

Project Sample: Poverty and Global Warming

Guidelines for Project Work in Economics (Class XI and XII)

The **objectives** of the project work are to enable learners to:

- probe deeper into theoretical concepts learnt in classes XI and XII
- analyse and evaluate real world economic scenarios using theoretical constructs and arguments
- demonstrate the learning of economic theory
- follow up aspects of economics in which learners have interest
- develop the communication skills to argue logically

The **expectations** of the project work are that:

- learners will complete only **ONE** project in each academic session
- project should be of 3,500-4,000 words (excluding diagrams & graphs), preferably hand-written
- it will be an independent, self-directed piece of study

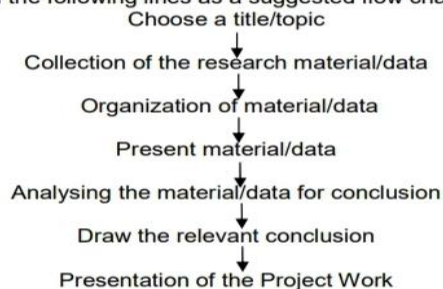
Role of the teacher:

The teacher plays a critical role in developing thinking skills of the learners. A teacher should:

- help each learner select the topic based on recently published extracts from the news media, government policies, RBI bulletin, NITI Aayog reports, IMF/World Bank reports etc., after detailed discussions and deliberations of the topic
- play the role of a facilitator and supervisor to monitor the project work of the learner through periodic discussions
- guide the research work in terms of sources for the relevant data
- educate learner about plagiarism and the importance of quoting the source of the information to ensure authenticity of research work
- prepare the learner for the presentation of the project work
- arrange a presentation of the project file

Scope of the project:

Learners may work upon the following lines as a suggested flow chart:



Economics Projects Guidelines

While choosing your Project of Economics you need to keep certain points in mind and they are listed below

- Be aware of what you are doing
- Make Sure your project is different and cut short it.
- Don't Exaggerate and try to include all the necessary points regarding the topic. However, a topic on demand might lead you to behavioral economics and that's not so important. Concentrate on specific features and don't make it lengthy.
- Take Proper Guidelines from your Faculty.

ECONOMICS

PROJECT

POVERTY

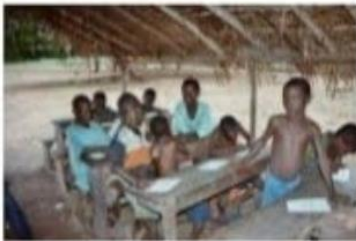
Y

What is Poverty

•Poverty is the world at its worst when people are deprived of basic everyday things that we take for granted like food, water shelter, money, and clothes

WHAT DOES POVERTY MEAN?

- Lack of shelter.
- Lack of food.
- Lack of education.
- Lack of basic transportation.
- Lack of ability to pay off debts.
- Lack of good health and medical infrastructure.



Poverty is a Horrrifying
thing

HOW?





Causes of poverty

- oLack of education
- oNatural disasters
- oLack of money
- oNo opportunities provided
- oOver population

Poverty is also caused by DRUGS & ALCOHOL as some people spend all their money on addictions like this.

Major causes of extreme poverty

- Hunger & Malnutrition
- Limited access to quality health care
- Insufficient access to sanitary water
- Limited education

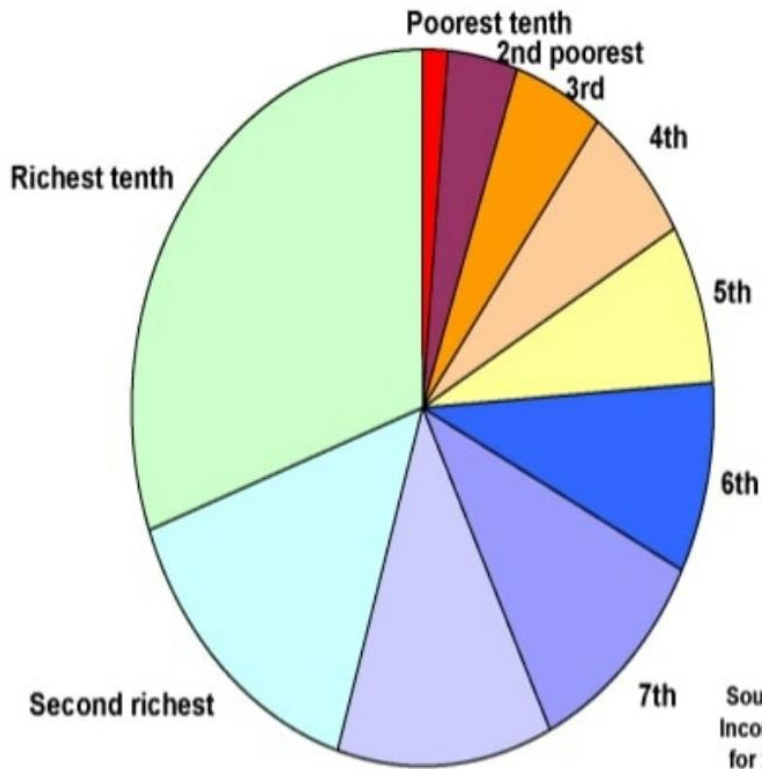


Effects of poverty

- High Mortality Rates.
- Increased health risks and perpetuation of epidemics such as HIV/AIDS and Malaria.
- Hampers children's ability to grow & develop properly and contributes to a cycle of poverty
- Inhibits education and social advancement
- Increased armed conflict



