WHY DOES BIODIVERSITY LOSS MATTER?

Answers for ministers & children
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CEEweb for Biodiversity is an international network of non-governmental organizations in Central and Eastern Europe. The mission of the network is the conservation of biodiversity through the promotion of sustainable development.

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WHY DOES BIODIVERSITY LOSS MATTER?

Answers for ministers & children
“Have a nice journey!”
Susie is a girl of seven – “turning on to eight” as she likes to say when she introduces herself to strangers. She enjoys the things little girls do: she likes running down hills with her arms stretched, and she enjoys long bubble baths.

She also likes animals. She has a large hamster with a ravenous appetite called Larry. Poor Larry is going to be lonely for this summer because Susie is going away: she is going to spend this summer with Grandma in the country! This is her first real journey – one that she is taking without her parents.

On the day of the trip Grandma is early. As usual… it is easy for her because she cannot sleep very well. As she always likes to say: “I just wake up with the birds”. Susie has never really understood what that has to do with the birds. Don’t birds sleep as long as they can? She is so full of questions and now she will have Grandma for two whole weeks!

As they get on the train, Grandma makes her sit by the window. She knows the thing Susie likes most in the whole world is to watch people and things. She sometimes sits in front of the TV but this is much more exciting! The window is like a giant TV set but here the ‘film’ is so real and the people and animals are moving so fast.

In their compartment there are other people sitting: an older man with a cute moustache and a boy of about 16. The boy is looking at Susie with curiosity. He has always wanted a baby sister… For Susie’s sake he even puts down his iPod and Technology Today magazine. By the time the train starts to move, they are friends. The boy – his name is Peter – is smiling at the little girl who is jumping by the window with excitement.

“There’s a nice journey, Susie” – he says.

And so the journey begins…
Susie is watching the urban gardens passing by. There is one big garden with so many different colours of flowers – she can hardly name all those colours and shapes…

**SUSIE:** Grandma! Why are there so many flowers?

**GRANDMA:** You know, just like people, animal and plant life also has many forms. Animal life is often called fauna, and plant life is called flora. It took millions of years for life to become as you see it today. This is what makes our planet unique.

**PETER:** This planet is too big for people to have it on their own. And it would be quite boring to live by ourselves, right?

**SUSIE:** I like flowers of all kinds. Especially red tulips! And violets! And roses…

**OLD MAN:** May I join in, little lady? This is called ‘biodiversity’ of life on earth. Bio means life, diversity means many different types of things.

**PETER:** I know this term. It is about having many species on earth like foxes, deer, hedgehogs and the like…

**OLD MAN:** Yes – and it means much more than that! Biodiversity means having many types within species. Take this example: *Brassica oleracea* is a plant that has many cultivated versions. Broccoli, Brussels sprouts, cabbage, cauliflower, kale, collard greens, Chinese broccoli and kohlrabi are all its varieties. But biodiversity is even more than that! It also means having many types between species like different plants, animals, fungi or bacteria. And the last thing it means is many types of ecosystems.

**PETER:** What’s an ecosystem?

**OLD MAN:** It is a complex of living creatures. A forest or a pond is an ecosystem. It is a system of living things that grow and work together. In an ecosystem each species has a role to play, so they need diversity for their stable functioning.

**SUSIE:** I know why we need apples. I love apples! They have funny seeds that you can make a necklace from. But why do we need the others?

**GRANDMA:** All these plants and animals give us presents all the time. Just think of the food you eat every day. The clean water you drink. The herbs you make your tea from. The fibre used for your clothes. The wood your bed is made of.

**SUSIE:** I know we need nature. But why does it have to be so different everywhere?

**PETER:** I think I know the answer! The more diverse and undisturbed nature is, the better it works together as a system. And these well-working systems are very important in the regulation of climate, clean water, clean air or the nutrients in the food you eat.

**OLD MAN:** You are very right there, my boy. We cannot buy these things on the market, but we all need them for our survival. A predictable climate, clean air and water are all “presents” nature gives us for free, if we don’t disturb it. We call them ecosystem services.
In an ecosystem each species has a role to play, so they need diversity for their stable functioning.
At this point Susie loses track of the conversation and is gazing out of the window again. Suddenly she becomes excited.

**Susie:** What is this field?

**Grandma:** It is a cornfield, honey.

**Susie:** How come it grows so high?

**Grandma:** Well I guess it must be because of all those chemicals they use on them.

**Peter:** Oh yes. This is modern technology. We can produce so much more food today. The chemicals used here are probably pesticides and fertilizers and they are very useful: pesticides kill the bad bugs, and fertilizers make the corn grow higher because of the nutrients they contain.

**Old Man:** That’s true. In our days agricultural plants grow higher and bear more yield. This is called “intensive agriculture” and it mostly means the use of chemicals (some of which are poisonous), heavy machinery and also more and more genetically modified crops.

**Susie:** These cornfields are so nice! With so much food around we will never be hungry!

**Grandma:** I wish you were right, honey. Still, it is not so. There are more people starving now than ever before. I don’t even know why we need poisonous chemicals and heavy machinery when we can do quite well without them. I have never used any spraying in my garden. I still have the same apple tree my grandfather planted and I can tell you it is famous in the whole village!

**Old Man:** Oh yes, but in your garden you grow plants which adapted to that environment. In such gardens you can leave all the work to the living creatures: worms and bugs, bacteria and fungi. Also, some plants protect each other by releasing chemicals which stop other plants from growing there. This is called allelopathy. So in your garden the ladybirds eat the mites and instead of big machines you probably do the physical work yourself.

**Susie:** So why can’t we let the ladybirds eat the bad bugs everywhere? Why do we need poisons? I don’t want to eat poisons in my corn!

