



MIGHT FEEDING THE WORLD IN 2050 BE OUR BIGGEST PROBLEM?

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GLOSSARY

***Definitions from Oxford online dictionary ***

Atmosphere:

The gaseous envelope of a celestial body (such as a planet), or the whole mass of air surrounding the earth.

Carbon Footprint:

The amount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organization, or community.

Circular economy:

An economic system aimed at eliminating waste and the continual use of resources.

Consumption:

The action of using up a resource.

Degradation:

The condition or process of degrading or being degraded.

Economics:

The branch of knowledge concerned with the production, consumption, and transfer of wealth

Ecosystem:

A biological community of interacting organisms and their physical environment.

GDP:

Gross domestic product is a monetary measure of the market value of all the final goods and services produced in a specific time period.

Greenhouse effect:

The trapping of the sun's warmth in a planet's lower atmosphere, due to the greater transparency of the atmosphere to visible radiation from the sun than to infrared radiation emitted from the planet's surface.

Hydropower:

Power derived from the energy of falling or fast-running water, which may be harnessed for useful purposes.

Industrial revolution:

The Industrial Revolution was the transition to new manufacturing processes in Europe and the United States, in the period from about 1760 to sometime between 1820 and 1840.

GLOSSARY

Infrastructure:

The basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise.

Overcrowding:

The presence of more people or things in a space than is comfortable, safe, or permissible.

Radiates:

Emit (energy, especially light or heat) in the form of rays or waves.

Renewable:

Capable of being renewed.

Renewable energy:

Useful energy that is collected from renewable resources, which are naturally replenished on a human timescale, including carbon neutral sources like sunlight, wind, rain, tides, waves, and geothermal heat.

Reservoirs:

A large natural or artificial lake used as a source of water supply.

Scarcity:

The state of being scarce or in short supply; shortage.

Supply and demand:

The amount of a commodity, product, or service available and the desire of buyers for it, considered as factors regulating its price.

Sustainability:

The ability to be maintained at a certain rate or level. The avoidance of the depletion of natural resources in order to maintain an ecological balance.

Underdeveloped:

Not fully developed, below standard.

WHAT MAJOR PROBLEMS ARE AFFECTING HUMANITY TODAY?

According to the **United Nations**, these are the current global issues that are affecting humanity:

- Growing population
- Poverty
- Lack of quality education
- Employment opportunities
- Health problems and diseases
- Gender equality
- Human rights
- Refugees
- Peace and security
- Access to clean water and sanitation
- Hunger

WHAT MAJOR PROBLEMS WILL AFFECT HUMANITY IN 2050?

According to the **BBC**, these are the global issues that will affect humanity in 2050:

- **Food security** — Feeding an estimated world population of 9.1 billion people in 2050 would require increasing overall food production by 70% to meet the needs of a larger population.
- **Global warming** — It is predicted that there will be no ice in Arctic by summer 2050. Sea levels could rise as much as 19 inches by 2050 , erasing and submerging particular coastal cities.
- **Sustainability** — Global waste could increase by 70% by 2050
- **Climate change** — The Earth's surface temperature is predicted to increase by 2 degrees Celcius (3.6 degrees Fahrenheit) by 2050. Temperatures could be forecasted in the summer 90 degrees or more, which could cause extreme droughts
- **Technology and social media** — More than 8 billion of the world's population will be on social networks by 2050.
- **Health problems and diseases** — It is predicted that chronic non-communicable diseases will be responsible for 74% of all deaths globally by 2050
- **Clean energy** — By 2050, global industrial energy consumption will reach to about 315 quadrillion British thermal units (Btu)
- **Lack of resources through consumption** — Global consumption of natural resources could triple to 140 billion tons a year by 2050
- **Access to clean water and sanitation** — 6 billion people will suffer from limited access to clean water and sanitation by 2050. At least one in four people will be affected by recurring water shortages.
- **Clean air** — Global greenhouse gas emissions projected to increase by 50% by 2050

HOW COULD WE POSSIBLY ELIMINATE THESE PROBLEMS BEFORE 2050?

The elimination or prevention of these problems from further developing would be a difficult task to achieve, but it is entirely possible. Research will need to be done on every issue and a greater understanding of its causes and solutions shall be attained from this research.

Once we know enough, the trial and error of certain solutions will begin and start to eliminate these problems. For this to occur everybody, both government officials and normal civilians will need to bond together and form proper alliances to take on these issues.



HOW DO THESE PROBLEMS EFFECT FEEDING THE WORLD?

Feeding the world in 2050 is already a large enough issue, but how will these different problems affect feeding the world?

Global warming and climate change is going to affect feeding the world in many ways, not only will it cause food sources to diminish faster as climate change problems will make surviving for some animals and plants not possible. But it will also causing an increase in some foods in some countries meaning that overall, global warming and climate change is not going to beneficially affect feeding the world in 2050.

Sustainability is going to be an issue as if we do not use sustainable food resources, our food sources will diminish very quickly and it will cause a crisis in terms of feeding the world in 2050. As if we are not sustainable and do not control our consumption of both non-sustainable and sustainable resources/ foods, the issue of feeding the world in 2050 will only worsen.

Advancements in **technology** will effect feeding the world in 2050 positively whilst social media may not. Technology can ensure our food system is more resilient, stable and sustainable, assisting farmers to ensure that there is an increased quality in foods, improvements in methods for producing food and innovations that can reduce food waste.

Social media on the other hand, can impact our food choices negatively through influencers and trends.

This could be an issue in 2050 if a large amount of people only want to eat certain foods to keep up with the latest trends as resources will already be diminishing and it will get harder and harder to cater for people with specific food preferences that is caused by social media and technology.