The income of the richest tenth is more than the income of all those on below-average incomes (i.e. the bottom five tenths) combined



Source: Households Below Average Income, DWP; the data is the average for 2006/07 to 2008/09; UK; updated

FACTS

- ✓ 1.4 BILLION people in developing countries live on \$1.25 or less
- ✓ 3 out of every 4 people live on less than \$1.25 a day
- ✓ 22,000 children die every day due to poverty
- ✓ 8MILLION people die from lack of food and nutrition - about 24,000 deaths each day

FACTS

- ✓ 60% of world's hungry are women
- ✓ Lack of proper maternal care results in 300,000 maternal deaths annually
- ✓ 1 out of 6 infants are born with a low birth rate in developing countries
- ✓ Malnutrition causes 1/3 of all child deaths resulting in 2.6MILLION deaths per year
- ✓ Every 5 second a child dies of hunger related diseases

FACTS

- ✓ 98% of the world's undernourished people live in developing countries.
- ✓ 2/3 of the world's hungry people live in just 7 countries: BANGLADESH, CHINA, DEMOCRATIC REPUBLIC OF CONGO, ETHIOPIA, INDIA, INDONESIA and PAKISTAN.
- ✓ 35 MILLION people are living with HIV/AIDS out of which 65% are women.
- ✓ More than 11 MILLION children die from preventable health issues such as malaria, Diarrhoea and pneumonia.

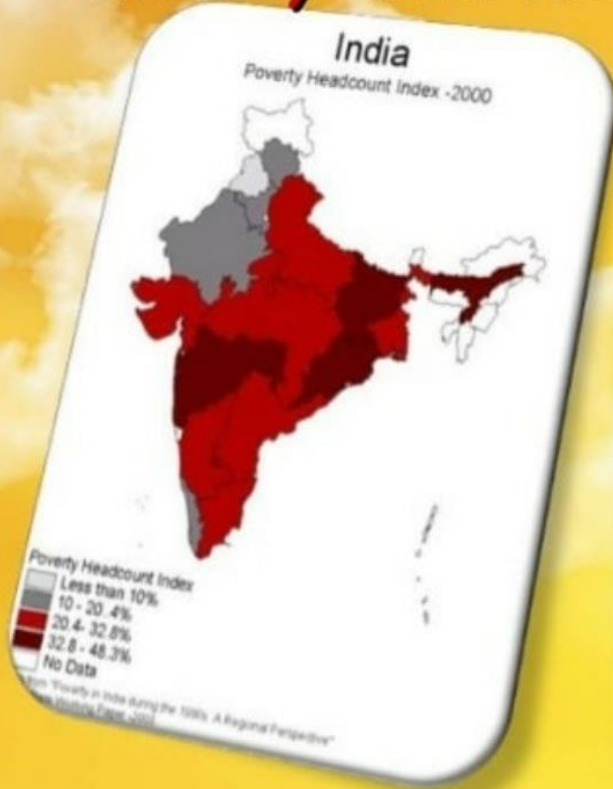
Poverty In India



Problem Of Poverty In India



Poverty in INDIA



TWO WAYS OF POVERTY

RELATIVE POVERTY

- Under Relative poverty the economic conditions of different regions or countries is compared. The capita income and the national income are the two indicators of relative poverty. According to the UNO those countries are treated poor whose per capita income is less than US \$725 per annum.

ABSOLUTE POVERTY

- Absolute poverty refers to the measure of poverty, keeping in view the per capita intake of calories and minimum level of consumption.
- Per capita income :
$$\frac{\text{National income}}{\text{Population}}$$

MEASUREMENT OF POVERTY

EXPENDIURE METHOD

- Under this the minimum food requirements for survival is estimated.
- The food value is converted into calories.
- The caloric value of food is then converted into the money value i.e. in rupees.
- The total equivalent amount is considered as the poverty line.

