



# Imprint

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**Design**

DW Design

**Printer**

Laserline Druckzentrum Berlin

**Publication date**

October 2020

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Printed on recycled paper.



Supported by:



Federal Ministry  
for the Environment, Nature Conservation  
and Nuclear Safety

based on a decision of the German Bundestag

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# Editorial

My children have very specific ideas about what they want to eat and drink. My daughter is vegan, and therefore rejects meat, dairy and fish. My son practices a lot of sport and doesn't want to give up fish, but he insists on it being organic. They're both driven by a wish to eat healthily while also protecting the planet.

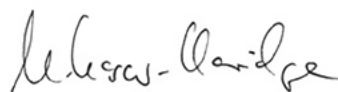
Conversations at home often turn to the climate crisis. Images of forest infernos, whether in Russia, Australia, the US or Brazil have the same shocking impact as heavy tropical storms and flooding events. We are acutely aware that the climate crisis is well underway, but the contents of our refrigerator don't yet reflect the increasing incidence of such extreme weather events.

It's a different picture in other parts of the world. In Asia, Latin America and Africa, failed harvests and rising food prices often pose a threat not only to nutrition, but also to livelihoods. Almost one in four people in the world is now living with the uncertainty of whether they will have enough to eat the following day.

As a family, we ask ourselves, what we can do? Our answer is to eat regionally. That means sourcing fruit and vegetables close to home in order to prevent long transport routes and thereby make a contribution to environmental protection. We shop on foot or by bicycle, and we eat seasonally. Where we live that means cabbage, potatoes and apples during the winter months, but no avocados and strawberries, which are generally grown in greenhouses and imported by plane. Whether we would go as far as others and eat insects, which are climate-friendly and packed with protein, or eat lab-grown meat, is hard to say. So far, such alternatives are barely visible on the German market.

We need new concepts that both secure food supply for a growing global population, and simultaneously protect the climate. In this learning pack "Food for the future – feeding the world in a climate-friendly way" we introduce you to some of these ideas. You will develop others for yourself. I wish you all fun working on this subject.

Yours faithfully,



**Manuela Kasper-Claridge**

*Project leader, Global Ideas  
Editor-in-chief, Deutsche Welle*

# Introduction

This **booklet** is part of the learning pack “Food for the future – Feeding the world in a climate-friendly way” published by Deutsche Welle and produced by the editorial team from the environmental series **Global Ideas**. It is designed to help teachers prepare and give classes. The content is aimed at children between the ages of 12 and 16, but the materials can also be used outside school settings by environmental groups.

The pack contains four modules with **worksheets** for participants and explanatory **handouts** for teachers. Where necessary, these include solutions. The modules build on each other but can also be used independently of one another. Suggested lesson durations should be regarded as a general guideline. You will be the best judge of the pace at which your group learns.

**Articles** and **films** are intended to be used as learning tools. Where necessary and possible, students should watch the films several times in order to complete the film tasks. It would be helpful, but is not essential, for students to have their own devices on which to watch the films. You will find instructions on how to play the films on the last page of this booklet.

The print version of the learning pack includes a **DVD** containing all the educational material in digital form. You will find an overview of all films and articles in the media index on the last page.

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For distance learning, we also offer a **workbook for participants**. This includes the handouts for independent study at a computer, as well as links to the films and articles.

You will find the PDF “workbook for participants” as well as all other materials under downloads on the web pages for learning pack #7 “Food for the future”:  
[dw.com/food-for-the-future](http://dw.com/food-for-the-future)

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## Tip

If you are interested in other learning packs for either distance or face-to-face teaching, take a look at our pages: [dw.com/learning-environment](http://dw.com/learning-environment)



Icon for handouts



Icon for worksheets

# Structure

How climate-friendly is our food? What impact do heat, drought and other extreme weather conditions have on food production? And how can farming be made fit for the future? In this learning pack you and your group will explore the relationship between food and climate change. We will address these questions in four modules, each of which has a different focus.

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## **Module I – Background and problem**

The first module looks at the relationship between food and climate change. You will start the module with a short game before inviting participants to ask each other about their eating habits. Make the participants aware of the correlations between meat, food production and climate change. Activate any existing knowledge among participants by having them connect two expressions. The answers are contained in two short films which explain the connections. Afterwards, the participants read an article explaining how climate change is directly impacting the harvest of subsistence farmers in Nicaragua.

## **Module II – Individual dimension**

Which foods do I consume? How climate-friendly is my favorite food? The participants are given a quiz to help them find out. They then conduct an experiment which teaches them to use the remains of lettuce or certain vegetables to grow new plants. In order to introduce them to the production side of food, organize a group excursion to a farm, a factory or another local site where food is made.

## **Module III – Solutions**

How can the manifold problems relating to food production be solved? Participants are given some indications in the third module. Using four reports – three films and one article – which look at climate-friendly solutions from different parts of the world, they are given an insight into the global dimension of the problem. The participants work in groups to create posters relating to the four examples. They then present these to the group and evaluate the potential solutions.

## **Module IV – Solutions**

In the fourth module, you will introduce participants to concrete action. In an article and through interviews they conduct themselves, they get to know foragers and discover the value of traditional knowledge. Give participants the chance to write down their own climate-friendly recipe, and to work together as a group to design a cookbook. To finish off, the participants share a climate-friendly buffet.

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The following table gives an overview of the modules. It contains information on the suggested duration of the tasks, a short description of the contents and learning objectives, the necessary material and links to the articles and films.

# Module overview

## Module I – Background and problem

What does our food have to do with climate change?

Duration	Content	Learning objective	Material and links
30 min	Reflecting on our eating habits	Playful introduction to the subject	<p><b>Handout 1</b></p> <p><b>Worksheet 1</b> (Questionnaire about a favorite dish)</p> <p><u>Material:</u> Rope or sticky tape</p>
45 min	Meat consumption, climate change, and living without meat	Recognizing the connection between food production and climate change, and the ways in which they influence each other	<p><b>Film 1</b> "Nutrition and climate change – the food of the future" <a href="http://dw.com/p/3fOpK">dw.com/p/3fOpK</a></p> <p><b>Film 2</b> "Can vegetarians save the planet?" <a href="http://dw.com/p/39Psl">dw.com/p/39Psl</a></p> <p><b>Handout 2</b></p> <p><b>Worksheet 2</b> (Pairing words and expressions)</p>
45 min	Subsistence farmers are impacted by climate change in Nicaragua	Understanding that advancing climate change destroys livelihoods	<p><b>Article 1</b> "Caught between floods and drought: Farmers in Nicaragua living in uncertainty" <a href="http://dw.com/p/3Jgi7">dw.com/p/3Jgi7</a></p> <p><b>Handout 3</b></p> <p><b>Worksheet 3</b> (Puzzle)</p>

## Module II – Individual dimensions

How environmentally and climate-friendly is the food on my table

Duration	Content	Learning objective	Material and links
30 – 45 min	Quiz: Recognizing climate-friendly foods	Participants reflect on their own eating habits	<b>Handout 4</b>  <b>Worksheet 4.1</b> (Quiz)  <b>Worksheet 4.2</b> (Definition of expressions for the quiz)  <b>Worksheet 4.3</b> (Quiz scoring)
Preparation: 45 min  Experiment: depending on the plant	Experiment: Regrowing new plants from vegetable leftovers	Increasing our appreciation of food  Getting participants excited about growing vegetables  Avoiding food waste	<b>Handout 5</b>  <b>Worksheet 5</b> (Regrowing experiment)  <u>Material:</u> Lettuce/vegetables, vessel, water, vegetable knife, measuring tape, flowerpot with earth
Preparation: 30 min  Individual implementation	Excursion: Getting to know regional food production	Individual planning of an excursion to explore “How is food produced in my region?”	<b>Handout 6</b>  <b>Worksheet 6</b> (Excursion questionnaire)  <u>Material for the poster:</u> Large piece of paper or card, scissors, glue, pens, perhaps photos



## Module III – Solutions

How can food be produced in a more environmentally and climate-friendly way?