Health problems and diseases will also negatively impact the issue of feeding the world as people with certain health issues and diseases such as malnutrition or diabetes might require specific foods for their conditions. If those foods are not available due to them being over-consumed already in order to help feed the world, those people's health will be impacted heavily and it will only result in more health issues for more people.

Clean energy/ renewable energy is going to be one of the few topics that will have a positive impact on feeding the world on 2050 as clean energy is going to help increase the production of foods and other resources. It is going to help make more resources more sustainable and therefore more accessible for people all over the world, having an overall very beneficial impact on feeding the world in 2050.

Lack of resources due to consumption is much like the other issues discussed, going to have a negative impact on the issue of feeding the world in 2050. As due to the lack of resources because of consumption, there will be less food and also less resources to produce more food, which will cause many countries to go hungry over long periods of time due to the lack of resources to be able to feed their citizens, and this will only worsen the issue of feeding the world in 2050.

Access to clean water and sanitation will much like clean energy be very beneficial to the issue of feeding the world in 2050. As it will help crops and foods grow much faster and also be much healthier to eat instead of eating food grown in pesticide filled soil. And it will also benefit the issue by helping more foods and food sources be safer and easier to eat, as they will have grown in much safer and healthier conditions, benefiting the issue of feeding the world.

And lastly, **cleaner air** is going to also be very beneficial to the issue of feeding the world in 2050. By not only just helping food sources grow quicker than they would in polluted air, but it will also help food production be quicker as more people will be able to inhabit once uninhabitable areas because of pollution and produce and manufacture more food, overall benefiting the issue of feeding the world tremendously. Overall, most of these issues aren't very beneficial to the issue of feeding the world in 2050, but some of them are however still going to be helpful in terms of solving/ preventing this issues from worsening. From climate change and global warming, to health problems and diseases, almost all of these issues are going to negatively affect the issue of feeding the world, and only worsen the impacts, but aspects such as clean air and access to clean water and sanitation will not only improve the issue of feeding the world but it will also help reduce the impact of some of the other issues.

WHICH MAJOR PROBLEMS HAVE WE CHOSEN TO FOCUS ON?

STELLA NICOLOPOULOS: FEEDING THE WORLD AND FOOD SECURITY

1. What is food security?
2. How can we feed the world in 2050?
3. What are some problems with feeding the world in 2050?
4. How can we prevent our food source from diminishing?
5. Will there be enough food to feed the population in 2050?
5. What are some possible solutions that can be put in place to ensure there will be enough food to feed the world's population?

OLVIA ROSS: CONSUMPTION AND SUSTAINABILITY

1. Will a future {ideal or not} in 2050 be sustainable?
2. How will consumption/ changing economy affect our future?
3. Will resources be more scarce in the future?
4. What is overconsumption?
5. Why is overconsumption a problem in the future society?
6. Will overconsumption affect our global economy in 2050?
7. How will over consumption contribute to the affects/ be affected by climate change?

EMILY MALCOM: CLIMATE CHANGE

- 1.What solutions are there to climate change?
2. What are fossil fuels and how can they be replaced?
3. How will climate change affect humanity n 2050?
4. If we do nothing about climate change will the world be in danger?
5. How do other problems contribute to climate change?
6. Who's responsibility is it to fix climate change and why should people care?
7. Why can't we just simply fix climate change?

FOOD SECURITY

1. WHAT IS FOOD SECURITY

According to the **United Nations' Committee on World Food Security**, food security is defined as the means that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life irrespective of their class, gender or religion. Individuals who are food secure do not live in hunger or fear of starvation - something that can be achieved in households where families have access to enough food daily to achieve an active, healthy lifestyle. Being food secure also ensures the availability and accessibility of food if there is to be future disruptions or unavailability of a particular food supply, due to factors such as droughts, shipping disruptions, fuel shortages, economic instability and wars.

Further to this, the United Nations identified four interrelated elements that determine food security.

These are:

1. Availability: the physical existence of food, through agriculture and food production, and trade, through imports and exports, and is not just quantity but also the quality and diversity of food. Improving availability requires sustainable farming systems, natural resources that are well managed and implementation of policies to ensure productivity.

2. Access: covers economic and physical access to food and is where all households have enough resources to obtain food in a sufficient quantity, quality and diversity for a nutritious diet. Improving access requires small-holders gaining better market entry, allowing them to generate more income from crops, livestock products and other enterprises.

3. Utilisation: focuses on how the body uses the various nutrients in food. A person's health, eating habits, food preparation, diversity of their diet and distribution of food in their family can affect a person's nutrition status. Improving utilisation requires improving education around nutrition and food safety, increasing diversity in our diets, adding value to food and reducing the loss of food after harvests.

4. Stability: explores the necessity of being food secure at all times and the time frame over which food and nutrition security is considered. Stability is determined when a supply of food, income and economic resources in a household remains constant during the year and in the long-term. When stability is not established, temporary food insecurity with short term impacts can occur. This can be a result of a bad season, a change in employment status, conflict or a rise in food prices, which affects poor people the most as most of their income is spent on food. Non for profit organisations and social support networks can provide assistance and support to those who are temporarily food insecure to ensure that they become stable.