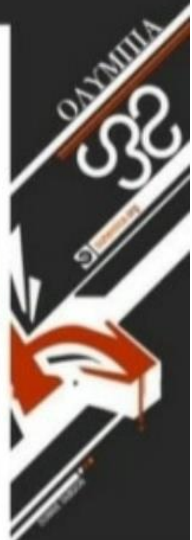
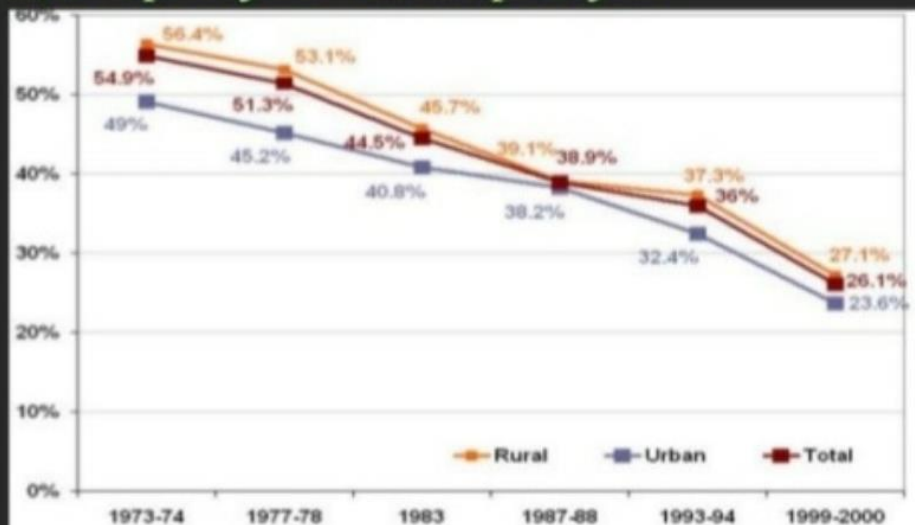
INCOME METHOD

- This method is used by the government while distributing food through PDS at the local level.
- Under this a poverty line is fixed by the government.
- All the families whose total income is less than the poverty line fixed by the government are considered as BPL.

WHAT IS POVERTY LINE?

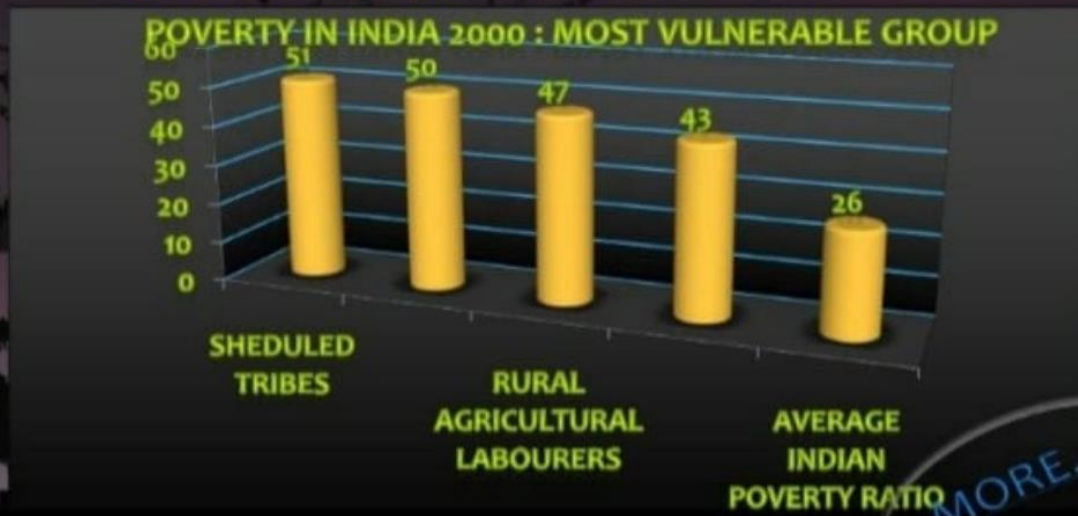
* Poverty line is the line which indicates the level of purchasing power required to satisfy the minimum needs of a person. It represents the capacity to satisfy the minimum level of human needs. The line divides the people into 2 groups :

1. Above poverty line 2. Below poverty line



VULNERABLE GROUP

Poverty and occupation both are co-related. Most of the poor people include agricultural and casual laborers, the SCs, STs and the physically challenged.



MORE...