**Old Man:** Intensive agriculture means that we use natural resources on a limited area – but we still want to achieve as many crops as possible. Besides, we also want to plough land which otherwise would not be suitable for agriculture because of its poor soil, frequent droughts or too much water. And for that there is a price to pay.

**Grandma:** I believe it is not natural to have so much food coming from one area. In my day we knew how much corn we could get out of one area – but we also knew that the land itself was not harmed.

**Peter:** But is it really harmed? How does intensive agriculture ‘harm’ the land?
This is called “intensive agriculture” and it mostly means the use of chemicals (some of which are poisonous), heavy machinery and also more and more genetically modified crops.
OLD MAN: When we focus so much on food production, we harm other functions of that area and its ecosystems. In the past fifty years corn yield has more than tripled. Just imagine! In such areas soil does not form as it should, the natural nutrient cycles become unbalanced, the area can no longer be used by most animals and plants for a living and hiding place. So intensive agriculture always leads to a loss of biodiversity.

GRANDMA: I can well imagine that all these machines people use on modern fields cause problems.

OLD MAN: And they do. There is always a price when we try to replace natural processes with human actions. And it is not only about the fields themselves. Besides cultivated lands, we cause harm to other natural areas, too. Imagine how fertilizers, pesticides and machines are produced. These processes all need energy and cause pollution. Also, the transport of these products and the treatment of waste needs energy and uses a large amount of natural resources. This virtual environmental pressure of intensive agriculture is much higher than what we can see on the land.

PETER: So if we harm our lands so much for more food, why is there still not enough food for the hungry people? I don’t understand...

GRANDMA: I believe, young man, hunger is a problem that people created for themselves. This is a social question: some people have much more food than they need, while others don’t have enough for their daily meals.

OLD MAN: And in this part of the world almost half of the food is wasted between harvesting and the actual consumption. Did you know that even in our kitchens we throw away 15 percent of our food before it expires? If people developed a more just system for food distribution, there wouldn’t be millions starving.
Intensive agriculture always leads to a loss of biodiversity.
**INTENSIVE AGRICULTURE, BIODIVERSITY LOSS AND MEAT EATING**

**PETER:** So you are saying that if we take more from nature than what is natural, we will always harm the ability of nature to give us other ‘presents’? Will we always lose biodiversity?

**OLD MAN:** Unfortunately that is the case.

**SUSIE:** But what about those little bugs you spoke about? Why do we need them in Granny’s garden?

**GRANDMA:** Oh, we will always need living creatures. Imagine bees and other bugs. Every third corn you eat is alive because little bugs carried pollen to its mother. We would surely not have any corn and fruits without them.

**PETER:** Yes, I know. These bugs are called pollinators: they carry pollen from plant to plant.

**OLD MAN:** That’s right. And we cannot substitute these bugs with modern technology. The problem is that in an ecosystem these creatures live in one community. They are just like a city: we need carpenters, firemen, teachers, and so on. If we lose any of them, the city will not be able to function any more. It could go on without them for some time – but not for long. Bees and other pollinators are mysteriously disappearing nowadays. We do not exactly know what causes them to die in such big numbers, but it is sure that we have disturbed them in a way that they cannot tolerate any more.

**PETER:** But I heard about national parks and so-called Natura 2000 sites… large strips of land with no intensive agriculture. Don’t these areas help? I don’t think it is a problem to have intensive agriculture on a limited area of land.

**OLD MAN:** Aha! You have heard about protected areas and ecological networks!

**PETER:** Yes, I’ve heard about them but I am not sure what they mean.

**OLD MAN:** Protected areas have been designated for many decades in Europe in order to protect some species and habitats from harmful human activities. Natura 2000 is a network of ecologically important areas found in all EU countries. The goal of the network is to save the European Union’s nature for the future, while it does not exclude human use from the land.

**PETER:** So there are natural lands. Then what’s wrong with having intensive agriculture somewhere else?

**OLD MAN:** You might be right. Maybe intensive agriculture would not be a problem, if we knew why and where we have it and limit its size, especially outside the EU. We would need to put an absolute limit on all the virtual environmental pressure which is related to it. But we don’t. Intensive agriculture, like other sectors, is not limited and regulated – especially in poorer countries.

**SUSIE:** But why do people need these big fields, if it so bad for the earth and still can’t feed all people?

**PETER:** I now remember an article about meat. I read that a large part of agriculture is needed for feeding cattle.

**SUSIE:** What’s cattle?
Intensive agriculture is not limited and regulated – especially in poorer countries.
The world's cattle, pigs and chickens consume an amount of food equivalent to the caloric needs of 8.7 billion people. It sounds like for our comfort not only nature suffers but billions of poor people as well...
PETER: Cows and beef.
SUSIE: I don’t like beef! It is tough and chewy. I don’t really like meat at all except chicken.
OLD MAN: Well, that is good for you then. If more people were like you, we would have less people starving. Did you know that we need eight pounds of grain to get one pound of cow meat? The world’s cattle, pigs and chickens consume an amount of food equivalent to the caloric needs of 8.7 billion people.
PETER: Wow, that’s unbelievable. Animals are fed more food than what would feed all people on the whole planet!
SUSIE: But why do people eat so much meat?
GRANDMA: Probably for comfort... for wellbeing. In my time we didn’t have meat twice a day. We had some on Sundays and that was all.
PETER: It sounds like for our comfort not only nature suffers but billions of poor people as well...
OLD MAN: And we export this suffering to poorer countries.
**POVERTY AND HUNGER**

**SUSIE:** What does export mean?

**GRANDMA:** To sell something to an other country... Sounds to me that because we eat so much meat, we need more land to feed ourselves and our cattle than what we have. So we buy animal feed from other countries where people may be hungry.