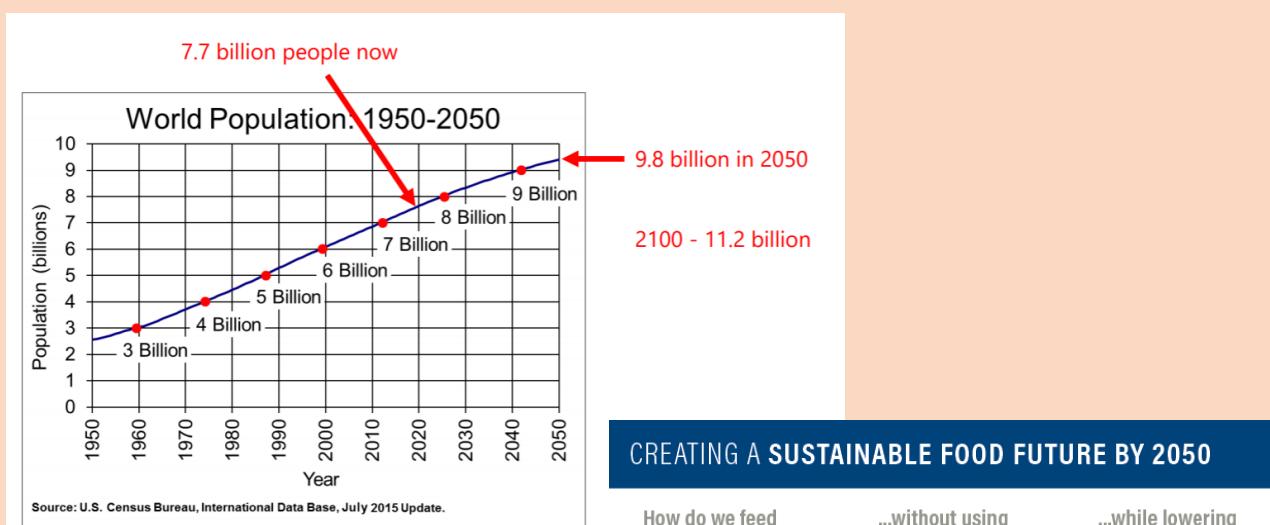


2. HOW DO WE FEED THE WORLD?

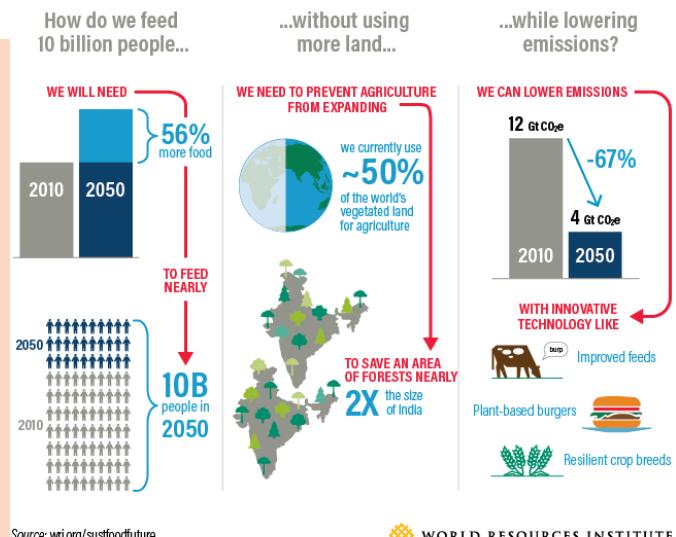
By 2050, there will be nearly 10 billion people on the Earth and an estimated two billion more mouths to feed. Feeding an estimated world population of 9.1 billion people in 2050 would require increasing overall food production by 70% to meet the needs of a larger population.

The population increase in the past century has had a positive impact, by encouraging an abundance of advancements in producing food through science which have helped us to improve the overall quality of food and life. With income rising, people will tend to consume more animal based foods but simultaneously, we must drastically reduce greenhouse gas emissions from crop agriculture and stop the conversion of remaining forests to agricultural land. As a result of this, feeding 10 billion people sustainably by 2050 requires closing three gaps:

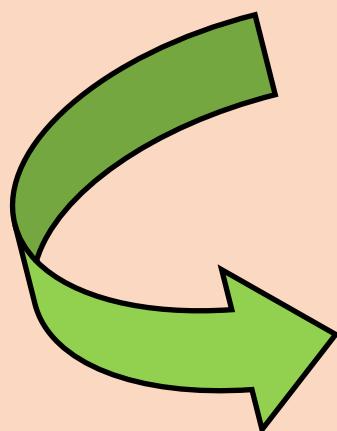
1. **A 56 percent food gap** between crops produced in 2010 and those needed in 2050
2. **A 593 million-hectare land gap** between global agricultural land area in 2010 and expected agricultural expansion by 2050
3. **An 11-gigaton greenhouse gases mitigation gap** between expected agricultural emissions in 2050 and the target level needed to reduce global warming below 2°C which is the necessary level for preventing climate impacts.



CREATING A SUSTAINABLE FOOD FUTURE BY 2050



<https://ourworldindata.org/world-population-growth>

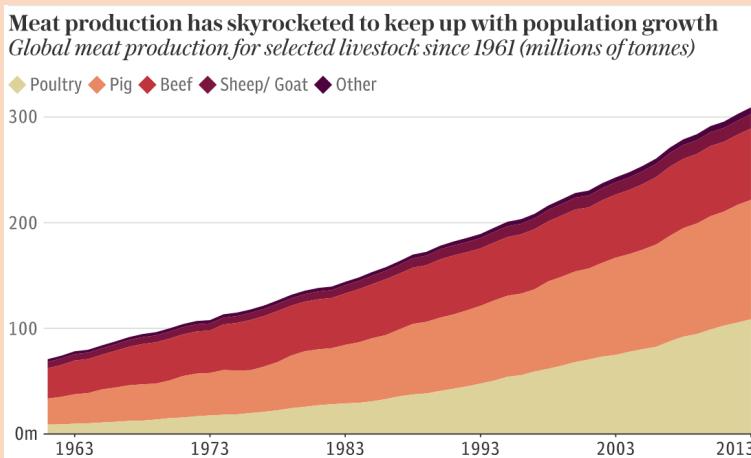


<https://www.wri.org/blog/2018/12/how-sustainably-feed-10-billion-people-2050-21-charts>