POVERTY ALLEVIATION PROGRAMMES



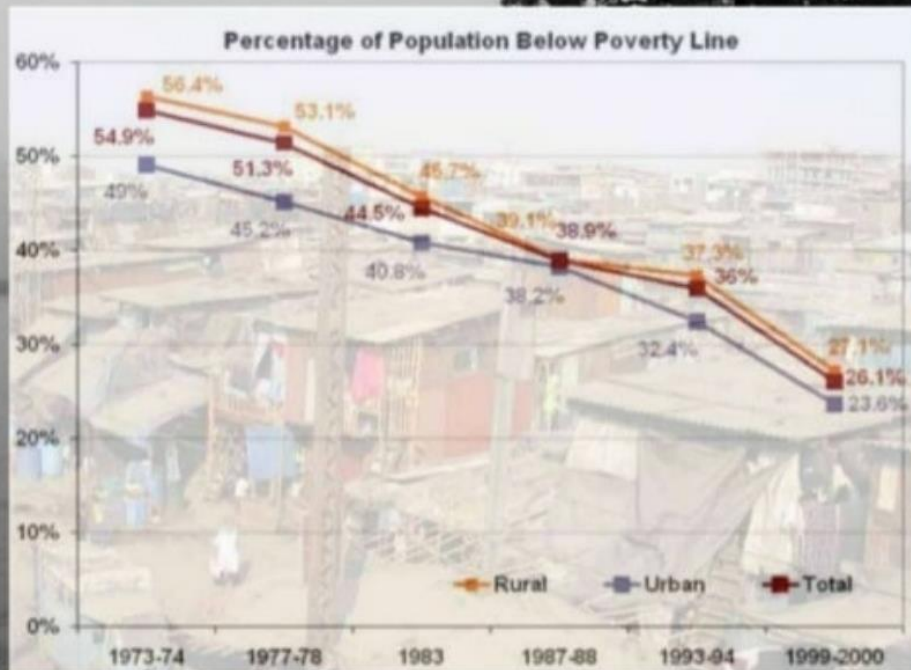
- * *Swarna Jayanti Gram Swarozgar Yojana (SGSY)*
- * *Sampoorna Gramin Rozgar Yojana (SGRY)*
- * *Prime Minister's Rozgar Yojana (PMRY)*
- * *Swarnajayanti Shahari Rozgar Yojana (SSRY)*
- * *Pradhan Mantri Gramodaya Yojana (PMGY)*
- * *National Rural Employment Guarantee Act (NREGA)*

Poverty in the States of India

- * One half of India's poor is located the three states of Uttar Pradesh, Bihar, and Madhya Pradesh
- * Maharashtra, West Bengal and Orissa account for 22.5% of poverty



Statistical Study





PROJECT FILE
GLOBAL WARMING

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81301113016

IT (2nd sem)

ACKNOWLEDGEMENT

I OWE A GREAT MANY THANKS TO A GREAT MANY PEOPLE WHO HELPED AND SUPPORTED ME DURING THE COMPLETION OF THIS PROJECT. MY DEEPEST THANKS TO LECTURER, [WING CDR KULDIP SINGH] THE GUIDE OF THE PROJECT FOR GUIDING AND CORRECTING VARIOUS DOCUMENTS OF MINE WITH ATTENTION AND CARE. HE HAS TAKEN PAIN TO GO THROUGH THE PROJECT AND MAKE NECESSARY CORRECTION AS AND WHEN NEEDED. I EXPRESS MY THANKS TO THE PRINCIPAL [K.K GOEL] FOR EXTENDING HIS SUPPORT.

I WOULD ALSO THANK MY INSTITUTION AND MY FACULTY MEMBERS WITHOUT WHOM THIS PROJECT WOULD HAVE BEEN A DISTANT REALITY. I ALSO EXTEND MY HEARTFELT THANKS TO MY FAMILY AND WELL WISHERS.

DUSHMANTA NATH

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IT (2^o SEM)

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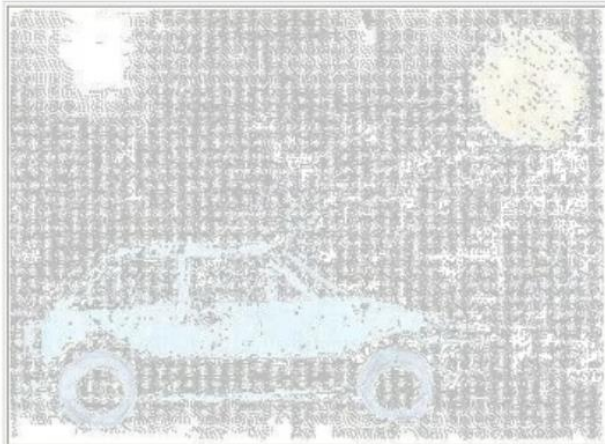
- *WHAT IS GLOBAL WARMING?*
- *ITS CAUSES*
- *ITS EFFECTS*
- *GREEN HOUSE EFFECT*
- *EFFECT OF NUCLEAR POWER*

GLOBAL WARMING SOLUTIONS

Effects of Global Warming:

What is the greenhouse effect?

The greenhouse effect is when the temperature rises because the sun's heat and light is trapped in the earth's atmosphere. This is like when heat is trapped in a car. On a very hot day, the car gets hotter when it is out in the parking lot. This is because the heat and light from the sun can get into the car, by going through the windows, but it can't get back out. This is what the greenhouse effect does to the earth. The heat and light can get through the atmosphere, but it can't get out. As a result, the temperature rises.