**OLD MAN:** And what’s more we even feed our cars with human food nowadays. Corn, rapeseed, palm oil and soybean are all used as fuel in cars. These could be eaten by people, too.

**PETER:** This is called biofuels, right?

**OLD MAN:** Right. You are one well-read boy for sure.

**PETER:** But I read that biofuels are a breakthrough! They are the solution to the energy problem. If we switch from fossil fuels to biofuels, we will not have energy problems in the future.

**GRANDMA:** I don’t know... It doesn’t sound right to feed corn to animals and cars when there are about one billion people starving.

**OLD MAN:** That is a very important point. Many people agree with you. Maybe you even heard about the food crisis?

**SUSIE:** What does crisis mean?

**GRANDMA:** A crisis is a situation when somebody is in big danger and something has to be done very quickly to help them.

**OLD MAN:** The food crisis of 2008 meant that the price of rice and other basic foods went up by 80 percent. So in poor countries there is less to eat now and it is more expensive. Everybody gets less food to eat, and women get even less than the men and children because of traditions.

**PETER:** Yes, I heard that there were hunger riots in places like Haiti, Cote d’Ivorie, Egypt, Mexico and Morocco. But I didn’t understand why those people had problems then.

**OLD MAN:** Well, one of the reasons is biofuels. Simply, there is not enough land to feed all people and the cars we drive. If most people used a bicycle or walked instead of a car on a daily basis, the price of basic foods like rice and corn would not have gone up so much.

**SUSIE:** This all happens because people don’t ride a bicycle instead of a car?

**OLD MAN:** There are other reasons too, like rising fuel costs, weather problems and increased demand for meat in huge countries like China and India.

**PETER:** But why can’t poor countries produce enough food for themselves? I have never really understood this. They also have big lands and rain.

**OLD MAN:** This has many reasons. In poorer countries (especially in Africa) the traditional tribal structures were destroyed in the past century. A large part of their arable land is now used for other purposes than feeding the local people. They produce grain we use in our cars and feed our cattle with. They also grow coffee, cocoa and tobacco – luxury items for countries like us.

**PETER:** I never thought of chocolate and coffee from that point of view...

**OLD MAN:** We don’t usually do. The system of food aid has also contributed to destroying their local markets. Now these people depend on outside help rather than trying to survive on their own terms as they used to for thousands of years. The agricultural subsidies farmers get in richer countries also make it difficult for them to compete with European markets. And what’s more, climate change also affects these countries the most: it decreases their yields.

**PETER:** But why were tribal structures destroyed?

**OLD MAN:** Hm. One thing is that cities have spread out and many poor rural people think they can have a better life in cities so they go there. Also, in these countries there are many wars for power, land, water and resources. Wars make it hard for farmers to do their work so they again go to the cities.

**SUSIE:** And what is the word you said... subsid... something?
OLD MAN: Aha! Subsidies. It means money the state gives to farmers. This is important because agriculture uses renewable resources so farmers cannot compete with industry which uses non-renewable resources. But we need agriculture for food and for our survival so we have to keep it going. This is why in richer countries farmers get extra money from the state.

PETER: But the world’s population is still growing. There are so many people. Couldn’t we feed them all by extensive agriculture?

GRANDMA: We were just told that if all the food going to animals and cars now went to people who are hungry, starvation would not be a problem.

OLD MAN: This is true. There is so much we can do today. We can stop wasting food. We can stop eating distant food or at least we can start buying fair trade goods.
Susie: What’s that?

Old man: Fair trade is when people in richer countries pay a fair price to producers in developing countries for their products. With this higher income producers can have better social and environmental standards in their areas. So if you want to end rich countries exploiting those who are poor, you can buy coffee, cocoa, sugar, tea, bananas, honey, cotton or fresh fruit from fair trade shops.

Peter: And what about meat?

Old man: Oh yes, there’s also the meat question. As I said we buy animal feed from other countries were people may be hungry. If we ate less meat or even became vegetarian, we could change the way agriculture works.

Peter: But I love meat. Is it bad to eat it then?

Old man: Eating meat only once or twice a week could already largely decrease the pressure on agriculture. But one thing is for sure: we cannot solve the problems in the world, if we don’t change our behaviour.
Biomass and Biofuels

There is silence. Peter seems to be thinking deeply.

**Peter:** So biofuels and intensive agriculture are not the real solutions.  
**Old Man:** We mostly need intensive agriculture to feed unreal needs and unnecessary demands. This is why so many people want to use genetically modified organisms called GMOs. These are plants that bear a higher yield because their genetic material has been changed in laboratories. Think of cars, for example. Some of these fields you can see from this train are not used to produce food for people: they are used to produce fuel for cars. This is not acceptable as long as there are hundreds of millions going without food.  
**Grandma:** In my time we would have never used what they call ‘biofuels’ today. We saved energy where we could. And I don’t see that with these GMOs there are fewer people starving today.  
**Old Man:** You are right. It is a nice intention to save the developing world with GMOs, but this method still doesn’t respond to the root causes of hunger. The GMO market is fuelled by lobby interests: by big companies concerned about constant growth and not about solving root problems. All this leads to growth with no end or perspective.  
**Peter:** But can’t we use at least some plants for energy? We have so many of them. Surely, we can use some of them for energy.  
**Grandma:** That’s right. When I was younger, we only used wood for heating. Was that wrong? Did we harm the environment?  
**Old Man:** I think this all depends on how much you use in what way and for what purpose. Plants like wood have been used for energy for centuries. Plants are called ‘biomass’ and they are not wrong in themselves. But we need to think when we use biomass.
Peter: Yes, I know now that biofuels are one of the reasons why there are so many people starving and they also cause a loss of biodiversity. But people have been burning wood for centuries.