Duration	Content	Learning objective	Material and links
90 min	Food production: solutions for the future	Understanding four different approaches to future-proofing food production, critically reflecting on them and presenting them on a poster	<b>Handout 7</b>  Material for poster: Paper or card, scissors, glue, pens, magazines or advertising brochures for a collage
<b>Subject 1</b>			
	Climate-friendly milk production in India	How can milk become more climate-friendly?	<b>Article 2</b> "Can less-flatulent cows help the planet?"  <a href="https://www.dw.com/p/2kfpk">dw.com/p/2kfpk</a>  <b>Worksheet 7.1</b> (Make poster)
<b>Subject 2</b>			
	Sustainable fish farm in Kenya	What constitutes sustainable fish production?	<b>Film 3</b> "Keeping cool with the sun on Lake Victoria"  <a href="https://www.dw.com/p/2xrUg">dw.com/p/2xrUg</a>  <b>Worksheet 7.2</b> (Make poster)
<b>Subject 3</b>			
	Improved harvests thanks to artificial light in Europe	Fruit and vegetables thanks to LED lights	<b>Film 4</b> "Bumper harvest with LEDs"  <a href="https://www.dw.com/p/39p47">dw.com/p/39p47</a>  <b>Worksheet 7.3</b> (Make poster)
<b>Subject 4</b>			
	Maintaining potato diversity in Peru	What is being done to ensure diversity of potato species and why is this so important?	<b>Film 5</b> "Preserving Peru's potato power"  <a href="https://www.dw.com/p/1CTHv">dw.com/p/1CTHv</a>  <b>Worksheet 7.4</b> (Make poster)

## Module IV – Taking action

### My personal food of the future

Duration	Content	Learning objective	Material and links
Preparation: 30 min + Individual implementation	Nature's pantry – wild plants, wild fruit and mushrooms	Getting acquainted with traditional knowledge	<p><b>Article 3</b> "Foragers find a taste of nature amid London coronavirus lockdown" <a href="https://www.dw.com/p/3dVAn">dw.com/p/3dVAn</a></p> <p><b>Handout 8</b></p> <p><b>Worksheet 8</b> (Interview)</p>
45 min	<p>Create a climate-friendly cookbook</p> <p><b>Optional</b></p> <p>Short film about a dish made from mangrove beans that grow in the wild</p>	Using a cookbook to share criteria for climate-friendly eating with others	<p><b>Handout 9</b></p> <p><b>Worksheet 9</b> (Climate-friendly recipe)</p> <p><u>Material:</u> Scissors, glue, pens, photos or leaflets</p> <p><b>Film 6</b> "Mangrove bean dish from the Solomon Islands" <a href="https://www.dw.com/p/3cA7X">dw.com/p/3cA7X</a></p>
Individual	Class task: climate-friendly buffet	Using a shared experience to cement what has been learned	<p><b>Handout 10</b></p> <p><u>Material:</u> Cutlery, food for the buffet</p>

## Module I – Background and problem

### Handout 1



# Reflecting on our eating habits

**Duration: 30 min**

What does nutrition mean for the participants? Use a movement game called **“line-up”** to introduce the subject and invite participants to share their views.

#### What it's about

Participants should consider their own eating habits. To do this, they answer questions and depending on their answers, stand in a line in the room. This gives you and the participants an initial impression of eating habits within the group.

#### Introduction to the game

Using a rope or tape, create a line along the floor. One end of the line stands for “yes”, the other for “no”.

YES

NO



Call out different statements about food and nutrition, which can be answered with yes or no. For example:

*“Breakfast is the most important meal of the day for me” or “I like to eat meat”.*

Participants give their answers to the questions by standing in the relevant spot along the line between “yes” and “no”. When participants have understood the system, they can formulate their own statements.

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#### Establishing a favorite dish

At the end of the game, ask participants to form pairs. They should then interview one another about their favorite dish. Use the questionnaire on **Worksheet 1**. Afterwards, some of the participants can present their partner's favorite dish to the rest of the group.

» **Worksheet 1**

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#### Tip

At the end of this unit, participants swap worksheet 1 so that everyone keeps the questionnaire relating to their own favorite dish. You will use these again in module II, so please ask participants to keep the worksheet.



# Worksheet 1

## Module I

### Questionnaire about your favorite dish

Working in pairs, ask each other the following questions. Make a note of each other's names and answers. Once you have finished, swap the questionnaires so you each keep the one relating to your own favorite dish.

\_\_\_\_\_

**Favorite dish of** ..... (Name)

1. What is your favorite dish?

.....  
.....

2. Which ingredients are in your favorite dish?

.....  
.....  
.....  
.....  
.....

3. Do you eat the dish on a particular occasion?

.....  
.....

4. Who makes the dish best?

.....  
.....

5. Do you have any memories connected to your favorite dish? If so, what are they?

.....  
.....  
.....  
.....  
.....



## Meat consumption, climate change and living without meat

**Duration: 45 min**

Climate change, nutrition and food production are connected. Two films give insight into how industrial meat production impacts land and water use, and the climate crisis. They also look at initial solutions, such as insects as a future food source, lab-grown meat, and space-saving methods of growing food for cities.

### What it's about

Before you show the films, you can introduce participants to the subject using the “**guess and know**” method. Participants work in pairs.

On **Worksheet 2** you will find 12 cards with pairs of words and expressions taken from films 1 and 2, which you will watch with the group later. Start by making enough copies of worksheet 2 to ensure there are sufficient cards for each pair of participants. Cut the cards out and randomly distribute them so that each group of two has one card.

» **Worksheet 2**

### Rules of the game

Each duo is given a pair of words and expressions, such as “*greenhouse gas emissions and cattle*”. The participants should write down bullet points about possible connections between the two terms. These are not to be marked. Instead show participants the films and ask them to check what they noted down. You will find the **solutions** on the next page.

### Films

Show both short films which explain the connections between the pairs of expressions on each card. You will find the films on the DVD or online under the following links:

**Film 1** “Nutrition and Climate Change – the food of the future”: [dw.com/p/3fOpK](http://dw.com/p/3fOpK)

» **Film 1**

**Film 2** “Can vegetarians save the planet?”: [dw.com/p/39PsI](http://dw.com/p/39PsI)

» **Film 2**

The participants should make notes while watching the films. When the films are finished, they tell the big group how the words and expressions on their respective cards are connected. The presentations shouldn't take more than two minutes.

**Note for distance learning.** In the workbook for participants, this exercise is available as a table which participants can fill out.



## Solution: How the pairs of words and expressions are connected

Words and Expressions	Connection	Film
<b>Affluence and Meat consumption</b>	As affluence increases, so does meat consumption. Last century, global meat consumption increased by 30%.	1
<b>Avocados and Water</b>	320 liters of water are required to produce a single avocado in the arid regions of Chile.	2
<b>Beef and Grains</b>	As more meat is consumed, more food – such as grains or soy – must be grown to feed the animals. It takes 9 kg of grain and up to 49 m <sup>2</sup> of land to produce 1 kg of beef.	1
<b>Industrial livestock farming and Insects</b>	If humans were to eat insects instead of cattle or pigs, there would be no problem with intensive livestock farming.	1
<b>Meat and Agricultural land</b>	Some 75% of all agricultural land is currently used for meat production. (Film 1). If everyone was vegetarian, it would free up 30 million square kilometers of land on which animals currently graze.	1 2
<b>Vegetarians and Superheroes</b>	Vegetarians are considered superheroes of climate-friendly nutrition. But that is not necessarily the case. The decisive question is: where does my food come from? Meat-eaters can also eat in a climate-friendly way by occasionally buying regional meat derived from animals kept on pastures.	2
<b>Water and Beef</b>	It takes 3,000 liters of water to produce a single steak. That is enough water to shower twice a day for three months.	2
<b>Forest and Animal farming</b>	Raising a growing number of animals requires increasing amounts of animal fodder. It takes a lot of land to grow crops such as soy and grains. In order to create more space for crop growth, forests are cleared.	1
<b>3D printers and Steak</b>	Scientists are working on creating meat from 3D printers or in petri dishes. No animals would need to be killed if meat were produced in this way.	1
<b>Cow manure and Farming</b>	Cows help enrich the soil with their manure, which is a natural fertilizer: When cows are kept in fields and eat grass, their dung and urine enriches the soil which is good for the environment.	2
<b>Fungi and Population growth</b>	Increasing populations imply a greater demand for food and a need for alternative sources, such as protein-rich fungi instead of meat.	1
<b>Cattle and Greenhouse gas emissions</b>	Cattle produce twice as many greenhouse gases as global air traffic. There are some one billion cows worldwide.	2

**Module I**
**Worksheet 2**


## Pairing words and expressions



<p><b>Affluence and Meat consumption</b></p>	<p><b>Avocados and Water</b></p>	<p><b>Beef and Grains</b></p>
<p><b>Industrial livestock farming and Insects</b></p>	<p><b>Meat and Agricultural land</b></p>	<p><b>Vegetarians and Superheroes</b></p>
<p><b>Water and Beef</b></p>	<p><b>Forest and Animal farming</b></p>	<p><b>3D printers and Steak</b></p>
<p><b>Cow manure and Farming</b></p>	<p><b>Fungi and Population growth</b></p>	<p><b>Cattle and Greenhouse gas emissions</b></p>



## Handout 3

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## Module I

# Nicaragua: Subsistence farmers suffer from climate change

 **Duration: 45 min**

As climate change takes hold, it is destroying harvests in many areas of the world. This poses a major problem for subsistence farmers who have few chances to adapt to the impacts of our warming planet.