The sun's heat can get into the car through the windows but is then trapped. This makes whatever the place might be, a greenhouse, a car, a building, or the earth's atmosphere, hotter. This diagram shows the heat coming into a car as visible light (light you can see) and infrared light (heat). Once the light is inside the car, it is trapped and the heat.

The squiggle lines coming from the sun are visible light and the lines and arrows inside the car are infrared light.



The planet is warming, from North Pole to South Pole, and everywhere in between. Globally, the mercury is already up more than 1 degree Fahrenheit (0.8 degree Celsius), and even more in sensitive polar regions. And the effects of rising temperatures aren't waiting for some far-flung future. They're happening right now. Signs are appearing all over, and some of them are surprising. The heat is not only melting glaciers and sea ice, it's also shifting precipitation patterns and setting animals on the move.

Some impacts from increasing temperatures are already happening.

- Ice is melting worldwide, especially at the Earth's poles. This includes mountain glaciers, ice sheets covering West Antarctica and Greenland, and Arctic sea ice.
- Researcher Bill Fraser has tracked the decline of the Adélie penguins on Antarctica, where their numbers have fallen from 32,000 breeding pairs to 11,000 in 30 years.
- Sea level rise became faster over the last century.
- Some butterflies, foxes, and alpine plants have moved farther north or to higher, cooler areas.
- Precipitation (rain and snowfall) has increased across the globe, on average.
- Spruce bark beetles have boomed in Alaska thanks to 20 years of warm summers. The insects have chewed up 4 million acres of spruce trees.

Other effects could happen later this century, if warming continues.

- Sea levels are expected to rise between 7 and 23 inches (18 and 59 centimeters) by the end of the century, and continued melting at the poles could add between 4 and 8 inches (10 to 20 centimeters).
- Hurricanes and other storms are likely to become stronger.
- Species that depend on one another may become out of sync. For example, plants could bloom earlier than their pollinating insects become active.
- Floods and droughts will become more common. Rainfall in Ethiopia, where droughts are already common, could decline by 10 percent over the next 50 years.
- Less fresh water will be available. If the Quelccaya ice cap in Peru continues to melt at its current rate, it will be gone by 2100, leaving thousands of people who rely on it for drinking water and electricity without a source of either.
- Some diseases will spread, such as malaria carried by mosquitoes.
- Ecosystems will change—some species will move farther north or become more successful; others won't be able to move and could become extinct. Wildlife research scientist Martyn Obbard has found that since the mid-1980s, with less ice on which to live and fish for food, polar bears have gotten considerably skinnier. Polar bear biologist Ian Stirling has found a similar pattern in Hudson Bay. He fears that if sea ice disappears, the polar bears will as well.

Global Warming Solutions:



The evidence that humans are causing global warming is strong, but the question of what to do about it remains controversial. Economics, sociology, and politics are all important factors in planning for the future.

Even if we stopped emitting greenhouse gases (GHGs) today, the Earth would still warm by another degree Fahrenheit or so. But what we do from today forward makes a big difference. Depending on our choices, scientists predict that the Earth could eventually warm by as little as 2.5 degrees or as much as 10 degrees Fahrenheit.

A commonly cited goal is to stabilize GHG concentrations around 450-550 parts per million (ppm), or about twice pre-industrial levels. This is the point at which many believe the most damaging impacts of climate change can be avoided. Current concentrations are about 380 ppm, which means there isn't much time to lose. According to the IPCC, we'd have to reduce GHG emissions by 50% to 80% of what they're on track to be in the next century to reach this level.

Is this possible?

Many people and governments are already working hard to cut greenhouse gases, and everyone can help.

Researchers Stephen Pacala and Robert Socolow at Princeton University have suggested one approach that they call “stabilization wedges.” This means reducing GHG emissions from a variety of sources with technologies available in the next few decades, rather than relying on an enormous change in a single area. They suggest 7 wedges that could each reduce emissions, and all of them together could hold emissions at approximately current levels for the next 50 years, putting us on a potential path to stabilize around 500 ppm.

There are many possible wedges, including improvements to energy efficiency and vehicle fuel economy (so less energy has to be produced), and increases in wind and solar power, hydrogen produced from renewable sources, biofuels (produced from crops), natural gas, and nuclear power. There is also the potential to capture the carbon dioxide emitted from fossil fuels and store it underground—a process called “carbon sequestration.”

In addition to reducing the gases we emit to the atmosphere, we can also increase the amount of gases we take out of the atmosphere. Plants and trees absorb CO₂ as they grow, “sequestering” carbon naturally. Increasing forestlands and making changes to the way we farm could increase the amount of carbon we’re storing.

Some of these technologies have drawbacks, and different communities will make different decisions about how to power their lives, but the good news is that there are a variety of options to put us on a path toward a stable climate.

Are there any ways to prevent global warming?