Susie: I like big fires. They are so warm and I love watching all those shiny sparks.

Old Man: It is not a problem when some people burn wood for energy. But when hundreds of millions do it to satisfy their ever growing needs, it can cause big trouble. We always need to consider if biomass is coming from healthy ecosystems. It is also important if their whole life cycle has a positive environmental balance – including carbon balance and land use implications. This last idea is mostly about the competition for land between food and energy crops that we have already talked about.

Grandma: My idea is that we should use sources of energy that every person can use to the same level. If there is enough for everybody to use, than it is a fair source of energy. And only then can we use it for a long time.

Old Man: This is an important point: there has to be enough for everybody to use and on the long run. This is called “sustainability”. We need to use energy and other resources in a sustainable way otherwise we will have even bigger troubles than today.
Biofuels are one of the reasons why there are so many people starving and they also cause a loss of biodiversity.
We will most likely see even more ecosystem collapses in the future – when ecosystems can no longer keep their function because we disturbed them so deeply.
SUSTAINABILITY

AND ECOSYSTEM COLLAPSES

SUSIE: What trouble will we have?
OLD MAN: Like even more poverty and hunger... Do you know how many people live on almost no money at all? Like less than two dollars a day?
GRANDMA: I believe over a billion.
OLD MAN: That’s right. In 2006 it was 2.6 billion people – 40 percent of the world’s population. And out of this number one billion are surviving with less than one dollar a day. Can you imagine that?
PETER: That is so awful. I never thought this number was so high. It is almost like every second person...
GRANDMA: And this is not only about food. I know that there are huge problems with water, too.
OLD MAN: Yes, the same problems with water. In 2000 more than one billion people had no access to safe water. If we don’t change our habits soon, we will have even more disasters. Even now there are people who have to leave their homes because their environment has changed so much. They are called environmental refugees. The Red Cross says now there are more people displaced by environmental disasters than war.
PETER: Gosh, I didn’t imagine that!
OLD MAN: We will most likely see even more ecosystem collapses in the future – when ecosystems can no longer keep their functions because we disturbed them so deeply. The presents or so-called ecosystem services provided by nature will also decline. Just think of climate change.
Peter: I read that in 2008 Cyprus had to import water from Greece because they did not have enough rains and water. Is that an example?

Old Man: Yes, it is. And there are many more: just think of Lake Aral. It was once the world’s fourth-largest inland sea. When its two main rivers were diverted by irrigation projects, it started to shrink. Now it is only one quarter of its original surface area.

Peter: I know about Lake Aral. I saw a film about that. It has become extremely salty and polluted too, so it lost most of its natural flora and fauna. The local fishing industry is now gone, and the fishery towns along the original shores are just ship graveyards. I saw some pretty shocking pictures about it.

Old Man: And there is even more to it. With this ecosystem collapse came unemployment and other problems. The wind blows the salt away from the dried seabed which damages crops, pollutes drinking water and causes serious health problems to the people living there.

Susie: This is all so frightening. I never want to see a dried up lake.

Grandma: Well honey, you will most probably see such things in your lifetime. I am afraid we have harmed nature for too long and have disturbed it too deeply.

Old Man: There are several examples of ecosystem collapses from the past like the Dust Bowl. In the United States people destroyed too much grassland for the sake of agriculture. The dried up soil turned to dust, and during the drought of the 1930’s it was blown away in large dark clouds. This was called the Dust Bowl and it was both an ecological and human disaster. Millions of hectares of farmland became useless and hundreds of thousands of people were forced to leave their homes. You may know about the fate of these people from John Steinbeck’s famous novels called *The Grapes of Wrath* and *Of Mice and Men*.

Grandma: I read these novels but I always thought these were caused by the economic depression of the 1930’s – not by nature.

Old Man: It is strange that people don’t usually know about the environmental aspects of this part of history. Our economy has always been closely connected to how we treat nature. But one thing is for sure: we will see many more of these disasters in the future – and even more if we don’t change our habits.

Peter: I saw a film about Lake Victoria in Africa. That is also an ecosystem collapse, right?

Old Man: You probably saw the film *Darwin’s Nightmare* which is about Lake Victoria, the world’s largest tropical lake.

Peter: Yes. They also have a large fish industry there – one of the best African fish we can buy in Europe as well but I stopped eating it after seeing that film. The ecosystem of Lake Victoria collapsed after a new fish called the Nile perch was introduced to improve fishery. By the 1980’s this fish has come to dominate the whole lake, and original species died out. What is really strange is that the people living there are not any richer.

Old Man: Again, can you see how economy is connected to nature? Fishery has become a huge business so poor people started to flock to the lake in an attempt to find employment. Together with them came pollution, deforestation, overpopulation of people and livestock, low wages and even bigger poverty. There are many children around the lake now who use drugs, work as prostitutes or try to find food in the rotten fish thrown out of the factories.
The ecosystem of Lake Victoria collapsed after a new fish called the Nile perch was introduced to improve fishery.
The destruction of the Tatra forest in 2004 happened because after the First World War people cut out the native trees and planted a different species that grows more quickly and can be turned into wood sooner. In this case again people chose profit over the rules of nature.
Susie: I don’t ever want to eat that fish!

Old Man: I understand you, little lady. Ecosystems collapse when we take too much out of them. The same happens with banks and money. If we take too many loans, the bank system will collapse – just like it did in 2008. We cannot overuse our environment in the long run. And when our ecosystems collapse, we won’t be able to “help them out” by investing more money.