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Participants read **article 1** "Caught between floods and drought: Farmers in Nicaragua living in uncertainty". You will find a copy of the article enclosed or you can access it using this link: [dw.com/p/3Jgi7](http://dw.com/p/3Jgi7)

» **Article 1**

In order to encourage participants to engage with the article, start off by giving them **worksheet 3**, which is a shortened and simplified summary of the article. The summary reads like a puzzle and the participants should try to make sense of it (mystery method). In order to solve the puzzle, they should then be asked to read article 1.

» **Worksheet 3**

Where necessary, explain the meanings of any unfamiliar words or expressions used in the text. Once they have solved the puzzle, they will understand the correlation between the consequences of climate change and insufficient food.

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### Solution

1. *Blanca Landero Betarco* lives in the village of *La Grecia*.
2. She works as a *farmer*. Blanca grows beans, rice, corn and wheat. Blanca lives from her crops. She is what is known as a *subsistence farmer*.
3. It is too hot and dry in her village; the plants don't have enough water which means the harvests are bad. There is not enough drinking water, which makes it increasingly difficult for her to take care of her animals. The result is that Blanca has less and less food. When it does rain, there is often so much water within a short space of time, that it causes flooding. This can also destroy her harvest.
4. Blanca's son Norlan Alberto Martinez Silvia lives in *San José*, the capital of Costa Rica. He sends half of what he earns to his mother in Nicaragua.
5. Although Blanca greatly misses her son Norlan, she is happy that he has work as it means they can both survive. She tries to call him, but it's not always possible for them to talk as he works at night and has to sleep during the day.



# Module I

# Worksheet 3



## Puzzle: Blanca’s story

*This is Blanca. She often waits a long time for rain, but when it finally comes, she is still sad, and hopes it will soon ease off.*

*She only speaks to her son Norlan on the telephone from time to time. She would like to talk to him more often, but it’s not easy. She misses him very much. Nonetheless, Blanca is happy that Norlan is not at home.*

In order to understand Blanca’s puzzling story, read the **article** “Caught between floods and drought: Farmers in Nicaragua living in uncertainty”.

Then answer the following **questions**:

1. What is Blanca’s full name and where does she live?

.....  
.....

2. What is Blanca’s job?

.....  
.....

3. Why does Blanca often wait longingly for rain? Why is Blanca then sad when it does rain?

.....  
.....  
.....

4. Where does Blanca’s son Norlan live?

.....

5. Why is Blanca glad that her son is not with her even though she misses him so much?

.....  
.....



## Caught between floods and drought: Farmers in Nicaragua living in uncertainty

**Across the Central American Dry Corridor, communities are facing increasingly extreme weather. In Nicaragua, the region's poorest country, subsistence farmers like Blanca Landero Betarco face a daily battle.**

The air is dry and the heat intense in the village of La Grecia in north-western Nicaragua. The temperature is a little more forgiving inside the modest red brick house where Blanca Landero Betarco shows off her small harvest of red beans.



Like her parents, and their parents before them, 60-year-old Betarco lives from subsistence farming – growing beans, rice, corn and wheat. However, in recent years, the land hasn't yielded enough to subsist on.

"I don't know how many more years I'll be able to stay living here on this land, in these conditions – whether I'm going to starve to death," Betarco told DW. "Because that's what this land might have in store for us: death."

La Grecia is in the Chinandega area in a region known as the Dry Corridor that extends along the Pacific coast of Central America, through Guatemala, El Salvador, Honduras and Nicaragua.

When El Niño hit from 2014 to 2016, drought laid waste to food production in the Dry Corridor. Betarco and her family made it through on the little money two of her four children earned working at local factories, but hunger became an everyday reality.

"We lost everything in those years, our whole harvests of beans, plus rice and corn," she says. "Sometimes we would skip one or two meals to make the food last longer. I don't know how we managed to survive."

For some, life in Betarco's village became unsustainable. "Some people starved to death, others got skinny," she says. "Those years were very hard around here. A lot of people left for Costa Rica, Panama and Spain."

### Nicaraguans on the move

According to local NGO, the Humboldt Center, 90% of maize and 60% of bean crops in Nicaragua were lost in 2016. Another NGO, Germanwatch, meanwhile, ranks Nicaragua – the poorest state in Central America – among the most climate-vulnerable countries in the world. Rainfall there has become increasingly irregular.

"Because of climate change, the conditions for agricultural production in the Dry Corridor don't exist any-

more," Victor Campos, director of the Humboldt Center, told DW. "That creates a food crisis, and if there isn't another kind of income available for families, it leads to famine."

According to the UNHCR, more than 55,500 people have left Nicaragua for neighboring Costa Rica in the last year. Political upheaval may be the most immediate cause, but climate change is increasingly recognized by organizations like the United Nations as a factor driving Central American migration.

Tania Guillen, a Nicaraguan researcher at the Climate Service Center Germany, told DW that with small farmers losing crops, food insecurity in Nicaragua "could be a decisive factor to migrate to other countries in the region."

### Support from remittances

Betarco's 25-year-old son, Norlan Alberto Martinez Silvia, fled because he couldn't see a future in Nicaragua, partly because of the strong and lasting drought.

"I came to Costa Rica to look for better economic conditions," he told DW, as he clocked off at 6am

Module I

Article 1



from his job as a security guard at a private school in Cartago near the Costa Rican capital of San Jose. "I worked with my mother before, but it didn't generate any money, just more or less enough food to feed oneself."

Now he can send more money back to his family than he could if he had stayed at home, where his monthly salary at a food processing plant was equivalent to \$200 (€177) a month. In Costa Rica, he earns the equivalent of \$600 (€532), and sends half to his mother. It was difficult for Betarco to see her son leave, but the money he sends is essential. "He sends me money so that I'm able to survive here," says Betarco.

**Struggling to adapt**

El Niño marked a low point for the Dry Corridor, but communities have continued to struggle. The Humboldt Center's latest research indicates that temperatures are rising and are likely to hit extreme highs with increasing frequency.

Betarco's last two harvests have seen little improvement on 2016 and she feels the environmental changes seem to be permanent.

"In Chinandega, we had a great river; today there is no river, it's more like a puddle."

The shortage of drinking water has also made it increasingly difficult to look after her livestock.

It now rains on only half the number of days each year compared to a decade ago. Yet too much rain in too short a period is also a problem and the Dry Corridor is seeing more frequent floods.

In May this year, a month's worth of rain fell in just five days, which means the first harvest of the year will likely fail, according to the Humboldt Center.

**El Niño** Spanish for "boy", "Christ child"

The term defines a natural phenomenon that occurs every three to four years, and which can lead to extreme weather events such as heavy flooding, drought or tropical storms around Christmas time. Climate change exacerbates El Niño, making it stronger and more unpredictable.

This uncertainty is one of the greatest challenges for farmers like Betarco. They can't plan when to sow as the plants can't thrive in soil that is too arid or too wet.

"Climate change has affected our production a lot," Betarco says. "It means that today it rains, tomorrow it doesn't. And then there is such heat."



© Manuel Esquivel Urbina

Since 2016, Betarco has been measuring rainfall levels each day using a plastic tube called a pluviometer. She pays close attention to the beginning of the rainy season and measures the soil to determine when it's best to sow her seeds. It

gives her a small sense of preparedness against the uncertainty. However with the prognosis for the conditions in the year ahead not looking good, she can only hope the harvest will exceed expectations: "We still have to wait and see about this year."

12.06.2019  
 Author: Lise J Hermann  
 dw.com/p/3Jgi7



## Test: Recognizing climate-friendly foods

 **Duration: 30 – 45 min**

What determines whether food is climate-friendly? Participants use a test to check how climate-friendly their favorite dish is and learn the most important criteria for climate-friendly nutrition in the process.

### Preparation

Use the completed **worksheet 1** “Questionnaire about your favorite dish” as a starting point. Hand out **worksheet 4.1** “Quiz: How climate-friendly is my food?”

» **Worksheet 1**  
» **Worksheet 4.1**

### Doing the quiz

Participants must name the three main ingredients in their favorite dish. These should be the main ingredients in terms of quantity – such as fish, meat, vegetables, pasta, rice or potatoes. They can ignore smaller ingredients such as spices.