The main cause of global warming is the increased emission of so called **greenhouse gases**, in particular **carbon dioxide**.

These greenhouse gases have an average lifetime in the atmosphere of 50 to 200 years. This means that even if we stopped the emission of greenhouse gases completely tomorrow, global warming would still continue.

In other words: It is impossible to stop global warming, it is only possible to mitigate its **effects** through a drastic reduction of the emission of CO₂.

Can nuclear power plants mitigate the effects of global warming?

Nuclear energy is used to generate electrical power. Therefore it is only possible to reduce the emission of CO₂ if nuclear power plants are used instead of other, CO₂ emitting technologies. This is in particular the case for electrical generation plants fuelled by coal, oil or gas. The CO₂ emission can indeed be reduced, if electrical power plants driven by fossil fuels are being replaced by nuclear power plants. However the application of nuclear power unfortunately is highly problematic, therefore the problem of CO₂ emissions must not be looked at independently of all other risks and problems. See our text about **pros and cons of nuclear power** for a summary of the advantages and disadvantages.

How much can nuclear energy reduce the main cause of global warming?

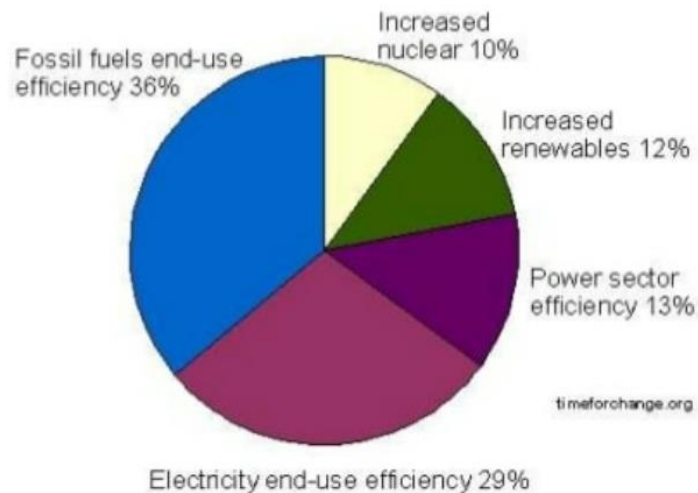
The International Energy Agency (IEA) records the energy consumption world-wide and produces a **forecast** for the next 25 years. In their last energy outlook published in autumn 2006, IEA predicts a strong increase of the carbon dioxide emissions by the year 2030 as a consequence of the increasing demand for energy world-wide.

Additionally, IEA investigated to which extent the above mentioned emissions of CO₂ could be prevented if politics applied rigorous measures. One of many measures investigated was massive facilitations and incentives for building additional nuclear power plants.

From all measures proposed, nuclear energy was found to have the smallest effect (only 10%). This result is even more remarkable facing the fact that IEA is known for having no reservations whatsoever against nuclear energy.

The chart below shows the effects of each proposed measure to reduce the main cause of global warming, the emission of carbon dioxide:

CO₂ reduction share by fuel type



Graph1: Proportional effect of measures to mitigate the main cause of global warming, the emission of CO₂ by the year 2030. 100% = effect of all proposed measures together.
Data source: International Energy Agency (IEA). <http://iea.org>

The following results attract attention:

- Almost 80% of the desired effects are due to increasing the energy efficiency (36% due to increasing the efficiency of the use of fossil energy, 29% due to increasing the efficiency of electrical appliances and 13% due to increasing the efficiency at the electrical power generation).
- 12% of the desired effects are due to furthering the generation and application of renewable energies.
- Only 10% of the desired effects are due to furthering nuclear energy.

This result is surprising, in particular if you think about how nuclear power is praised as solution to global warming by politicians like George W. Bush and Tony Blair. It seems like they would (again) head into the wrong direction.

Instead of talking about measures to increase the energy efficiency, which accounts for 80% of the effects, some politicians propagandize building nuclear power plants, which according to IEA can only account for 10% of the desired effects. Here the focus is clearly on the wrong subject!

Why is the focus on nuclear energy instead of energy efficiency?

Unfortunately, there is no lobby for energy efficiency, except perhaps some environmental organisations. The nuclear industry however, does have quite a strong lobby world-wide. If a politician asks for a higher efficiency of cars, he or she gets opposed immediately by the automobile industry (keyword work places). If the same politician suggests building nuclear power plants, he or she can even hope for some money for the next election campaign.

Why use nuclear power at all?

If the focus is put only to avoid the emission of CO₂ and if all other side effects are neglected, then nuclear energy can indeed contribute to the solution. However the problem of climate change should be solved and discussed in a much wider context: It is important to limit our consumption of resources to such an amount which does not curtail future generations nor other beings on Earth. We finally must learn to live a **sustainable living** .