Grandma: I couldn’t agree more with you. I have never used a loan in my whole life. We were always taught not to overspend.

Old Man: When people want to make more profit out of nature, they will most likely make a mistake. Remember the storm in the Tatras? The destruction of the Tatra forest in 2004 happened because after the First World War people cut out the native trees and planted a different species that grows more quickly and can be turned into wood sooner. So the whole forest consisted of one type of fir-tree.

Peter: This is called a monoculture, right?

Old Man: Exactly. People planted a species which was not adapted to that environment. The new Norway Spruce did not have such strong roots so the storm destroyed the whole forest. In this case again people chose profit over the rules of nature. Monocultures have many dangers – we should never look at the profit alone.

Peter: Like what we said about GMOs?

Old Man: Yes. When we introduce new species for the sake of profit, there is always a danger that things will get out of hand. Like it happened with some animals and plants which are now spreading no matter what we do. They are called invasive species.

Susie: But if it is good to have many different animals and plants in one place, then why is it bad that some of them are spreading?

Peter: I know about invasive species! Like ragweed that causes allergy to many people in Europe now. It was originally a species in North America, and it was only carried into Europe in the past century. Once it starts growing somewhere, it is very difficult to eliminate. The main thing is that these species originally did not belong to that ecosystem.

Old Man: There are many invasive species and most of them were carried there by humans. Another similar example is the nutria. Originally it is from South America but it is kept for its fur on other continents, too. But it escaped from farms or has been released to the wild intentionally in order to harvest its fur. Today the nutria has established in many European countries and causes damage to crops and riverbanks. Besides, it also eliminated yellow water-lilies over large areas through selective feeding. Climate change is also a part of this problem because it changes environmental conditions and can help invasive species spread even more at the expense of native ones.

Susie: When I grow up I will have a big garden and many pets. But I won’t have nutrias in my garden. I only want natural animals. Natural animals are so cute.

Old Man: And they are not only cute. Biodiversity can also protect you. For example, if there are many different types of small mammals in a forest, the ticks will be less likely to be infected with Lyme disease. This means they are less likely to make you sick!

Peter: I read that diseases like malaria or SARS have also developed from human activities.

Old Man: That’s right. People have too often disturbed wildlife and ecosystems. But nobody can use biodiversity endlessly without consequences.

Susie: I wish we stopped bothering nature. It causes so much trouble…
**Tourism**

Susie climbs into Grandma’s lap.

**Susie:** It is so good to travel! I can see animals and trees, and we can walk in the forest and pick mushrooms.

**Grandma:** Yes, this is a beautiful countryside. I think it is sad when people go so far away for holiday and do not even know their own region. When I was young, we used to rest close to our village or town. We didn’t have much money to travel around but I have very good memories about my summers.

**Peter:** But why is travelling a problem, if we have enough money to pay for it?

**Grandma:** Today so many people are not fond of their environment any more. I think this is why they want to go somewhere else for their holidays.

**Old Man:** True. I also see it a problem that people have become rootless. With globalization we lose our cultural identity, we no longer feel close to our origins, and we always want to be somewhere else. And when we travel as tourists we export our habits and lifestyle to other countries as well. This is what I call cultural pollution.

**Peter:** But when we are tourists, we spend so much money abroad – so destination countries can benefit from tourism, too.

**Old Man:** Well, the thing is that in many cases mainly big international companies benefit from tourism, not the locals. And if the natural environment is largely destroyed because of mass tourism, ecosystem services are also harmed. This again has far reaching negative consequences for the livelihood and well-being of local people.

**Susie:** I still don’t understand why people go so far away, if this means problems?

**Peter:** I don’t get it either: if we can afford it, why not travel?

**Grandma:** Well, fashions have changed. You know how fashionable it is nowadays to travel to far-away, “exotic” locations.

**Old Man:** And don’t forget: in many places the environment is more or less destroyed in the nearby area or people simply don’t have enough places to rest in the cities so they believe they *have to* go somewhere else to be close to nature.

**Peter:** But fuel and kerosene are relatively cheap so we can afford to travel very far.

**Old Man:** Travelling is part of our culture now and people don’t see the consequences of their actions. Many say if others collect my litter, why shouldn’t I drop it on the street or in the forest?

**Susie:** But I like going on excursions and see animals and trees.

**Peter:** Me too. And I also love flying! Airplanes are such a big invention!

**Old Man:** Do you know how much pollution is caused by flying?

**Peter:** I’ve just read on a website that air travel only causes 1.6 percent of air pollution, so it is one of the most environmentally friendly ways to travel.

**Old Man:** Well, if you travel from Europe to Miami, the plane produces more CO₂ *per person* than the amount you would emit driving a car for a whole year! And airplane companies don’t have to pay tax on kerosene so they do not pay even partly for the environmental damage they cause. Your airplane ticket would be much more expensive, if environmental damage was counted.

**Peter:** Wow, these are high numbers. I had no idea… So how can we go on a nice holiday and not harm the environment?

**Grandma:** I suppose we should just stay closer to our homes.

**Old Man:** The best thing you can do is to go to a village in your own country by bicycle, train or bus and stay at least for ten days. This is one form of tourism which is socially and environmentally sound: it is both good for the tourists and the visited place.
Susie: I like this! This is what we are doing right now! Going to a small village and spending two weeks there.

Peter: I like this idea. But why do you say that tourism can be bad for the people living in an area? Tourism is a great part of the income of many countries.

Old Man: Think of all the hotels that are built in the most beautiful places. Local people will never be able to use these places as before.

Grandma: I am thinking of the large amounts of people flocking in every summer.