In order to do the quiz participants have to research the background of the three main ingredients. For example, whether the ingredients were produced ecologically or conventionally, or whether they were grown seasonally or regionally. Discuss the differences using **worksheet 4.2** “Glossary of words and expressions used in the quiz” and help participants with their research, for example into possible certifications on food packaging.

» **Worksheet 4.2**

### Scoring

Using **worksheet 4.3** participants can work out their quiz scores themselves. But this should not be given to them until they have completed the quiz. For each ingredient, participants add up the climate points (symbolized in the test by leaves). They add together the scores of all three ingredients and then divide the total by three to get an overall climate score which helps them to see how climate-friendly their favorite dish is. The more points they score, the more climate-friendly their dish is.

» **Worksheet 4.3**

### Note

When evaluating the number of climate points, we are looking at averages. For example, plant-based foods are generally more climate-friendly than animal products, and organic food produces fewer emissions than conventionally farmed produce.

As with all averages, however, there are exceptions. Meat from ruminants such as cattle grazed sustainably is more climate-friendly than that from cows kept in sheds and fed with soy and corn. Since this is an introduction to the subject, we have not made any more complex distinctions.

Module II

Worksheet 4.1



### Quiz: How climate-friendly is my favorite dish?

This quiz will reveal how climate-friendly your favorite dish is. To work this out, name three of the **main ingredients** in your dish. You will collect *climate points* 🌿 for each one. If a question is not relevant to your choice, you can leave it out. On **worksheet 4.2** 🌿 = 1 *climate point* you will find a list of words and expressions that might help you. You will find the quiz scores on **worksheet 4.3**.

**Favorite dish of** ..... (Name)

<b>Ingredient 1</b>	<b>Ingredient 2</b>	<b>Ingredient 3</b>
.....	.....	.....
.....	.....	.....

<b>1. PREPARATION</b>	Ingredient		
	1	2	3
<b>To what extent was the ingredient processed in a factory before it was put into your favorite dish?</b>			
• Barely processed (such as <i>potatoes, lentils, rice, raw meat, raw fish, fresh vegetables, eggs, milk, etc.</i> ) 🌿 🌿			
• Processed (such as <i>pasta, bulgar/couscous, bread, canned vegetables, sugar</i> ) 🌿			
• Heavily processed food (such as <i>sausage, fries, chicken nuggets, fish fingers and other ready meals</i> )			
<b>2. FISH, MEAT OR VEGETARIAN?</b>	Ingredient		
<b>Is your ingredient vegetarian?</b>	1	2	3
• Yes 🌿 🌿 🌿			
• No			
<b>The ingredient is meat from the following source:</b>			
• Conventional meat (not organic) or meat from a wild animal (illegal hunting and/or threatened species)			
• Organic meat 🌿			
• Meat from subsistence farming or from wild animals (legal hunting, non-threatened species) 🌿 🌿			
<b>The ingredient is fish from the following source:</b>			
• Fish (caught in the wild or from aquaculture without a certificate) 🌿			
• Fish (aquaculture or sustainable fishing with relevant certification) 🌿 🌿			
• Fish you caught yourself (unthreatened stocks) 🌿 🌿 🌿			



# Worksheet 4.1

## Module II

<b>3. NEITHER FISH NOR MEAT: ANIMAL OR VEGAN PRODUCTS?</b>	Ingredient		
<b>Is the ingredient an animal product or is it vegan?</b>	1	2	3
• Vegan <span style="float: right;">🌿🌿🌿</span>			
• Eggs, milk <span style="float: right;">🌿</span>			
• Cheese, butter, cream, other animal product			
<b>Are these products from organic farming?</b>			
• Yes <span style="float: right;">🌿</span>			
• No			
<b>4. FRUIT, VEGETABLES OR GRAINS</b>	Ingredient		
<b>How was the fruit, vegetable or grain grown?</b>	1	2	3
• Conventional (non-organic) and/or in an air-conditioned greenhouse			
• Organic farming outside <span style="float: right;">🌿</span>			
• Homegrown (without artificial fertilizer and pesticides) <span style="float: right;">🌿🌿🌿</span>			
<b>5. SHOPPING</b>	Ingredient		
<b>Where did the ingredient come from?</b>	1	2	3
• Locally (growers such as local or neighboring farms) <span style="float: right;">🌿🌿🌿</span>			
• Regional – up to 100 kilometers away <span style="float: right;">🌿🌿</span>			
• Between 100 – 500 kilometers away <span style="float: right;">🌿</span>			
• Imported by plane or container ship			
<b>How do you and your family shop?</b>			
• On foot or by bicycle <span style="float: right;">🌿🌿🌿</span>			
• On the bus or train (public transport) <span style="float: right;">🌿</span>			
• By car / motorcycle / moped			
<b>6. USE</b>	Ingredient		
<b>Do you use all your ingredients, or do you have some left over?</b>	1	2	3
• I use everything for my dish, or I use what is left over later. <span style="float: right;">🌿</span>			
• There is something left over that gets thrown away			
<b>TOTAL CLIMATE POINTS <span style="float: right;">🌿</span> PER INGREDIENT</b>			

## Module II

## Worksheet 4.2



### Glossary of words and expressions used in the quiz

**Vegetarian food** contains no meat, fish or other seafood. It means not consuming other products that contain animal ingredients, such as gelatin. Vegetarians largely eat plant-based foods.

» *Question 2*

---

**Vegan food** is purely plant-based, with no animal products whatsoever. That means no cold cuts, meat, fish, honey or dairy products, such as cheese, yogurt or eggs.

» *Question 3*

---

**Seasonal fruit and vegetables** are grown outside and ripen in harmony with nature. Fruit and vegetables that are imported from distant locations are not considered “seasonal” – even if they are freshly ripened in the place where they were grown.

» *Question 4*

---

**Regional foods** are planted and grown close to where they are consumed. This saves long journeys. The term “regional” is not specifically defined. Many people interpret it to mean a distance of up to 100 kilometers from where they live.

» *Question 5*

---

**Organic farming:** Organic describes food that has been produced in an environmentally friendly way. Many countries have organic certifications to mark these products.

» *Question 2, 3 and 4*

---

**Fish caught in the wild:** Almost all seas, rivers and lakes are overfished, which means fish are being caught faster than stocks can be replenished by reproduction or migration. Numbers of tuna and swordfish have declined by 90% in the past 10 years. Only a few species of fish can now be caught in the wild without reservation.

» *Question 2*

---

**Sustainable wild fishing:** When fishing is done sustainably, quotas are used to protect species.

» *Question 2*

---

**Aquaculture** is the term used to describe fish farming. Fish produced in this way can help to counter depletion of stocks in seas and lakes.

» *Question 2*





## Worksheet 4.3

## Module II

### Quiz score

#### How to score?

= 1 climate point

Ingredients that imply higher than average levels of emissions, receive zero or a lower number of *climate points*. Food which is more climate-friendly receives two or a maximum of three *climate points* per question.

#### Working out your score

Add up the *climate points* from all your ingredients and divide the result by three. This formula will help you:

(All points for **ingredient 1** ..... + All points for **ingredient 2** ..... + All points for **ingredient 3** .....) ÷ 3 = \_\_\_\_\_

The result reveals the number of climate points your favorite dish scores. You can then look at the *climate scale* to see how climate-friendly your dish is.

#### Climate scale

**13 - 20** **Very climate-friendly**

Congratulations!

It would be good for the planet if more people enjoyed eating your favorite dish.

**6 - 12** **Moderately climate-friendly**

Your favorite dish isn't a climate killer, but it is also not a superhero of the future.

**0 - 5** **Not climate-friendly**

Don't worry: You don't have to live without your favorite dish in the future just because it isn't very climate-friendly. One solution could be to eat it less often or in smaller quantities.

#### Tip

#### How to get more climate points for your favorite dish

Do you want to get more points for your favorite dish? You can do this by swapping out individual ingredients and doing the quiz again. If possible, you could replace animal ingredients, such as meat, fish and dairy, with plant-based alternatives such as tofu, tempeh, mushrooms or plant-based milks. Avoid heavily processed fast food and replace it where you can with unprocessed ingredients, such as chicken meat instead of chicken nuggets, or fish instead of fish fingers. You should avoid foods that have been imported by plane or grown in air-conditioned greenhouses. Whenever you can, eat regional and seasonal foods. How you shop – whether on foot, by bike or in a car – is also important.