3. WHAT ARE SOME PROBLEMS WITH FEEDING THE WORLD IN 2050?

Despite the fact that we're currently dedicating over 38% of the Earth's ice-free land to farming, 795 million people worldwide still go hungry each day and more than two billion people lack vital nutrients, affecting their health and life expectancy. Both developed and non developed countries, are facing the issue of both hunger alongside obesity, with one in three people across the globe currently suffering from some form of malnutrition. With the rising impact of climate change, this will only make things worse as elevated levels of CO₂ reduce the nutritional content of grains, vegetables grown underground and legumes, affecting key nutrients such as zinc and iron.

With the expanding population becoming wealthier, food that requires a lot of resources to generate, such as meat and dairy, is in high demand. Meat-based diets create a massive increase in livestock farming with a $\frac{1}{3}$ of our crop production being used to feed the animals that supply us with meat and dairy products. This has contributed to the 8.1 billion tonnes of greenhouse gases in 2010. This increases the pressure to grow more food such as corn and soybeans, to feed more cattle, pigs, and chickens. By 2050 it is estimated that we will be consuming 60% more meat and dairy, 1.2 trillion litres of dairy milk and 500 billion kilograms of meat per year, which is considered unsustainable.



<https://www.telegraph.co.uk/news/feeding-the-future/>

Due to the total land devoted to agriculture being more than 51799762 square kilometers, it is estimated that in 2050, there will be no new land for agriculture, as it would increase deforestation, extinction of species and cause a greenhouse gas impact that's more than cars, trains and aeroplanes combined.

This is caused not only by urbanisation, with an estimated 70% of the world to be urbanised by 2050, but a rise in sea levels reducing land availability and the need for land for bioenergy to remove greenhouse gases from the atmosphere. Food production is dependent on other ecosystem services, so it is essential that these are maintained. Agriculture uses 70% of all freshwater, produces around a third of all greenhouse gas emissions, and contributes to biodiversity loss and soil degradation. If the food demand continues to grow, by 2050 we would need 120% more water, 42% more cropland, lose 14% more forest, and produce 77% more greenhouse gas emissions to ensure healthy crops to feed the increasing population.

Climate change is also a major problem, with agriculture and livestock production not only being one of the major contributors to climate change, but are also one of the industries that are most affected by it. Natural disasters such as floods, storms, droughts and bushfires and pests and diseases in crops and livestock, devastate wide areas of crop land - not only damaging them but causing crop loss which harms agricultural yields, increases food costs, income loss and reduces the overall access to food. The increased water scarcity is also a major concern, as the agricultural industry uses 70% of consumable global water and if it is depleted, crops can diminish due to the land becoming dry and not being suitable for crops to thrive, limiting where crops can be grown. This emphasises the fact that feeding the increasing population won't be solved by simply growing more food.



Overall, the major challenge is understanding how we can redesign the food system to not only be healthy, sustainable and adaptable to climate change, but ensure enough food to feed the rapidly increasing population now and for the future in 2050.

4. HOW CAN WE PREVENT OUR FOOD SOURCE FROM DIMINISHING?

Feeding the world in 2050 is already becoming an issue not only because of population increasing, but also due to the demand for more food. As a result of this demand for more food, certain food resources are diminishing very quickly and are becoming non-existent in some countries, causing a hunger crisis in different countries worldwide. So, how can we prevent our food sources from diminishing and prevent world-wide hunger? One step we need to take in order to prevent our food sources from further diminishing is portion control in developed countries. In many countries such as the United States, portions vary a vast amount from undeveloped countries such as Cambodia. This means that countries such as the US are over-consuming large portions of food without even realising it, meaning that food sources in those countries tend to diminish faster. If we are able to find a middle ground between all countries for the average food and drink portion, we will prevent over-consumption and under-consumption of certain resources, which is step one to preventing food sources from diminishing.

Another step to prevent our food sources from diminishing is to implement production practises that favour organic and agroecological strategies over highly industrialised farming. These strategies ensure that far less fertiliser is used, which not only assists biodiversity but produces less greenhouse gas emissions. (*Figure 1*).

A further step to ensure that our food sources don't diminish are through cities aiming to source their food from surrounding regions rather than globally. This will not only support local farmers, but will reduce the reliance on food being transported long distances, alleviating fossil fuels, reducing air pollution and lowering greenhouse gas emissions as well as providing organic food to all. Eating seasonal foods will also ensure that our food sources don't diminish as food produced out of season is typically imported or takes more energy to grow due to the need for heated greenhouses, producing more unnecessary greenhouse gas emissions, when there are other in season food options available.

A final step to preventing our food sources from diminishing globally, is working on accessing more sustainable resources and shifting our diets from less-sustainable foods, such as meats and dairy, and to a more vegetable and legume based diet. Not only would this be more nutritional, but it is a lot more sustainable, as fresh vegetables, fruit and legumes are faster to produce and are also beneficial to the environment. While vegetables and legumes aren't as tasty as meats and dairy based foods, we don't have to cut meats and dairy out of our diets entirely, we just need to once again lower the portion intakes of these foods, to support a sustainable consumption of resources and further prevent our food sources from diminishing.



Figure 1: Implementation of Agroecological systems in Brazil emphasises the benefits of growing several crops in the same field <https://theconversation.com/eight-ways-to-halt-a-global-food-crisis-118436>



Overall, we can prevent our food sources from diminishing, but it will require world-wide effort from all countries. Countries will need to focus on portion control and sourcing food from more sustainable resources. If we are able to do this, not only will our diets be healthier, but our food resources will be fully sustainable and will have a much lower possibility of diminishing supplies.