Old Man: Yes, they bring a lot of money with them, but most of it remains in the hotel. Very little is spent on locally grown food or goods which are produced nearby. Tourists require infrastructure that is not used during off-season times, but the municipality has to maintain it all year round. Public money could be spent more wisely. In addition,
mass tourism creates part-time unemployment in these places because people have no work in off-season months. **GRANDMA:** Tourists also cause huge amounts of pollution: they want to consume the same way as if they were in their home cities.

**OLD MAN:** There is also crime coming with massive tourism like theft, illegal trade in endangered plants and animals or prostitution. If we count all the costs and benefits, this type of mass tourism is not good for any country, rich or poor alike.

**PETER:** I have never thought of it this way. I don’t want to be a typical tourist any more. I will tell my parents to find a small village for long holidays where local people can benefit and where we don’t harm the environment. I think I will even search for a nice small village on the internet when I get back.

**GRANDMA:** It is exciting to know how many of the old things we used to do are still the best!

**OLD MAN:** Yes, it is true. But we cannot expect all people to change their behaviour for environmental reasons only. Most people would give up frequent, long distance holidays only if they had strong economic reasons. And tourist destinations also need to develop and implement tourism management plans and strategies effectively.

**But we cannot expect all people to change their behaviour for environmental reasons only. Most people would give up frequent, long distance holidays only if they had strong economic reasons.**
Susie is gazing out of the window to see some animals. Suddenly she remembers something.

SUSIE: I heard on TV that there are fewer birds in the world than before. Is that true?
PETER: That’s right. A lot of animals are disappearing for ever. Biodiversity is constantly decreasing.
SUSIE: I also heard that there are more floods than before. Why is that?
PETER: It is because of climate change. Have you ever been into a greenhouse? It is always hotter inside than outside. People have turned the earth into a greenhouse with all the dangerous gases they released in the atmosphere.
GRANDMA: That’s right. We have completely changed the climate of our planet.
PETER: But do not worry! Politicians have already realised that this is a big problem for all people and it can
Are you sure we couldn’t survive without cars and a constant 23 degrees in our flats in winter?
threaten our lives, food, houses and comfort. So they are trying to find ways to solve this problem for good.

**GRANDMA:** Well, we keep on adding CO₂ in the atmosphere every year. So I believe we will make this problem even worse in a few years.

**SUSIE:** But why don’t we stop these gases altogether?

**PETER:** We cannot give up civilization. We need lights and heat and cars to survive.

**OLD MAN:** Are you sure we couldn’t survive without cars and a constant 23 degrees in our flats in winter? People were able to do it for many centuries... But even if we only gave up our wish to use more and more energy each year, that would lead to a significant change. If the amount of energy we can use was maximised, we could still improve our energy efficiency and use the energy that we saved this way for other purposes. But people should be patient for this type of development.

**GRANDMA:** I often think about this... how whole countries could change such habits. But I know that people don’t like giving up their confort.

**OLD MAN:** How we live in our society and maintain our economy is mostly determined by the structures we created and the culture we developed. Our institutions, economic regulations, transport systems, trade connections or technology are all part of these structures. If we want changes, we need to transform many of these structures.

**GRANDMA:** But first we need to change ourselves.

**OLD MAN:** Right. What we know about the world, how we think about problems, how we cooperate with others all affects the way we shape these structures. It is no wonder that people develop economic regulations which are destructive to the environment, if they think that money and material welfare are more important than a healthy environment. We need to change our values, our approach to problems and our economic structures. And we need to change them at the same time, otherwise our attempts will be useless because of opposite influences.

**PETER:** But I don’t think we have to change the whole structure we live in. We need civilization! There must be other ways to keep our standards of living. For example, I heard that in certain industries they sell so-called emission quotas to big factories. This means these factories cannot emit more CO₂ above that limit. This system covers about half of the carbon traded mainly coming from fossil fuels.

**GRANDMA:** But what if other factories emit more and more at the same time? What if we emit more and more greenhouse gases through transport? Won’t we emit more CO₂ altogether in the end?

**OLD MAN:** This idea of CO₂ quotas is a typical “end-of-pipe” approach of environmental regulation. When people try to regulate what comes out of the exhaust pipes and the factory chimneys instead of what goes in. The true solution can only be an approach that regulates the resource use when it enters the economy. Of course, this would mean that the production of fossil fuels should be regulated, too.

**PETER:** And why can’t we just take this CO₂ from the air and put it somewhere else? Like some scientists would like to put these gases into the oceans.

**OLD MAN:** Aha! You have heard about ocean fertilization.

**SUSIE:** What is that?

**PETER:** It means that we dump iron into the oceans. This iron makes the algae grow and the algae will eat up more CO₂ gas from the atmosphere. I read that many scientists and businessmen are working on such solutions in geo-engineering, and they propose modern solutions. So we can continue our lifestyle and take care of the earth at the same time.

**OLD MAN:** In my opinion if we want to solve environmental problems, first we have to change our own relationship to them. We need to explore why we cause these environmental problems and then we need to respond to these root causes. I am afraid we have no other long-term solution but to change our own behaviour – and how our society and economy work.
**GRANDMA:** So you don’t think putting iron into oceans and seas will work?

**OLD MAN:** No, I am afraid ocean fertilization won’t work. What’s more it may create even bigger problems. If we disturb the natural processes of our environment, there will always be problems. And these problems will not be solved by changing the environment even more, like taking CO₂ from the air and putting it into the oceans or burying it into the ground. With these things we simply cannot foresee the risks and consequences. Real solutions should consider the long term interest of both people and the environment.