## Experiment: Regrowing – new plants from vegetable scraps

 **Duration: 45 min** preparation + implementation (depending on the type of vegetable)

For the regrowing experiment, participants create a small vegetable garden for the windowsill, the school yard or balcony. They can keep a record of the results. Participants don't need seeds – the plants grow from vegetable scraps generated during cooking. **Worksheet 5** shows how the experiment works.

» **Worksheet 5**

---

### Preparation

Hand out worksheet 5 (regrowing experiment). Take participants step-by-step through the introduction. Discuss the necessary materials and allocation of tasks. Participants could get the vegetable scraps from the school kitchen, for example, or from a restaurant, or they could bring them from home.

### Implementation

Participants can conduct the experiment as an ongoing homework assignment, or they can do it as a joint project in class. As each plant grows differently and depending on various factors will be ready to harvest at different times, participants should grow as great a variety of plants as possible.

### Documentation

In order to document the growth of the plants, ask participants to create a **profile** of each one, which can be regularly updated.

---

Possible **questions** for the **profile**

- How long did it take to sprout in water?
- When did the first leaves/stalk begin to show and what did they look like?
- When, and in what vessel, did you plant it?
- How did the plant continue to grow after being planted?
- When was the first harvest?
- How did it taste?
- What was most surprising for participants and what would they still like to try?

---

Once the project is finished, ask participants to talk about it in the big group.



## Worksheet 5

## Module II

### Experiment: Vegetables that can regrow

In this experiment you can use vegetable scraps generated when cooking to create a small garden on a windowsill or in your backyard. With a bit of luck, you'll soon be harvesting your own vegetables.

Regrowing works best with these types of **vegetables and lettuce**. Start by choosing one:

- Lettuce such as iceberg or Batavia
- Swiss chard, pak choi, Chinese cabbage or celery
- Leeks or spring onions (grow particularly fast)

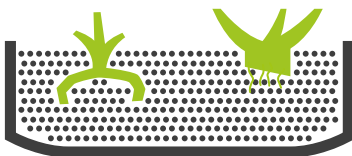
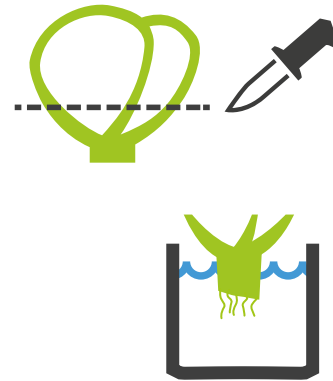
#### Material you will need:

- 1 head of **lettuce/vegetable** (see left)
- Small **vessel** (jar or dish)
- **Water**
- Sharp **vegetable knife**
- **Measuring tape or yardstick**
- **Plant pot** and **earth**

#### Instructions:

##### 1. From stalk to delicate plant

- Measure 5 centimeters from the base of the stalk or stump, then using a sharp knife, cut off the leaves or stalk above that point
- Fill a small vessel (such as an old jam jar) with water and place the stalk or stump upright inside it
- Replace the water daily to avoid any decay
- When, after a few days, new shoots start to grow up from the middle of the stalk or stump, and tiny roots become visible at its base, you can transplant it into a flowerpot



##### 2. Planting

- Dry the stump or stalk from the bottom and remove any rotting leaves or parts
- Put the plant into 2-3 centimeters of earth
- Give it a good drink of water. Now you can watch your plant's daily growth

#### Tip

Regrowing also works with carrots, beetroot, horseradish and onions. You won't get new vegetables from the scraps of the plant, but you will get new leaves which are good for adding flavor to soups, salads, etc.

## Module II

## Handout 6



### Excursion:

## Getting to know regional food production

**Duration: 30 min + Individual implementation**

Participants will be looking at local places where food is grown or produced, and working together to organise an excursion.

### Planning

Start by letting participants work in pairs to research which nearby places they could observe food production. Possible places: *Farm, communal gardens (urban farming), fattening farm, fish farm, greenhouses, dairy farm, fruit plantation*. Each pair takes one to three minutes to present the results of their research to the group. Write the participants' suggestions on the board. Discuss a realistic excursion location.

### Preparation

Participants can help you to organize the excursion. Create small groups of between 3 – 5 people and give each group a task:

- *Date*                      When could the excursion take place?
- *Making contact*        Register the group at the excursion location; find out whether participants will be allowed to take photos there
- *Getting there*            How will participants get there? Devise a travel plan. Work out the costs.
- *Formalities*              Organize permission from parents, inform the school director
- *Costs*                      Collect money for possible costs (transport, entry fee)

### Implementation

In advance of the excursion, each group comes up with questions to ask while they are on site. A template can be found on **worksheet 6**. Each group focuses on one subject **(A-E)**. The groups name one person to ask the questions during the excursion. All participants should take a pen and paper on the excursion to write down the answers.

» **Worksheet 6**

### After the excursion: Making a poster

Following the excursion, each group makes a poster about their subject to hang on the wall. If the participants are allowed to take photos on site these can be used to illustrate the poster. When they have finished their posters, participants hang them up in the group room for others to look at in whatever order they like and at their own pace.

### Material

For the poster, participants need a *large piece of paper* or card, *scissors, pens, glue* and if possible, *photos* from the excursion.



# Behind the scenes: Questions for the excursion

**In this task, you will be looking at places where food is grown or produced in your area.**

1. Work in small groups. Each group **Gruppe (A-E)** focuses on one of the subjects outlined below. Make a note of your group and the excursion location.
2. Before the excursion, think up some questions to ask while you are there. For each area of focus, there are already two or three questions. Come up with some more.
3. During the excursion ask the questions relevant to your area of focus and take notes.
4. You will use your notes later to make a poster. Take photos or draw pictures when you are on the excursion. You can then use these to illustrate your poster.

**Our excursion location** .....

**Group A Products**

- What is produced? .....
- In what quantities? .....
- What are the products used for? .....

**Group B Production methods**

- How is food produced? .....
- Which machines are used in the production process? .....
- What is the production process? .....

**Group C Workforce**

- Who works there? .....
- What abilities or qualifications do employees need to have?  
.....

**Group D Environmental-friendliness**

- Is production environmentally-friendly? (If so, how? / If not, in what way?)  
.....

**Group E Animal rearing**

- How are animals kept or slaughtered? .....
- What are animals fed and where does the food come from? .....

## Module III – Solutions

## Handout 7



# Food production: Solutions for the future

**Duration: 90 min**

In module III, participants will be looking at four different solutions for future-proof food production.

### Subject 1 India: Climate-friendly milk production

**Article 2** “Can less-flatulent cows help the planet?” takes the reader to a dairy farm in India, where methane emissions were successfully reduced by changing what the animals are fed. You will find the article using this link [dw.com/p/2kfpk](https://www.dw.com/p/2kfpk), or contained here in hard copy.

» **Article 2**

### Subject 2 Kenya: Sustainable fish farm

**Film 3** “Keeping cool with the sun on Lake Victoria” tells the story of two Kenyan siblings who use solar power to run a sustainable fish farm on Lake Victoria. You will find the film using this link [dw.com/p/2xrUg](https://www.dw.com/p/2xrUg), or on the enclosed DVD.

» **Film 3**

### Subject 3 Europe: Vertical farming using artificial light

**Film 4** “Bumper harvest with LEDs” shows how vegetables can be grown in city warehouses without natural light. You will find the film using this link [dw.com/p/39p47](https://www.dw.com/p/39p47), or on the enclosed DVD.

» **Film 4**

### Subject 4 Peru: Securing potato diversity

**Film 5** “Preserving Peru’s potato power” shows how science and agriculture can work together to develop climate-resistant varieties for the future. You will find the film using this link [dw.com/p/1CTHv](https://www.dw.com/p/1CTHv), or on the enclosed DVD.

» **Film 5**

## Making a poster

Participants work in small groups of three to four people. Each group works on one of the subjects 1 – 4 and makes a relevant poster.

Before they begin, talk to participants about the information on the poster. It should contain memorable **keywords**, **bullet points** and visual elements such as **pictures** or **drawings**, that make the content visible.

On **worksheets 7.1 – 7.4** the participants will find helpful **questions** for their posters. Each worksheet also includes four **pictures**. Participants in each group should choose the picture they think represents the subject particularly well. This picture will become the central element of the poster.

When the posters are finished, participants should show them to the big group as part of a **presentation**.

### Material

For their poster, participants need a *large piece of paper or card*, *scissors*, *pens*, *glue* and if possible, *photos* from the excursion.