5. WILL THERE BE ENOUGH FOOD TO FEED THE WORLD'S POPULATION IN 2050?

In 2050 there is no doubt that food will become a scarce resource, but will there even be enough food to feed the world in 2050 at all?

Hunger is a prominent issue in many countries, especially in developing countries. (Figure 2) Since hunger is already such a big problem, it is only going to get worse as time goes on due to the population increasing, causing an increase in food demand and food scarcity. As the demand for food increases along with the population, food resources are going to diminish and our food production will have to increase by significant amounts to keep up with the demand.

It is said that food production will have to increase by double the amount it currently is, and if we are not able to keep up with those demands, there is a high chance we will not have enough food to be able to feed the world's population in 2050.

If in 2050 we do not end up having enough food to feed our world's population, it will have an extremely negative effect on the overall state of the world. Not only will it cause hunger for people across the world, it will also result in many countries' hunger-related death rates to increase by extremely large amounts. If we are not able to sustain our food demands, there is no way we can guarantee that we will be able to sustain our population.

Overall, there is definitely not going to be enough food to feed the world's population in 2050 if we are not able to keep up with our food demands, due to both an increasing population and diet. However, if we are able to keep up with our food production demands, we will have a nourished and stable society in 2050 and the issue of hunger will be almost eradicated in most countries. If we don't keep up with food demands, and there isn't enough food to feed our population, a lot of problems other than hunger will arise and a future society in 2050 might not be possible.



Figure 2: World hunger statistics <https://echonet.squarespace.com/world-hunger-statistics-poverty-facts>



6. WHAT ARE SOME POSSIBLE SOLUTIONS THAT CAN BE PUT IN PLACE TO ENSURE THERE WILL BE ENOUGH FOOD TO FEED THE WORLD'S POPULATION?

To combat this potential issue of not having enough food to feed the world in 2050, relevant and achievable solutions need to be put in place to ensure 10 billion mouths are fed. The importance of these solutions can vary from country to country and are organised in **3 categories**.

1. Reducing the increasing demand for food and agricultural products

Reduce food loss and waste

With approximately $\frac{1}{4}$ of food produced for human consumption going uneaten, reducing food loss and waste by 25 percent by 2050 would close the food gap by 12%, the land gap by 27% and the impact of greenhouse gases by 15%. Food waste can be reduced by ensuring that people are shopping smart by avoiding buying more food than necessary, improving food storage in developing countries, upcycling food, selling and buying 'not perfect' fruits and vegetables and providing education around preserving food. Another solution is donating unsold food and produce to food banks and soup kitchens for those living in poverty.



Shift to healthier, more sustainable diets

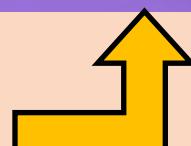
Consumption of beef, lamb and goat is predicted to rise by 88% between 2010 and 2050. Beef is the most commonly consumed meat but is also one of the most resource-intensive to produce, requiring 20 times more land and emitting 20 times more greenhouse gases per gram than common plant substitutions for meat such as beans, peas and lentils. Limiting meat consumption to 52 calories per person per day by 2050, would reduce the amount of greenhouse gases by half and nearly close the land gap.



By improving the marketing and implementation of policies that favour consumption of plant-based foods and providing meat substitutions such as protein from plant based sources and even insects, can ensure that people will willingly make this shift.



The "**Impossible burger**" patty is a new plant based sustainable alternative to a typical beef patty and is made from soy and potatoes.



Avoiding the competition of bioenergy for food crops and land

Bioenergy can expand the food and land gap as well as increase greenhouse gases if it competes with food production by depleting the food and energy crops or dedicated land. Biomass is considered as an unsustainable energy source, with harvest biomass only providing 20% of global energy needs by 2050. Gradually eliminating existing biofuel production on agricultural lands, through removing biofuel monetary incentives, would reduce the food gap from 56% to 49%. In addition, not labelling bioenergy as carbon-neutral in renewable energy policies and greenhouse gases trading programs, will also reduce competition from bioenergy, making it less attractive for consumers and industries.

2. Increasing food production without expanding agricultural land



Increase livestock and pasture productivity

Livestock production varies in different countries, with the lowest production rate being in the tropics. Due to an estimated 70% rise by 2050 of animal based foods, causing $\frac{1}{3}$ of agricultural land to be dedicated to pasture to be able to feed these animals, boosting pasture productivity is one of the only efficient and effective solutions. A 25% increase in pasture between 2010 and 2050 could close the land gap by 20% and the impact of greenhouse gases by 11%. To ensure pasture

productivity, governments can support farmers with financial assistance to allow farmers to improve fertilization and maintenance of pasture. This will ensure an increase in livestock, as animals are being provided with the nutrients from the thriving pasture to allow them to be healthy and ready to be consumed by humans.

Improve crop breeding

To feed the rapidly growing population in 2050, future yield growth is essential. Conventional crop breeding, which are selected thriving crops based on genetic traits, was the result for half of the historical gained crop yield and is a great solution to be implemented especially with advances in molecular biology. This will ensure yield gains through making cheaper and faster to identify genetic codes of plants, test necessary DNA traits and purify the crops to the desired genes. Another solution that will boost yields and improve crop breeding whilst requiring less land and is sustainable, is indoor vertical farming.