**SUSIE:** So what about birds and plants and animals disappearing? What will happen to them?

**OLD MAN:** Well, they will keep disappearing, which is sad because they also play an important role in climate regulation both at local and global level.

**PETER:** I know. Like when people cut down the rainforests which absorb a lot of CO₂, right?

**OLD MAN:** Yes. But plants also shape the climate right on the spot. They change how much rain we have, they protect us from wind. When we destroy the natural vegetation cover, we further contribute to climate change. And still, people sometimes destroy the vegetation in the name of “mitigating climate change”. Isn’t it ironic?

**PETER:** Like with biofuel production? Brazil is destroying the Amazon rain-forests to plant biofuels and it really emits so much more CO₂ in the air. But in my school we planted trees on environment day to stop global warming. Wouldn’t it be enough to plant a lot of trees then?

**OLD MAN:** Planting trees is very nice and it would be good to have as many natural-like forests as possible. But trees are tricky: they only absorb extra CO₂ while they are growing. When they die, the stored CO₂ will again enter the carbon cycle – unless it becomes fossilised.

**PETER:** I guess you are right: we have to look at more than just the surface of problems.

**SUSIE:** This is so simple. I am only seven but I understand! We have to save animals from disappearing and for this we have to stop putting those bad gasses into the air. Why can’t adults understand this?

**PETER:** That is right, Susie. If nothing happens, these end-of-pipe solutions will not only harm animals – millions of people will lose their livelihood and even their lives because of climate change.
**GREENWASHING**

**GRANDMA:** I wish we could do some good. But we alone cannot do too much. Such things are mostly decided by people whose job is to make decisions about our laws. They are called politicians.

**SUSIE:** So why don’t politicians do something about it?

**PETER:** I guess some politicians don’t know about these issues. Like many of the things I read and believed are just not right. I think our politicians read the same magazines about nature as me.

**SUSIE:** I wish kids learnt about this stuff at school. Then we would not need to worry so much about the future of people and animals.

**OLD MAN:** Some politicians would like to help but they may get false information from big companies. Many rich multinational companies don’t want things to change because they would lose a lot of money. So they sometimes pay scientists and experts to help them. These experts then give false numbers and untrue explanations.
and let politicians think that everything is all right. For example, they say that global warming is a natural process and it has happened before so it is not people’s fault. You can also see companies which seem to take care of the environment or donate money for social purposes, but they are among the worst polluters. If a company donates money only to improve its “image” and disguises its environmentally and socially irresponsible behaviour, it is called greenwashing.

**GRANDMA:** But politicians should find ways to ensure it cannot happen. That all companies act in favour of people and the environment on the whole planet. Life cannot only be about profit.

**OLD MAN:** This is true. Still, some politicians do not think of the planet as a whole. They bother about their own country and the economy. Of course, it is important to take care of the economy, but it should not be an aim in itself, only a tool for providing social welfare.
Environment is not just a natural resource, but a limiting condition for economic and social processes. But most people, including politicians, don’t see the real connections between these issues. They just take samples of the masses of problems, and apply quick-fix solutions to them, with which they can gain the support of the voters in the short run. They never look at the root causes or ask fundamental questions about how society and economy function even if there are obvious links for instance between environmental destruction, unemployment and cheap natural resources.

**Grandma:** Yes, people over-exploit the environment. In my lifetime I saw how human and animal labour was replaced by machines, pesticides and fertilizers in agriculture.

**Old Man:** Yes. And a similar change has happened in the industry: machines and technology instead of human labour. And a sea of problems followed: unemployment, urban sprawl, environmental degradation, agricultural subsidies, and so on. Politicians try to deal with them separately, but without real results.

**Peter:** From what you have told us I can see how these responses even make the problems bigger somewhere else. And they have long-term bad consequences.

**Old Man:** That’s true. Production, consumption and trade have become globalized and they all originate from our current economic regulations. But they bring with themselves environmental destruction, migration, cultural tensions and even wars! We can’t tackle these issues separately, without looking at the processes and factors driving them. Quick-fix and end-of-pipe solutions don’t deal with the complex relationships and the root causes so they will be just a waste of money and resources in a long term.

**Peter:** When I get back home I will search the internet about these issues. I want to see the whole picture because I want to be able to decide on the right things. And when I grow up, I want to be a politician because I want to make this world a good and fair place for me and younger children.

**Grandma:** I think you will make a great politician! You are open to new things, you like educating yourself, you like reading and you care about things. I wish there were more people like you who are willing to start thinking in a different way.

**Susie:** Stop talking about politicians! I want to finish my fairytale book before we get there.
Dear Ministers and other Grownups in Pan-Europe,

We are very grateful for your hard work in making the world a better place. We know that you are also making it for us, the so-called “future generations”. But we don’t understand some of the things you do (for example why you call us “the future generation” when we are already here, and not in the future?) so after this journey we decided to come together and find out more about nature stuff because we know that when we grow up we will need to take over your work. We will have to continue the good things and correct the mistakes you made from which both nature and humans suffer. But please, can you start undoing the mistakes right now and not wait for us to do it?