» **Worksheets  
7.1 – 7.4**



## Suggested solutions for worksheets 7.1 – 7.4

<b>Subject 1</b>	<b>Climate-friendly milk production in India</b>	<b>» Worksheet 7.1</b>
<i>Problem</i>	Globally, one billion cows release methane into the atmosphere. Methane contributes to global warming.	
<i>Solution-based approach</i>	Using different feed to reduce the levels of methane emissions from cows; food from grass and maize sprouts considerably reduces the average daily methane emissions by 500 liters per day for each cow (a total of between 60 – 70 % less methane); cow dung and urine are fed into a biogas power plant, which generates enough electricity for the whole farm. A side product of the biogas power plant is a fertilizer which is used to enrich the soil. The Gau entrepreneurs share their knowledge in “cow dung management workshops”.	
<i>Critique points</i>	Insufficient information about the quality of milk on the Gau farm; European countries often use concentrated food that is grown in environmentally-unfriendly ways.	
<b>Subject 2</b>	<b>Sustainable fish farm in Kenya</b>	<b>» Worksheet 7.2</b>
<i>Problem</i>	Up to 60% of fish caught in Lake Victoria is lost. Many Mfangano Island residents live from fisheries, but there are no longer many stocks in their traditional waters. Tilapia has been in high demand since the 1980s, leaving supplies in Lake Victoria severely depleted.	
<i>Solution-based approach</i>	A brother and sister team opened a modern fish farm in order to strengthen local production. Fish is sold as far away as Nairobi (an improved cool chain using cooling boxes from Finland). Siblings are planning a climate-friendly refrigerated warehouse powered by solar energy.	
<i>Critique points</i>	Many fish farms are not environmentally-friendly. Fish are kept in small spaces which implies a need to use pesticides and antibiotics. Fish unsustainably caught in the wild are used as fodder.	
<b>Subject 3</b>	<b>Improved harvests thanks to artificial light in Europe</b>	<b>» Worksheet 7.3</b>
<i>Problem</i>	7,75 billion people inhabit the planet, most of them in cities. Cities are continuing to expand, and there is not enough space for crop growth.	
<i>Solution-based approach</i>	Vertical farming enables crop growing in cities (warehouses). All-year growing thanks to LED technology and heating systems; LEDs offer a way to directly target light at plants.	
<i>Critique points</i>	Greenhouses can be climate-damaging because the large numbers of LED lamps require a lot of electricity.	
<b>Subject 4</b>	<b>Maintaining potato diversity in Peru</b>	<b>» Worksheet 7.4</b>
<i>Problem</i>	Potato diversity threatened by climate change	
<i>Solution-based approach</i>	The “International Potato Center” in Peru (“Centro Internacional de la Papa”) collects, analyses and conserves seeds and plants from as many species of potato as possible – from all over the world. Farmers also share their knowledge. Peru, which originally domesticated the potato, is home to more than 4,000 different varieties. Another 1,000 or so come from other countries.	
<i>Critique points</i>	When potatoes are processed to make fries or chips, they become less climate-friendly. Importing potatoes from far away releases emissions.	



Module III

Worksheet 7.1



# Climate-friendly milk production in India

Carefully read the **article** "Can less-flatulent cows help the planet?" Take note of the two **info boxes** on the right.

Use the information you have gathered to create a **poster** on **subject 1**

*"How can milk become more climate-friendly?"*

Chose the **picture** below that best suits your subject, cut it out and stick it in the middle of the poster.

**Main questions for your poster:**

- What is the problem?
- What is the suggested solution?
- What do you think of the suggested solution?
- What do you like about it?
- Which aspects are you critical of?

**Cows in India**

For many Indians of Hindu faith, cows are considered a holy animal. In most Indian states, slaughtering cows is forbidden. Keeping them for milk, however, is allowed.

**Milk production and feed**

Many industrialized countries, such as Germany or the US, have used breeding and particular feed over recent years to significantly increase milk production. High-producing animals supply up to 10,000 liters of milk per year. These animals are mostly fed concentrated feed from corn and soy. The disadvantage is that soy is often grown in South America on land created by razing areas of rainforest. Corn also damages the environment because it is grown in monocultures using lots of pesticide.





## Worksheet 7.2

## Module III

# Sustainable fish farm in Kenya

Watch the **film** "Keeping cool with the sun on Lake Victoria" [dw.com/p/2xrUg](http://dw.com/p/2xrUg)  
Then carefully read the **info box** "Fish farms (aquaculture)".

Use the information you have gathered to create a **poster** on **subject 2**

*"What constitutes sustainable fish farming?"*

Chose the **picture** below that best suits your subject, cut it out and stick it in the middle of the poster.

### Main questions for your poster:

- What is the problem?
- What is the suggested solution?
- What do you think of the suggested solution?
- What do you like about it?
- Which aspects are you critical of?

### Fish farms (aquaculture)

Half the fish consumed in the world comes from fish farms – also called aquaculture. In most of these farms, fish are kept in very small areas, which means their feces and food remnants float through the net cages into the open water where they lead to pollution.

Chemical pesticides and antibiotics are therefore used to prevent the fish getting sick, but these put more pressure on rivers and seas.

For the breeding of some species, wild fish are caught and turned into feed. But that is rarely sustainable, because many rivers, lakes and oceans are already overfished.







## Improved harvests thanks to artificial light in Europe

Watch the **film** "Bumper harvest with LEDs" [dw.com/p/39p47](http://dw.com/p/39p47)  
Then carefully read the **info box** "Vegetables from the greenhouse".

Use the information you have gathered to create a **poster** on **subject 3**

*"Bumper harvest with LEDs"*

Chose the **picture** below that best suits your subject, cut it out and stick it in the middle of the poster.

### Main questions for your poster

- What is the problem?
- What is the suggested solution?
- What do you think of the suggested solution?
- What do you like about it?
- Which aspects are you critical of?

### Vegetables from the greenhouse

Whether greenhouse-grown fruit and vegetables are climate-friendly has less to do with the location of the facility and more to do with where the electricity for technologies, such as LED lamps, air-conditioning and heating, comes from.

Fossil-fuel energy sources like coal, oil and gas are much less climate-friendly than those derived from wind, solar and geothermal energy. This means regional produce is not always more climate friendly.





## Worksheet 7.4

## Module III

### Maintaining potato diversity in Peru

Watch the **film** "Preserving Peru's potato power" [dw.com/p/1CTHv](http://dw.com/p/1CTHv)  
Then carefully read the **info box** "The potato".

Use the information you have gathered to create a **poster** on **subject 4**

*"What is being done to secure potato diversity and why is it so important?"*

Chose the **picture** below that best suits your subject, cut it out and stick it in the middle of the poster.

#### Main questions for your poster:

- What is the problem?
- What is the suggested solution?
- What do you think of the suggested solution?
- What do you like about it?
- Which aspects are you critical of?

#### The potato

They can be stored for a long time, are full of healthy vitamins, minerals and fiber and compared to other side dishes, are almost unbeatably climate friendly.

The potato doesn't need too much water. Farming rice, for instance, generates three times more climate-damaging greenhouse gas emissions than growing potatoes.

But processing it to make fries or potato chips makes the potato less climate friendly. The same goes for potatoes that have been imported from far away. Transportation by ship or truck results in high emissions.





## Module III

## Article 2



### Can less-flatulent cows help the planet?

**Funny as it may sound, belching and flatulent cows are a serious contributor to the emissions that threaten our planet's climate. But the cows on one cattle farm in India are doing their part to pass less gas.**



*Cows produce methane when they pass wind. It's a potent greenhouse gas*

*Gau Farm* is unique among India's dairy producers. Its cows are said to fart and burp less than those on farms elsewhere in the country. That may not sound particularly important until you consider the one billion cows on the planet produce a lot of methane – a greenhouse gas at least 25 times more potent than CO<sub>2</sub>.

Located in Kota, about 500 kilometers (311 miles) south of the Indian capital New Delhi, *Gau* is home to about 130 cattle on 40 acres. “*Gau*” means cow in Hindi but it also stands for the names of the farm's three directors, brothers Gagandeep, Amanpreet and Uttamjyot Singh.

Their father set up the farm 15 years ago as a side project. Today, it's a serious business, says 27-year-old manager Amanpreet Singh. He watches carefully as his cows chew finely chopped, organic green grass and sprouts of maize. The mix results in much lower emissions than the approximately 500 liters (132 gallons) of methane a cow would usually release in a day, he says.

“We have reduced the whole gaseous emission of methane by around 60 to 70 percent just by cutting down the extra feed,” he told DW, adding that the

farm uses local “*Makkhan*” grass. Much of the feed is grown in water without soil using a technique known as hydroponics.

The brothers have been able to measure the emissions reductions by releasing the tracer gas sulfur hexafluoride and testing air samples collected around the cow's nose and mouth using a gas chromatograph.

