



Climate change is a huge global issue affecting all of us wherever we live. We need to take action now to try and prevent it from getting worse and to help people prepare for and adapt to its devastating consequences.



Flood victims in Sirajganj, Bangladesh



Drought in Kenya means herders have to drive their goats up to 45km to reach water



Have you heard about the **Sustainable Development Goals (SDGs)** or **Global Goals**?

These are 17 Goals that were put together by global leaders from many countries around the world to **end poverty, protect the planet and ensure prosperity for all** by 2030.

To find out more about the Global Goals, you can watch a video about them [vimeo.com/181766755](https://vimeo.com/181766755) and/or go to [www.globalgoals.org](http://www.globalgoals.org)

One of these, **Global Goal 13** is about taking **climate action** to slow down climate change and helping people adapt to it and prepare for it. To find out why this is important watch this [bit.ly/SDG-climate](https://bit.ly/SDG-climate)

The impact of climate change includes **increased flooding, extreme drought and changing temperatures**. Gas emissions from human activity contributes massively to climate change. Affecting poorest the most. BUT we can do something about it. We can reduce how bad it gets, and put into place ways to help people cope with it when it happens.

Targets for Goal 13 include:

- Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters
- Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

These are the targets that the use of STEM knowledge and skills can help us reach.

## SOME IDEAS TO GET YOU STARTED

We hope you will do a lot of research yourself, looking at websites, videos etc. so that you get a clear picture of what is happening in the world before you start designing your Global STEM challenge. To help you we have some ideas and links to things you might like to look at - all related to climate action. Don't feel you have to select one of these, what you do is up to you!

The main thing to keep in mind is how STEM skills can help deliver this Global Goal, either in Europe or a developing country.

## Putting the brakes on climate change

If we are to survive on this planet we must act now to slow down climate change. If we allow our planet to just get hotter, there will be catastrophic consequences such as mass flooding.

## Reducing our energy and water consumption

Climate change impacts the poorest in the world...who contribute the least to it. An idea for a challenge could be to design a product or a system that would reduce the amount of energy and/or water you or your community uses. This would ultimately help people in the developing world as well as your own country.



For ideas on reducing energy and water consumption try looking at:

15 gadgets designed by other people to reduce energy consumption—<http://www.techrepublic.com/pictures/photos-15-gadgets-to-reduce-your-energy-consumption/3/>

Ideas on how to save water  
<http://www.how-to-save-water.co.uk/>

A very sustainable day!  
<http://www.biethinking.com/storyof.htm>

## Recycling waste water

Recycling waste water is an important part of reducing the amount of precious water we all use. You may want to focus your challenge on how to recycle waste water in your own local community and/or in a community in a developing country.

As a starting point you could find out if your school or other buildings in your community recycle waste water. Consider how you might persuade other people it is important.

You can find information about ways to clean water used in homes here:

- Centre for Alternative Technology Water and Sewage <http://info.cat.org.uk/water-and-sewage>
- The Renewable Energy Centre  
<http://bit.ly/rec-wtr-recycle>



**Building flood defences in Nepal**

## Producing less waste

A lot of energy goes into making food, packaging etc., much of which is wasted. If we produce less waste we will reduce energy consumption and again contribute to reducing the impact of climate change around the world. Would you like your challenge to be around designing a product that helps reduce food waste or packaging?

Website looking at reducing food waste  
<http://www.wrap.org.uk/food-waste-reduction>

15 ways to reduce food packaging  
<http://www.care2.com/greenliving/reducing-food-packaging.html>

Website with lots of useful information and videos on recycling <http://www.recyclenow.com/>

Maybe your challenge could be around making a product out of recycled or reused materials?

Ideas for products  
<http://sobadsogood.com/2013/05/19/21-brilliant-objects-made-from-recycled-materials/>



Rainwater harvesting in Sri Lanka

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**SPURS AND DYKES FOR FLOOD WATER PROTECTION**

Spurs and dykes are structures that can be made by communities on a small scale from available materials and used to protect river banks and help the communities in Nepal cope with flooding waters.

Introduction  
 Around 80% of Nepal is mountainous. In these areas, the main risk on the steep slopes erodes the soil and leads to landslides, resulting in loss of life and property and a threat to life. And in the lower lying areas of the country there is often flooding during the monsoon season, especially the ravine communities. Much of the flood-prone areas are marginal communities, active such as deforestation and farming. This has led to a significant increase due to rising riverbed levels and in locations where the rivers meet, changes occur. Breaches of embankments occur every year in some places.

People most at risk are those living alongside the rivers. In many cases these people are the indigenous disadvantaged who are the poorest of the poor - potters, bamboo craft workers and untouchables - the socially excluded. The majority are dependent on the river's resources for their livelihoods, therefore settlements of these communities are almost always near the river.

Communities that are at risk can act together to put in place flood management plans and work on preventative measures before flood events occur. Community activities include the use of gabions to reinforce spurs and dykes along with a range of other activities to reduce their vulnerability to flooding.

The response to floods  
 Traditional flood response to floods were often a hasty mobilised reaction to an emerging disaster. Practical Action and ECHO have been working alongside the government and CDF to review flood reduction activities. The approach of Practical Action and its partners was to galvanise the community to act as a whole in their preparation for floods. Together with the government the approach was to establish a Community Flood Management Committee - CFMC that promotes cooperation.

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**technical brief**



## Preparing for natural disasters

No matter what we do to try and reduce the impact of climate change in the future, some of those impacts such as flooding and drought will continue to happen. Maybe your challenge could be around how to warn people of natural disasters such as flooding, earthquakes or drought.