Greetings,
Susie and Peter
LEARN MORE

Become familiar with your future and the ways to make it better. Visit our website and support the work of people who are concerned about the biodiversity.

www.ceeweb.org
GLOSSARY

**Biodiversity**: variability of life on earth
* within species (e.g. *Brassica oleracea*: broccoli, Brussels sprouts, cabbage, cauliflower, kale and kohlrabi)
* between species (different plants, animals, fungi, micro-organisms)
* on the level of ecosystems (complexes of living creatures and their abiotic – inorganic – environment, like forests, ponds)

**Biomass**: biologically originated organic material; it is a renewable energy source but it can be depleted
* body mass of creatures living in ecosystems or deceased terrestrial and water creatures (animals, plants and microorganisms)
* the products of biotechnological industries (e.g. GMO energy grass)
* all sorts of products (wastes and by-products) of various transformers such as people, animals or the processing industry

**Carbon cycle**: part of the biogeochemical cycle throughout which carbon is exchanged among the biosphere, soil, sediments, oceans and air

**Cultural pollution**: due to the increased mobility and worldwide communication in the globalised world different lifestyles, values and habits are transmitted through the media, tourism, traded goods, etc. Cultural pollution influences people even if its symptoms do not fit into the cultural environment. This type of pollution often results in the loss of cultural identity and local cultural heritage. (The spreading of democratic values cannot be included within this phenomenon.)

**Drivers**: socio-economic processes leading to environmental pressures. In one approach different levels of drivers can be distinguished, including structural drivers (e.g. consumption and production patterns, infrastructures, urban structures), institutional drivers (e.g. economic and legal regulations, sectoralisation in institutions, the education system) and cultural drivers (e.g. knowledge, approach, values of the people).

**Ecosystem**: a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit

**Ecosystem collapse**: the level above which the natural units called ecosystems lose their function so they cannot operate and no longer provide ecosystem services

**Ecosystem services**: the benefits people obtain from ecosystems. These include provisioning services (e.g. food and water), regulating services (e.g. regulation of floods, droughts, land degradation and diseases); supporting services (e.g. soil formation and nutrient cycling) and cultural services (e.g. recreational, spiritual, religious and other non-material benefits).

**Emission quotas**: the portion or share of total allowable emissions of greenhouse gases assigned to a country or group of countries within a framework of maximum total emissions and mandatory allocations of resources

**End-of-pipe solutions**: environmental protection measures which do not change the drivers of environmental pressures, but aim to reduce the pollution at the output side. One example is emission trading schemes. Usually these are technological solutions such as filters for treating water and air pollution, noise and solid wastes.

**Environmental pressure**: direct effects of human activities on the environment. In the case of biodiversity loss they include habitat fragmentation, degradation and
destruction, over-exploitation, the spread of invasive species and pollution.

**ENVIRONMENTAL (OR CLIMATE) REFUGEES**: people who are displaced or forced into migration by environmental disasters or climate change (e.g. increased droughts, desertification, sea level rise) and the more frequent occurrence of extreme weather conditions (e.g. hurricanes, cyclones, floods and tornadoes)

**EXTENSIVE AGRICULTURE**: an agricultural production system usually applied on smaller fields with diversified crops with the use of little input such as fertilizers, pesticides, machinery or irrigation. This agricultural production system is more adapted to the ecological conditions.

**GMO (GENETICALLY MODIFIED ORGANISM)**: any organism that possesses a novel combination of genetic material obtained via modern biotechnology and based on technologies that do not occur in traditional breeding and natural selection

**GREENWASHING**: environmental virtue unjustly stated by a company, industry, government, politician or even a non-governmental organization with the aim of creating a pro-environmental image or selling a product or policy

**HABITAT**: the place or type of site where an organism or population naturally occurs

**INTENSIVE AGRICULTURE**: an agricultural production system usually applied on large, monocultural fields with the use of a lot of input such as fertilizers, pesticides, machinery, irrigation and genetically modified (GM) crops in order to radically increase yield or to include otherwise unsuitable lands into the production

**INVASIVE ALIEN SPECIES**: a species, subspecies or lower taxon introduced outside its natural past or present distribution. Its introduction and/or spreading always threatens biodiversity.

**MONOCULTURE**: the agricultural practice of producing or growing one single crop over a wide area for several consecutive years

**OCEAN FERTILIZATION**: dumping nutrients such as iron into the oceans or seas to stimulate algae growth so that the increased amount of algae binds more carbon-dioxide. Although some experts believe the process to mitigate climate change, its net environmental benefits have not been proven yet. Moreover, it could bring about unpredictable and potentially dangerous geophysical changes and pose enormous threats to marine ecosystems.

**POLLINATORS**: animals such as bees, honey bees, hummingbirds and some rodents that carry or move pollen grains from and to the reproductive organs of plants

**SUSTAINABLE USE**: the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity. Such use maintains the potential of biodiversity to meet the needs and aspirations of present and future generations.

**VIRTUAL ENVIRONMENTAL PRESSURE**: indirect harmful effects of human activities on environment that we cannot measure directly. These include all the natural resources and land used in the production and consumption throughout the whole life-cycle of products and services.

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**Documents used for the glossary:**
Convention on Biological Diversity
Cartagena Protocol on Biosafety
Intergovernmental Panel on Climate Change
Iván Gyulai: *The Biomass Dilemma*
Millennium Ecosystem Assessment
This publication is supported by the Federal Office of Environment of Switzerland. The donor is not responsible for the expressed views and the use of the information made available.
Travelling by train is a great way to make new friends. It is also a great way to look at the world around us and see things from a faster and closer perspective. At least this is what Susie and Peter found out on their journey. They are “typical youngsters”: they go to school, they watch TV, and they like nature. Still, they know so little about the surrounding natural world – nor do they understand how important nature and biodiversity is in their own lives. Even though they often hear adults speak about “global problems”, they have never thought about the real causes behind them and they believe the world is a safe and friendly place for everybody. Luckily, on this journey they meet a man who knows so much! He can explain complicated relationships between biodiversity and climate change, tourism and poverty, biofuels and rice prices, and the like. As their journey draws closer to its end, they come to understand that the fate of people and biodiversity are inseparably related. Join Susie and Peter on this exciting trip and find out yourself about the most pressing environmental issues of our times!