Day http://climate-l.iisd.org/news/175-parties-sign-paris-agreement-15-ratify-agreement-on-earth-day/

Tiki the Penguin is trying to make the world a better place for people and animals and the rest of the world: http://tiki.oneworld.org/ and also Tiki's pages about climate change here: http://tiki.oneworld.net/global_warming/climate_home.html

Toyola Energy ltd – do the Toyola stoves with a very successful production and marketing model…. http://www.pciaonline.org/toyola-energy-limited

38 degrees website: www.home38degrees.org

Here are some websites with ideas of what we can all do to help stop climate change, but they are from the perspective of northern countries, so not all actions are relevant:
http://www.broward.org/PollutionPrevention/AirQuality/EducationalPrograms/Pages/ThingsToPreventClimateChange.aspx
http://www.davidsuzuki.org/what-you-can-do/top-10-ways-you-can-stop-climate-change/
http://www.climatechange.gc.ca/default.asp?lang=En&n=D27052CE-1
http://www.greenpeace.org/international/en/campaigns/climate-change/Solutions/What-you-can-do/
http://climatekids.nasa.gov/how-to-help/
https://www3.epa.gov/climatechange/kids/resources/index.html
http://www.preventclimatechange.co.uk/prevent-climate-change.html