Improve soil and water management

$\frac{1}{4}$ of the world cropland can be affected by degraded soils. By improving soil and water management practices, farmers can boost crop yield in degraded soils, drylands and areas with low carbon. If improvements in crop breeding and soil and water management can increase by 20% between 2010 and 2050, this could close the land gap by 16% and the effects of greenhouse gases by 7%. Measures that need to be put in place to ensure an improvement in soil and water management include educating farmers about rainwater harvesting and restoring soil fertility through experimental programs.

Plant existing cropland more frequently

By reducing unmaintained land or implementing the “double cropping” system, where two crops in a field are planted in the same year, this will ensure more frequent planting and harvesting in existing croplands, boosting food production without requiring any new land. Increasing the number of annual cropping cycles by 5% by 2050, would decrease the land gap by 14% and the effect of greenhouses gases by 6%. More research is needed to be conducted in relation to practical cropping cycles, taking into consideration factors that could have negative effects such as water, emission and environmental constraint.



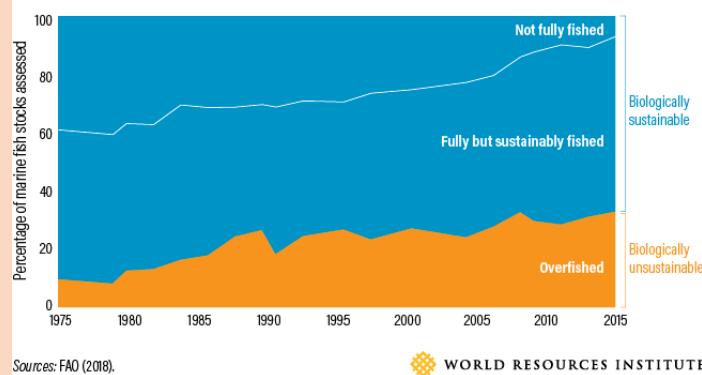
Adapting to climate change

According to the 2014 Intergovernmental Panel on Climate Change report, without the adaptation to climate change, global crop yields decline by at least 5% by 2050 and an even more detrimental decline by 2100. A decline of 10% in crop yield would increase the land gap by 45%, which is why adaptation is required through the implementation of growing a diverse range of food, breeding crops to cope with higher temperatures, constructing effective water conservation systems and changing production systems where climate change could possibly affect the growth of certain crops.

3. Increase fish supply

According to WWF, each person eats on average 19.2kg of fish a year which is around twice as much as 50 years ago. Over the past 40 years there has been a decrease in marine species of 39%, with 29% of the world's fish stocks are overfished and a further 61% being fully fished. To allow world fisheries to recover, catches need to be reduced rapidly to maintain an adequate amount of fish for 2050. This would involve implementing catch management systems and shares, enforcement of laws against illegal fishing as well as removing possible incentives that are in favour of overfishing, which according to National Geographic, can save an estimated 11 to 26 million tons of fish. Another solution would be to increase aquaculture to ensure that humans are consuming fish and seafood sustainably without the risk of overconsumption, whilst allowing particular species to thrive.

Wild fish stocks are increasingly overfished



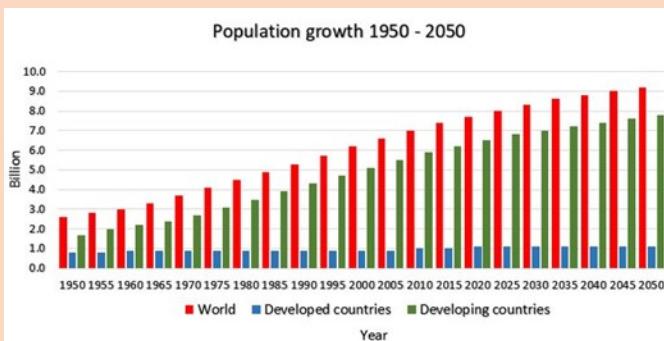
<https://www.wri.org/blog/2018/12/how-sustainably-feed-10-billion-people-2050-21-charts>

Overall, feeding 10 billion people sustainably by 2050 is a difficult challenge and is significant effort, requiring major changes to how we produce and consume food, but through the implementation of these solutions, food and land gaps can be closed as well as the effects of greenhouse gases being significantly reduced, whilst ensuring benefits to not only farmer and society, but also human health and wellbeing.

CONSUMPTION AND SUSTAINABILITY

1. WILL A FUTURE (IDEAL OR NOT) IN 2050 BE SUSTAINABLE?

Is the ideal future sustainable? Is a future in 2050 even sustainable to begin with? We all think that in the future we will have a better and safer society that's more advanced, more co-operative, more inclusive, less violent, a better and more stable economy, but is that really sustainable? Is that really an achievable goal? Society in 2050 is going to have many different complications. From issues such as over population, lack of housing, loss of jobs and job opportunities and more demand than supply for certain, possibly all food resources.



Multiple studies have shown that with a current population boom, we will have an estimated population of 10 billion people by 2050. If this estimate is true, that means that our population will increase by 2.8 billion in just 20 years. Because of this estimated population boom, necessary resources such as food, water, housing and jobs will become more scarce and also more in demand.

It is also estimated that we will have to increase our

<https://www.canr.msu.edu/news/feeding-the-world-in-2050-and-beyond-part-1>

food production by 69% {double}. As a direct result of this, foods such as dairy products, meats, and others will become very scarce as they aren't as sustainable as foods such as grains or fruits. Products such as meats and dairy are not sustainable as they are derived from animals which are not self sustaining resources like plants and grains are. This means that too many resources will be needed to keep farm animals that produce meats and dairy alive, which in turn takes more food from us. Because of these foods becoming more and more scarce, it will then cause our diets to have to change to a more grain and fruit/ vegetable based diet, which many people in different countries will most likely not agree with whether it's because of their nutritional preferences, because its not very healthy, or even because of factors such as religion.