In this context, nuclear power plants are no solution at all. On the contrary, it would mean to shift from one problem (CO₂ emission) to another and not less severe problem (nuclear waste, risk of nuclear catastrophes, limited resource uranium, nuclear proliferation).

Nuclear energy could contribute only little to reduce the cause of global warming. Moreover, it can only be a serious option if you shut the eyes to the many cons of nuclear power.

Our energy consumption has increased year by year. Politics and industry made sure that the demand of energy was always fulfilled. Supply followed demand. Sustainability was rarely looked at.

Greenhouse effect:

The “greenhouse effect” is the warming that happens when certain gases in Earth’s atmosphere trap heat. These gases let in light but keep heat from escaping, like the glass walls of a greenhouse.

First, sunlight shines onto the Earth’s surface, where it is absorbed and then radiates back into the atmosphere as heat. In the atmosphere, “greenhouse” gases trap some of this heat, and the rest escapes into space. The more greenhouse gases are in the atmosphere, the more heat gets trapped.

Scientists have known about the greenhouse effect since 1824, when Joseph Fourier calculated that the Earth would be much colder if it had no atmosphere. This greenhouse effect is what keeps the Earth’s climate livable. Without it, the Earth’s surface would be an average of about 60 degrees Fahrenheit cooler. In 1895, the Swedish chemist Svante Arrhenius discovered that humans could enhance the greenhouse effect by making carbon dioxide, a greenhouse gas. He kicked off 100 years of climate research that has given us a sophisticated understanding of global warming.

Levels of greenhouse gases (GHGs) have gone up and down over the Earth’s history, but they have been fairly constant for the past few thousand years. Global average temperatures have stayed fairly constant over that time as well, until recently. Through the burning of fossil fuels and other GHG emissions, humans are enhancing the greenhouse effect and warming Earth.

Scientists often use the term “climate change” instead of global warming. This is because as the Earth’s average temperature climbs, winds and ocean currents move heat around the globe in ways that can cool some areas, warm others, and change the amount of rain and snow falling. As a result, the climate changes differently in different areas.

Aren’t temperature changes natural?

The average global temperature and concentrations of carbon dioxide (one of the major greenhouse gases) have fluctuated on a cycle of hundreds of thousands of years as the Earth’s position relative to the sun has varied. As a result, ice ages have come and gone.

However, for thousands of years now, emissions of GHGs to the atmosphere have been balanced out by GHGs that are naturally absorbed. As a result, GHG concentrations and temperature have been fairly stable. This stability has allowed human civilization to develop within a consistent climate.

Occasionally, other factors briefly influence global temperatures. Volcanic eruptions, for example, emit particles that temporarily cool the Earth's surface. But these have no lasting effect beyond a few years. Other cycles, such as El Niño, also work on fairly short and predictable cycles.

Now, humans have increased the amount of carbon dioxide in the atmosphere by more than a third since the industrial revolution. Changes this large have historically taken thousands of years, but are now happening over the course of decades.

Why is this a concern?

The rapid rise in greenhouse gases is a problem because it is changing the climate faster than some living things may be able to adapt. Also, a new and more unpredictable climate poses unique challenges to all life.

Historically, Earth's climate has regularly shifted back and forth between temperatures like those we see today and temperatures cold enough that large sheets of ice covered much of North America and Europe. The difference between average global temperatures today and during those ice ages is only about 5 degrees Celsius (9 degrees Fahrenheit), and these swings happen slowly, over hundreds of thousands of years.

Now, with concentrations of greenhouse gases rising, Earth's remaining ice sheets (such as Greenland and Antarctica) are starting to melt too. The extra water could potentially raise sea levels significantly.

As the mercury rises, the climate can change in unexpected ways. In addition to sea levels rising, weather can become more extreme. This means more intense major storms, more rain followed by longer and drier droughts (a challenge for growing crops), changes in the ranges in which plants and animals can live, and loss of water supplies that have historically come from glaciers.

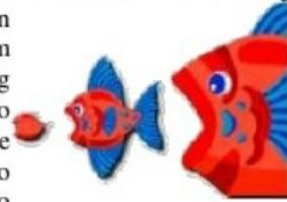
Scientists are already seeing some of these changes occurring more quickly than they had expected. According to the Intergovernmental Panel on Climate Change, eleven of the twelve hottest years since thermometer readings became available occurred between 1995 and 2006.

What are greenhouse gasses?

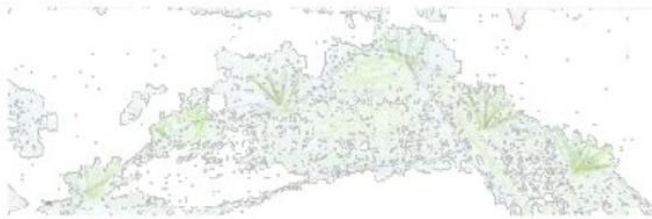
Greenhouse gasses are gasses in the earth's atmosphere that collect heat and light from the sun. With too many greenhouse gasses in the air, the earth's atmosphere will trap too much heat and the earth will get too hot. As a result people, animals, and plants would die because the heat would be too strong.