#### Greens reduce methane emissions

The *Gau* farmers aren't the only ones looking to put their cows on a special fart-fighting diet. Indian scientists are looking into a number of methane reduction strategies for livestock, including feeding cattle fermented grains, as well as herbs.

“The use of oilseed cakes and a few Indian herbs also cuts down on methane emissions,” Seema Midha, an animal nutritionist at the state-owned Rajasthan Livestock Nutrition Lab told DW. “They block the availability of hydrogen for microbes living in the guts of livestock, which restricts the reaction of carbon with hydrogen to form methane.”

Local policymakers are also taking the growing evidence of a connection between feed and methane emissions into account. The state of Rajasthan's new livestock fodder policy will include recommendations for feeds that decrease methane emissions while increasing milk output.



*Farm workers carefully harvest greens for an organic feed mix*

The policy should provide an incentive for cattle farmers. Slaughtering cows is prohibited in Rajasthan – where Kota is located – so milk and ghee production are among the few reasons to rear the animals. Dung is another.

## i

## Article 2

## Module III

**Useful poop**

Despite the dramatic reductions in methane emissions, Gau Farm's cows still poop – a lot. And when dung decomposes, it also releases methane gas.

But the Singhs are putting the cows' waste to good use. Urine and cow dung go into a biogas power plant, where they generate 40 kilowatts of electricity per day. That's enough to power the entire farm, Amanpreet says. The waste makes a nutrient-rich, organic fertilizer too.

"The leftover cow dung and urine along with other vegetable or food waste and bedding materials is thoroughly mixed with earthworms," says Giriraj Sharma, who is in charge of the process. "This is very good manure for all plants, fruits, crops and vegetables."



*The Gau Farm runs on electricity from its biogas plant*

**Dung with a spiritual purpose**

The farm also sells dry cow dung cakes online via platforms such as Amazon. The semi-liquid substance is first dried and then heated in big solar cookers. Then they're mailed across India in cardboard boxes. The brothers sell about 500 to 1000 cakes a week at about 120 rupees (€1.50) for a dozen.



*Ready to deliver dung products to the Amazon office*

They're sometimes used for heating and cooking as well as in religious ceremonies. Hindu Yajna rituals, for example, involve prayers offered in front of a sacred fire fuelled with dung patties.

"Cow dung is very important," says Hindu priest, Pandit Ravi Shastri, at a temple near the Gau Farm. "It is very pure and pious." When burned, it is also said to repel mosquitoes and other insects, he adds.

**Spreading knowledge**

India is under pressure to cut its greenhouse gas emissions to meet the Paris climate goals set in 2015. The Gau brothers hope their efforts will help to achieve that. One way of doing so is helping other farmers to lower their emissions

Bhawani Singh (53) has come to the farm to learn more about how the cows' waste can be used. He is one of 10 farmers attending a workshop on "cow dung management."

Bhawani believes the suggestions won't take too much time or money and he wants to spread the knowledge further. "I will educate the farmers in my village to adopt this model," he told DW. "So as to have healthy cows and clean climate."

26.09.2017 | Text and pictures: Jasvinder Sehgal | [dw.com/p/2kfpk](http://dw.com/p/2kfpk)

## Module IV – Taking action

## Handout 8



# Nature's pantry – wild plants, wild fruit and mushrooms

 **Duration: 30 min introduction + individual interview + 10 min per presentation**

### Introduction

How can traditional knowledge about wild-growing foods be used? Start module IV "Taking action" with **article 3** "Foragers find a taste of nature amid London coronavirus lockdown". You will find a copy of the article enclosed in here, or under this link: [dw.com/p/3dVAn](https://www.dw.com/p/3dVAn)

» **Article 3**

Give the group time to read the text. Participants can read the text to themselves or you can ask them to take turns reading it aloud. Where necessary, explain any unknown expressions.

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### Homework

Hand out **worksheet 8** (Interview: Wild plants) and discuss the interview questions it contains. Participants should interview somebody who forages, or who has done so in the past. It can be a family member or someone from the neighborhood.

» **Worksheet 8**

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### Presentation

Afterwards, participants should present the outcome of their interview in the big group. They can also bring wild plants, mushrooms or wild fruits to class to show everyone. Alternatively, they can show photos of the respective foods.



## Interview: Gathering food from nature

As an introduction to the subject, read the **article** "Foragers find a taste of nature amid London coronavirus lockdown."

Now talk to someone with a knowledge of wild plants, mushrooms or wild fruit. The questions listed below could help you with your **interview**. Ask your own questions as well and note the answers as bullet points.

- 
1. What food do you pick in the wild? Which do you most enjoy picking?

.....  
.....

2. What do you have to pay particular attention to (such as mistaking one plant for another, conservation or pest infestation)?

.....  
.....

3. How do you use what you pick?

.....  
.....

4. What do you have to pay attention to when preparing and storing the food?

.....  
.....

5. Why do you pick food in the wild instead of buying it in a shop?

.....  
.....

6. How do you know so much about it?

.....  
.....

7. Your own questions:

.....  
.....  
.....

## Module IV

## Article 3



## Foragers find a taste of nature amid London coronavirus lockdown

**Escaping COVID-19 lockdown for their daily walk, urban foragers are connecting to nature via their taste buds. Understanding of what plants are edible is growing alongside an increasing appetite for wild food.**



*With bare hands, the best way to grab a stinging nettle is quickly, explains Izzy "Fizzy" Johnson*

In a sun-lit hedgerow on the edge of a path in Tottenham, north London, the 24-year-old snatches the young leaves from the top few inches of the stem. Skillfully, she rolls one leaf like a cigarette, upside down, keeping the needle-like stinging hairs on the leaf's underside away from her skin, to produce a chubby slug of green tissue.

That, she says, popping it between her teeth, is how you eat a nettle raw – the best way to guarantee maximum nutrition from a plant rich in iron, vitamin A, and with more protein than spinach.

"I always think it tastes like those long beans, French beans," says Johnson who, in normal times, runs foraging walks under the name Benevolent Weeds, "but it's different for everyone."

Lockdown, which began in the UK on March 23 and is only now starting to ease, has opened the eyes of many city-dwellers to the usually overlooked fruits of spring blooming in their neighborhoods.

Since March foragers have been using their daily permitted outings – for food and exercise – to

gather nettles, elderflowers, dandelions, rare spring mushrooms, tart blackberry leaves, aniseed-like cow parsley and abundant wild garlic from hedgerows, riverbanks and marshland.

Before the COVID-19 crisis began, urban foraging was already surging in popularity, says Wross Lawrence, author of 'The Urban Forager: Find and Cook Wild Food in the City.'

Interest spiked as Londoners were suddenly presented with long, empty days, deserted streets, and hedgerows left bushy and unclipped as many maintenance workers were furloughed. But the biggest change during lockdown has been in mindset, Lawrence says.

"There's definitely more people that are out there doing it. I get a lot more messages through social media and friends asking me: 'What's this leaf; what's that leaf? Am I picking the right thing?'" Lawrence says. "I think lockdown has made people want to get in contact with nature."

### Crisis mentality

Diverse newcomers – including restaurant chefs, Instagrammers, children and pensioners – have taken to the internet to learn from experienced foragers, who have livestreamed their outings on social media or, like Johnson, shared knowledge in conversations on Zoom.

Kim Walker, a foraging instructor and PhD student at Royal Botanic Gardens, Kew, said people confined to home have eclectic reasons for wanting to get out and collect wild foods.



*A path with nettles, yarrow, elder tree and other wild plants in north London*



## i

## Article 3

## Module IV

“One is that we are all kind of feeling this fear about the future and the economic future — where will our food come from? So people are perhaps a bit interested in, if you had to be in a survival situation, what kinds of foods could you eat out in the wild? Could you survive on your own?”

Interest in foraging peaks in times of hardship, according to a 2017 study that looked at the 2008 recession and highlighted how foraging knowledge can support community resilience during social and economic crises.

But most foragers, Walker says, see it as a way to discover the subtly changing surroundings and seasons, practice mindfulness, engage with natural medicines, or explore the mythical and folkloric stories connected to native species.

“One of the philosophical questions about the emergence of this crisis is about how humans live and feel separate from nature,” Walker says, “and has it been partially caused from living in an unbalanced way with nature?”

### Hope and flavor

Food supply chains have mostly held firm during the crisis. But given a break from hectic nine-to-five routines, Londoners have eagerly taken to growing vegetables, exchanging plants, baking sourdough and other activities that produce food from hands-on engagement rather than commercial markets. Many are drawn by their taste buds, like the Michelin-starred chefs who have jumped on the trend for urban foraging.