<https://twitter.com/fertilizerca/status/655036248197869568>

Alongside the diet having to be more grain based, housing will also become a problem as less space for houses means more people will be forced into apartments, and apartments will also become overpriced, and for the people who cannot afford housing at such high prices, they will be forced into homelessness.

Alongside housing becoming more and more overpriced, there will be a sudden lack of jobs from both overpopulation, but also aspects such as some jobs becoming no longer necessary. It will cause more and more people to not be able to keep their jobs or even get a job in the first place, leaving many people and families with no access to money for food, housing or things like education or maybe even clean drinking water.

A current future in 2050 may seem quite dystopian and the opposite of ideal, but there is still hope. While there are many different aspects to 2050 and the supposed "ideal" future, it is possible that the "ideal" future is sustainable, as it really depends as to how we manage to tackle issues such as food production, housing, jobs, climate change etc. While currently, if we do not manage to turn these problems around, the "ideal" future in 2050 is not looking very sustainable as even basic resources will be scarce and if we are not quick to turn these problems around, even a simple and not necessarily "ideal" future will be out of reach and in-accessible.

But once again, a future in 2050 is definitely possible and therefore definitely sustainable but it will require many major changes to our current every day lives. For instance, we will need to change our diets to include less meat and dairy, and to include more fruits, veggies and grains not only because they're more sustainable, but they are also healthier for us. We will need to try and expand our major cities so that housing is less compact and that there is room for more apartments and other housing options, which will also allow for more room for public housing options for the homeless. And while a future in 2050 is possible, there are still chances it won't be sustainable as it will be hard to keep up supply with demand caused by the current population boom. Meaning that while a future in 2050 is certainly possible and maybe even sustainable, it is most likely going to be far from the ideal and perfect society we picture.

“

We must choose to prioritise long-term sustainability over short-term gratification, and calculate the true cost borne by societies in the future instead of just the price of actions and policies today. The global community has a responsibility to facilitate this transformation, and it starts by recognizing the environment as a key determinant of human health.”



-Dr. Sania Nishtar, SI, FRCP, PhD
Co-Chair, Independent High-Level Commission
on Non-Communicable Diseases
World Health Organization



2. HOW WILL CONSUMPTION/A CHANGING ECONOMY AFFECT OUR ECOSYSTEM?

Consumption is defined as “as spending for acquisition of utility” and it is a major concept in economics and is also studied in many other social sciences. It is seen in contrast to investing, which is spending for acquisition of future income. Different schools of economists define consumption differently.

Consumption is largely considered as the backbone or the heart of economics. Consumption is a key factor in the way our society runs today, which means it will also therefore be a key factor in the way our future society, specifically one in 2050, will run.

A key aspect to whether our future in 2050 is possible, is if we can control the supply and demand for things such as jobs, food, housing and others. And consumption, is the demand part of the equation. Consumption plays the role of how much we demand in a supply/ demand situation. For instance, if a country needs 200,000 apples to sell at its supermarkets, but the available farmers could only produce a total of 150,000 that would be a problem as the demand is more than the supply. Which can not only affect the people who needed the food but also the people who sell the food for a living as it means they aren't getting as much money as they could, hence affecting our economy.

It will not only be a problem for the economy, but also a problem for the environment as if we continue to demand more than we can supply we will begin to use up all the remaining resources on earth, taking away from ecosystems and natural habitats and only further contributing to the effects of climate change.

Because of this, Consumption is going to play a big part in our future society in 2050. At our current rate, we are consuming more than we are producing which is tipping the scale, meaning that things like our economy is being negatively affected. Our consuming more than supplying is causing food scarcity in different countries, homeless populations rising and decline in the economy.

Consumption is negatively impacting the future economy as An increase of consumption raises GDP by the same amount, and A relatively low saving rate implies higher current consumption but lower future consumption. This means that if we continue to demand more than what we can supply, our future will be negatively affected as it will lead to economic and financial instability.

Overall, consumption will affect our future society in 2050 in many different ways. From harming our economy, to negatively affecting our environment it is not doubt that consumption will be affecting our future society one way or another. However, there is a way to turn around the negative effects, as if we can begin to control our consumption of our resources we will be able to ensure that our future won't be affected by consumption and that we will continue to have a stable economy and financial future.



3. WILL RESOURCES BE MORE SCARCE ON THE FUTURE?

In 2050, or the future, many problems are going to arise if we do not face them now. From lack of jobs, no room for housing or even issues such as scarcity. Scarcity is most definitely going to be a big problem in the future whether we acknowledge it or not. From food scarcity to even water scarcity if we do not attempt to change our ways, basic necessities such as food and even drinking water will become luxury items in the future because of their scarcity.

According to the 2018 edition of the United Nations World Water Development Report, by 2050 nearly 6 billion peoples will suffer from clean water scarcity due to climate change, increased demand and polluted supplies, according to a UN report on the state of the world's water. This means that more than half the worlds population will not have access to clean water in 2050, which will cause a global health problem. Alongside water scarcity, food scarcity will also be an extreme problem in the future.

As previously said, experts say that in order to feed our population in 2050 we will need to increase food production by 69%. And if we are not able to hit that goal, food scarcity is going to be another large problem. As if we cannot feed our population in 2050 we will have world-wide hunger crisis's, people will be dying from malnutrition and in turn, our population will not be able to survive.

Alongside basic resources such as food and water becoming scarce, other resources such as according to Professor Cribb the author of the book "The Coming Famine: The Global Food Crisis and What We Can Do to Avoid it", shortages of water, land, and energy combined with the increased demand from population and economic growth, **will** create a global food shortage around **2050**. Lack of technology and knowledge **will** also add to the crisis.