### Flooding

If communities have enough notice that they are going to be flooded they have more chance of evacuating themselves and their possessions, so early warning systems save lives. Such systems include

- An electronic device that enables people 'up river' to detect when water levels rises, so that they can alert communities that will be affected
- A watch tower to both see when river levels are dangerous
- A very loud alarm system to warn people of flooding

For general info on early warning systems go to <http://practicalaction.org/flood-early-warning>

### Earthquakes

Knowing that an earthquake is about to happen will enable evaluation for the area. How could this be done?

### Drought

When water is scarce farmers need to know when to use the small amount of water they have stored to irrigate plants. Perhaps a challenge could be around designing a system that indicates when soil is dangerously dry and needs watering.



**Climate change has caused unpredictable weather patterns in Peru. This farmer has made use of an alpaca shed to reduce deaths of his animals in harsh weather conditions.**

## Adapting to climate change

As well as flooding, drought and earthquakes, climate change has also affected the temperature of our planet. This means that natural environments have changed, places may be hotter, colder or wetter than they used to be and this affects which crops can be grown. Could your challenge investigate how to make crops more resilient to new conditions brought about by climate change, or could you think of a way of growing a well-known crop in a new condition?

To find out how plants can be adapted to salty water, see <http://practicalaction.org/adapting-rice-to-saltier-water-1>

To see how farmers in Peru have adapted to colder weather go to <http://practicalaction.org/surviving-freak-freezes>

Take a look at this amazing project where pumpkins are grown in infertile land caused by river flooding <http://practicalaction.org/compost-pit-demo-1>



Pumpkins grown on infertile land caused by flooding in Bangladesh

**PRACTICAL ACTION**  
Technology changing lives

**ADAPTING RICE TO SALTIER CONDITIONS**

This brief outlines the approach of using indigenous varieties of rice to develop salt tolerant crops for areas where soil salinity is an increasing problem.

**Introduction**

Rice is the principle cereal crop and forms a part of subsistence agriculture in many countries. In developing countries rice is a major source of protein in the diet of the poor. There is a growing interest in using indigenous rice varieties to adapt to the challenges of climate change and improve the land conditions and cope with high soil salinity. This brief aims to highlight the work of Practical Action.

**Why use indigenous crops and adopt organic farming?**

Saltiness is one of the major factors limiting crop production in the world, especially in the developing countries. Salinity is a major constraint to rice growing countries face a major problem of high soil salinity. There is a growing interest in using indigenous rice varieties to adapt to the challenges of climate change and improve the land conditions and cope with high soil salinity. This brief aims to highlight the work of Practical Action.

**Traditional rice varieties**

Traditional rice varieties can offer a home grown solution to the increasing soil salinity and farmers can benefit by increasing their harvest on salt affected lands. Increased food production in the face of climate change will be a major concern of the farmers, but will also create the employment opportunities for the local people. The improved varieties will be more resistant to pests and diseases and will help to reduce the cost of production. Few case studies point out that certain traditional rice varieties have greater tolerance for soil salinity. These varieties are more resistant to pests and diseases and will help to reduce the cost of production.

**The study carried out in India (Bhowmik and Kishorean, 2001) observed that the traditionally cultivated salt tolerant varieties showed good grain quality characteristics, sold for a higher price and had better consumer's preferences.**

**Land preparation process**

Traditional saline soils can be rehabilitated by using short term, medium term and long term strategies proposed by the Soil Science Society of Sri Lanka.

**Short term strategies**

The short term strategy is a simple and cheap and involves suitable salt content to a level at which the salts do not seriously interfere with the plant growth. The only practical way of removing salt from the soil is by leaching, a process that involves washing out the salt with water.

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## Useful Links

### Global Goal 13: Climate Action

<http://www.globalgoals.org/global-goals/protect-the-planet/>  
Useful information on Global Goal 13 and how to get involved

### Global Goal 13: Climate Action

<http://www.un.org/sustainabledevelopment/climate-change-2>  
Information from the UN about Global goal 2: ending world hunger

### The Paris agreement on Climate Action

<https://www.youtube.com/watch?v=CCyAQT-uHZc>

### Technical briefs from Practical Action

<http://practicalaction.org/technical-briefs-schools-manufacturing>  
Examples of manufacturing goods by recycling and reusing materials

### Technical briefs from Practical Action

<http://practicalaction.org/technical-briefs-schools-agriculture>  
Technical information on agricultural techniques

### The 6 R's of sustainability–

<http://practicalaction.org/6rs-sustainability>  
Activities to help understanding of the 6R's, reduce, reuse, recycle repair, rethink and refuse

### Energy saving trust

<http://www.energysavingtrust.org.uk/>  
Useful information on energy saving

### How big is your environmental footprint?

<http://footprint.wwf.org.uk/>  
A ways to calculate your environmental impact

### Climate change videos

### Case study of how an early warning system saves lives

<http://practicalaction.org/blog/where-we-work/nepal/early-warning-system-saves-lives-in-monsoon-hit-nepal>  
How an early warning system saved the lives of people in Nepal

### Videos – preparing for disaster

<https://www.youtube.com/watch?v=sAQWYtj-a6c>  
Shows how a student is an active part of the Disaster Risk Reduction committee

### YouTube videos form Recycle Now

<https://www.youtube.com/user/RecycleNowCampaign/videos>  
Lots of great videos on recycling and reusing form the Recycle Now campaign

### Before the flood

<https://www.beforetheflood.com/>  
National Geographic film (with trailer) on climate change

### Climate change Images

<http://practicalaction.org/climate-change-image-gallery>  
Images around climate change



A Nepalese man building a flood defence which will protect the river bank from eroding