*Climbing plants include sticky weed, a common plant with velcro-like leaves that can be used to make herbal tea*

Rick Baker runs pop-up pizzeria Flat Earth Pizzas in Homerton, east London, which uses organic and foraged ingredients.

Before lockdown, Baker achieved success selling a pizza featuring chickweed and nettle tops cooked in brown butter but had to answer to customer suspicions about the dangers of foraged ingredients. When restaurants reopen, he’s hopeful for a more localized food system, where public desire to support small business and food workers can synchronize with excitement about local food.

“The industry that I work in is going through hell,” Baker says. “Hopefully it will be the new normal that people are more inquisitive. They’re more willing to try stuff. They’re more appreciative of what’s going on around them.”

He is hopeful that this period of reflection will ignite more questions about our food.

“It’s a step-by-step process, people aren’t going to suddenly go into foraging,” Baker says. “People are going to start to grow herbs on the windowsill or courgettes or whatever it may be. And then you start asking more questions about ‘where does this stuff come from?’”

### Reclaiming lost knowledge

London is not alone in seeing a new appetite for wild food, says Lukasz Luczaj, head of the botany department at the University of Rzeszow, Poland. On his YouTube channel, Luczaj has seen an increase in foragers across Europe trading lessons.

He led foraging courses in London some 15 years ago, and found that, in contrast with Poland and its neighbors, the English had lost much of their traditional gathering culture.

“Collecting mushrooms in Britain wasn’t very popular,” said Luczaj. “Maybe after lockdown even more people will be interested.”

Michael Green, a civil engineer who lives on London’s border with the county of Essex, got a taste for mushroom collecting years ago, and streams his forages on Instagram.



## Module IV

## Article 3



*Forager and civil engineer Michael Green in a patch of nettles and wild plants in Waltham Forest, London*

Working from home during lockdown, Green replaced a two-hour commute with a long forage through woodland and playing fields in northeast London. On Passover, Green was able to collect and

share horseradish leaves when shops ran short of bitter herbs served as part of the seder plate at the start of the Jewish holiday.

"I'm so lucky to have this place on my doorstep. It's like therapy coming here," he says. "It helps me to slow down in my day-to-day life. I'd be in a rush to go somewhere, to catch the bus to go to work, and now I'm always noticing weeds and plants popping up in the paving cracks, wildflowers shooting up in patches of wasteland. It makes the city more interesting."

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10.06.2020

*Text and pictures: Matthew Ponsford  
dw.com/p/3dVAn*



## Create a climate-friendly cookbook

 **Duration: 45 min**

Once the participants have learned the criteria for climate-friendly food, they can get creative and write their own recipes down. Working together, they create a climate-friendly cookbook, which they can give to friends, acquaintances or share at school.

### **Writing down recipes**

Participants should contribute one or more **recipes** to the cookbook.

For each recipe, the participants need a copy of **worksheet 9**, on which they will find a helpful template. Participants can add a photo of their meal to the template or draw a relevant picture.

» **Worksheet 9**

### **Make a cookbook**

Using the different recipes from participants, you can make a **cookbook** by compiling the pages in a book or a folder and designing a cover page to go with it.

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### **Optional**

As an introduction, watch **film 6** "Mangrove bean dish from the Solomon Islands".

» **Film 6**

The film presents a specialty made from mangrove beans, which grow in the wild in many coastal regions. You can watch the film using this link [dw.com/p/3cA7X](http://dw.com/p/3cA7X), or you will find it on the enclosed DVD.



# My climate-friendly meal

..... (Recipe)

Recipe by ..... (Name)



### Level of difficulty

- easy
- medium
- difficult

### Best time of year for the dish

- spring
- summer
- autumn
- winter

### Ingredients

- |   |   |
|---|---|
| • | • |
| • | • |
| • | • |
| • | • |
| • | • |
| • | • |

### Preparation

.....

.....

.....

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.....

.....

.....

.....

Preparation time ..... minutes

For ..... portions



## Group exercise: Climate-friendly buffet

### **Duration: individual**

To finish, organize a **climate-friendly** buffet with your participants. Talk to them about what should form part of the buffet, discussing both the type of *dishes*, the *shopping*, *transport routes* of different *ingredients* and the *packaging*, choice of *crockery* and *cutlery* and *decoration*.

Participants can use recipes from the climate-friendly cookbook or ingredients harvested from their regrowing experiment. They could also contribute meals made from foraged ingredients – so long as they only forage in the company of an experienced person so nothing inedible accidentally lands on the table.

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Consider the following points in particular and where necessary, discuss them with your participants:

#### **Hygiene**

On the day of the buffet, make sure all participants wash their hands with soap and water before they put the dishes on the buffet table. For hygiene reasons, everyone should bring their own cutlery and crockery and take it back home with them afterwards.

#### **Meal plan**

Work with participants to create a meal plan so it is clear who will be bringing what. Decide between you how much of which dish participants should bring. This will avoid food waste. Give each participant the opportunity to report back on why they chose their dish.

#### **Distance learning**

If it is not possible to bring everyone together in person, you can move your climate-friendly meal online. Participants prepare a meal themselves and meet up to eat together in a virtual space. For this, each participant would need to have their own computer with a stable internet connection, and access to video-conferencing software. Moderate the online event, so that every participant can explain why they chose their respective dishes.



## Instructions for playing films

You have several options for playing the films accompanying this learning pack:

### 1. Playing films from DVD

If you have a hard copy of the learning pack, you will find all the films in two formats on the accompanying DVD. You can play the films using a DVD player (PAL format). You will also find the films as mp4 files on the DVD. These can be played on a computer.

### 2. Downloading and playing films from the internet

If you don't have the learning pack DVD, you can download or stream all the films directly from Deutsche Welle's website. You will find the film links in the handouts, as well as in the module overview. We recommend you download the films before class to ensure your lessons run smoothly.

To download the films, follow the links in the handouts and module overview. Then click on "Download Save MP4 file." You can save the film as an mp4 file on your computer or mobile storage device (e.g. USB key). Downloading the material can take between a few seconds and a few hours depending on the speed of your internet.

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**Note** **Good sound quality**

If you're playing the films on a projector connected to your DVD player, PC or laptop, we recommend you use loudspeakers.

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## Media Index

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### Films

#### Film 1



“Nutrition and climate change – the food of the future”

[dw.com/p/3fOpK](https://www.dw.com/p/3fOpK)

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#### Film 6



“Global Snack: Mangrove bean dish from the Solomon Islands”

[dw.com/p/3cA7X](https://www.dw.com/p/3cA7X)

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#### Film 2



“Can vegetarians save the planet?”

[dw.com/p/39Psl](https://www.dw.com/p/39Psl)

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### Articles

#### Article 1



“Caught between floods and drought: Farmers in Nicaragua living in uncertainty”

[dw.com/p/3Jgi7](https://www.dw.com/p/3Jgi7)

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#### Film 3



“Keeping cool with the sun on Lake Victoria”

[dw.com/p/2xrUg](https://www.dw.com/p/2xrUg)

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#### Article 2



“Can less-flatulent cows help the planet?”

[dw.com/p/2kfpk](https://www.dw.com/p/2kfpk)

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#### Film 4



“Bumper harvest with LEDs”

[dw.com/p/39p47](https://www.dw.com/p/39p47)

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#### Article 3



“Foragers find a taste of nature amid London coronavirus lockdown”

[dw.com/p/3dVAn](https://www.dw.com/p/3dVAn)

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#### Film 5



“Preserving Peru’s potato power”

[dw.com/p/1CTHv](https://www.dw.com/p/1CTHv)

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# Global Ideas

## The multimedia environment magazine

**Around the world, imaginative people and innovative projects are working to protect our climate and biodiversity. Global Ideas tells their stories on TV and online every week.**

**Global Ideas** is Deutsche Welle's multiple award-winning, multimedia environment magazine supported by the German Environment Ministry's International Climate Initiative. Established in 2009, it showcases TV reports, background articles, web specials and much more, as a means of informing people all over the world about best practice initiatives to protect the planet.

**Global Ideas** is more than just television. Think interactive specials such as a visit with Africa's wild animals or easy-to-understand explainers that answer complex questions like "does global warming really exist?" The magazine also has an educational element in the form of carefully crafted "learning packs" on key environmental topics. Available free of charge in German, English and Spanish, these learning materials include videos, articles, worksheets and teacher handouts, as well as other educational materials such as posters, picture cards and practical experiments. The learning packs are available in booklet form with an accompanying DVD, as well as online.

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