What is global warming doing to the environment?

Global warming is affecting many parts of the world. Global warming makes the sea rise, and when the sea rises, the water covers many low land islands. This is a big problem for many of the plants, animals, and people on islands. The water covers the plants and causes some of them to die. When they die, the animals lose a source of food, along with their habitat. Although animals have a better ability to adapt to what happens than plants do, they may die also. When the plants and animals die, people lose two sources of food, plant food and animal food. They may also lose their homes. As a result, they would also have to leave the area or die. This would be called a break in the food chain, or a chain reaction, one thing happening that leads to another and so on.



The oceans are affected by global warming in other ways, as well. Many things that are happening to the ocean are linked to global warming. One thing that is happening is warm water, caused from global warming, is harming and killing algae in the ocean.



Algae is a producer that you can see floating on the top of the water. (A producer is something that makes food for other animals through photosynthesis, like grass.) This floating green algae is food to many consumers in the ocean. (A consumer is something that eats the producers.) One kind of a consumer is small fish. There are many others like crabs, some whales, and many other animals. Fewer algae is a problem because there is less food for us and many animals in the sea.

Global warming is doing many things to people as well as animals and plants. It is killing algae, but it is also destroying many huge forests. The pollution that causes global warming is linked to acid rain. Acid rain gradually destroys almost everything it touches. Global warming is also causing many more fires that wipe out whole forests. This happens because global warming can make the earth very hot. In forests, some plants and trees leaves can be so dry that they catch on fire.

What causes global warming?

Many things cause global warming. One thing that causes global warming is electrical pollution. Electricity causes pollution in many ways, some worse than others. In most cases, fossil fuels are burned to create electricity. Fossil fuels are made of dead plants and animals. Some examples of fossil fuels are oil and petroleum. Many pollutants (chemicals that pollute the air, water, and land) are sent into the air when fossil fuels are burned. Some of these chemicals are called greenhouse gasses.

We use these sources of energy much more than the sources that give off less pollution. Petroleum, one of the sources of energy, is used a lot. It is used for transportation, making electricity, and making many other things. Although this source of energy gives off a lot of pollution, it is used for 38% of the United States' energy.

Some other examples of using energy and polluting the air are:



- ☉ Turning on a light
- ☉ Watching T.V.
- ☉ Listening to a stereo
- ☉ Washing or drying clothes
- ☉ Using a hair dryer
- ☉ Riding in a car
- ☉ Heating a meal in the microwave
- ☉ Using an air conditioner
- ☉ Playing a video game
- ☉ Using a dish washer



When you do these things, you are causing more greenhouse gasses to be sent into the air. Greenhouse gasses are sent into the air because creating the electricity you use to do these things causes pollution. If you think of how many times a day you do these things, it's a lot. You even have to add in how many other people do these things! That turns out to be a lot of pollutants going into the air a day because of people like us using electricity. The least amount of electricity you use, the better.



Industrial Pollution

Scientists have spent decades figuring out what is causing global warming. They've looked at the natural cycles and events that are known to influence climate. But the amount and pattern of warming that's been measured can't be explained by these factors alone. The only way to explain the pattern is to include the effect of greenhouse gases (GHGs) emitted by humans.

To bring all this information together, the United Nations formed a group of scientists called the International Panel on Climate Change, or IPCC. The IPCC meets every few years to review the latest scientific findings and write a report summarizing all that is known about global warming. Each report represents a consensus, or agreement, among hundreds of leading scientists.

One of the first things scientists learned is that there are several greenhouse gases responsible for warming, and humans emit them in a variety of ways. Most come from

What Is Global Warming?

Global warming is when the earth heats up (the temperature rises). It happens when greenhouse gases (carbon dioxide, water vapor, nitrous oxide, and methane) trap heat and light from the sun in the earth's atmosphere, which increases the temperature. This hurts many people, animals, and plants. Many cannot take the change, so they die.



Glaciers are melting, sea levels are rising, cloud forests are drying, and wildlife is scrambling to keep pace. It's becoming clear that humans have caused most of the past century's warming by releasing heat-trapping gases as we power our modern lives. Called greenhouse gases, their levels are higher now than in the last 650,000 years.

We call the result global warming, but it is causing a set of changes to the Earth's climate, or long-term weather patterns, that varies from place to place. As the Earth spins each day, the new heat swirls with it, picking up moisture over the oceans, rising here, settling there. It's changing the rhythms of climate that all living things have come to rely upon.

What will we do to slow this warming? How will we cope with the changes we've already set into motion? While we struggle to figure it all out, the face of the Earth as we know it—coasts, forests, farms and snow-capped mountains—hangs in the balance.