Overall, many studies and research projects have concluded that our current consumption of resources will cause scarcity of almost every resource we currently have on earth today in the future of 2050, which will lead to not only health problems and possibly higher hunger related mortality rates. But it will also lead to a significant decline in economic growth, which will cause our future society in 2050 to almost indefinitely be not sustainable and possibly be unliveable.

5. WHAT IS OVERCONSUMPTION?

Overconsumption when defined is: the action or fact of consuming something to excess. Overconsumption can occur in almost any situation and can be unnoticeable in most situations. Overconsumption is essentially when the demand half of a supply and demand situation is too big as the demand/ consumption of a product is larger than the actual supply of the product. This can then cause lots of issues as when there isn't enough of a product but there is still a high demand and need for the product, issues such as health problems, economic problems and environmental problems such as environmental degradation which leads to the eventual loss of resource bases.

Usually, the topic of overconsumption relates to that of human overpopulation, which is another big issue considering the current population boom. And this is that the more people, the more consumption of raw materials that help take place to help sustain their lives/ feed them. The larger the population, the larger the problem of overconsumption becomes and therefore our carbon footprint increases, which is an equally large problem. It is a problem as when the carbon footprint reaches 2, {which is predicted to happen by 2030} it means that we will need the equivalent of two planet earths to keep up our consumption habits, which is a big problem as we only have one earth.

Consumption however, can be a good thing as it can help grow the economy and can also help keep things such as overproduction/ oversupply of some things stay at bay or normal levels. It can also help developing countries get a boost to help begin developing their countries, which can be extremely beneficial for both their economy but also the people living there. But it is not consumption that is an issue, it is overconsumption that is the problem.

The problem of overconsumption is only going to expand as if we are not able to take into account the per capita consumption, which can be a problem as countries such as developing nations are expected to consume more than their land can support/ produce, hence the tipping scale of supply versus demand, which is the backbone of the cause of overconsumption.

Overall, overconsumption is a big topic based around the action of consuming something to excess, that affects many different nations and continents all over the earth. But it can be especially harmful to people who inhabit land in developing countries. However, there is a way we can turn around our efforts of overconsumption and it is to once again focus on only using what we need and ensuring that when we can we donate and recycle things to maximise the products potential amount of usage. There are many solutions to overconsumption and while it may seem like a big issue that is going to be hard to turn around and solve, it really isn't if we simply focus on consuming only what we need, and reusing when we can.



4. WHY IS OVERCONSUMPTION A PROBLEM IN FUTURE SOCIETY?

Overconsumption may not currently seem like a large issue for the future to many people, but it is going to impact people in almost every country. From resources such as water scarcity becoming a large problem for almost 6 billion people by 2050 {more than half the population} or because of our overconsumption of other necessary resources such as food, food scarcity problems will only be amplified in the future with an ongoing population boom and further demand for resources.

Overconsumption is going to cause our future society in 2050 to have to adapt to lifestyles with less access to clean drinking water, less food and less overall room as a direct result from overcrowding in major cities. Due to this lack of resources, our future society in 2050 will be directly affected in terms of not only there simply being less resources in the future, but also due to the fact that there will most likely not be enough resources to continue to build and develop cities to their full potential. Which could in turn cause our future society in 2050 to be extremely underdeveloped.

Alongside our future society being affected by overconsumption in terms of lack of resources, it is also said that according to [Theworldcounts.com](https://theworldcounts.com/), our choices of what to eat and drink has global consequences. It is estimated that by 2030 the Global Ecological Footprint is going to reach two, meaning that we will need an equivalent of two planet earths to provide us with resources for our consumption and absorb our waste. This means that in no way shape or form is our current consumption habits sustainable, as not even by 2050 will the earth be almost out of resources to keep our current consumption habits alive.

Overall, at the current rate we are overconsuming our resources on earth, there will not be enough resources left on earth to keep our future societies functioning, causing a big problem for our future in 2050. However, there are ways to turn our consumption habits around by simply focusing on using only what we need and recycling and reusing as much as possible to minimise waste and maximise usage. Overconsumption has caused both a big current and future problem for our earth and if we are not able to turn around our consumption rates, the earth's resources will run out and our future societies will end.



As of 1:23pm on the 8th of March 2021, this is how much time the earth has left before running out of food.



6. WILL OVERCONSUMPTION AFFECT OUR GLOBAL ECONOMY IN 2050?

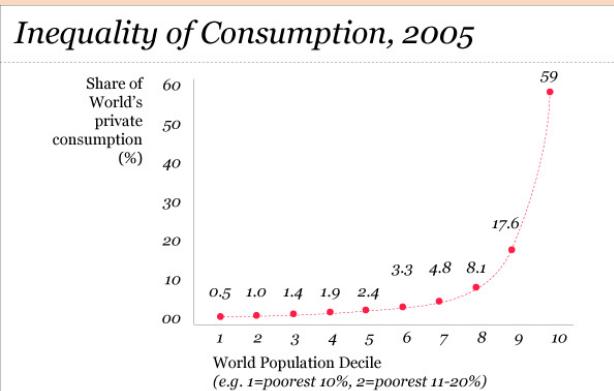
Overconsumption may seem like a problem that will only affect things such as feeding the world and the environment and climate change in the future, but it is actually most likely going to effect our global economy the most significantly. Overconsumption is going to effect the global economy in many different ways, from boosting some countries economies and then also decreasing and causing other countries economies to fall, which will then affect the overall global economy as a whole.

With the current Coronavirus pandemic negatively impacting different countries economies all over the world, the global economy is already taking a downward spiral, which isn't good. And if our economy is already in a bad state from the pandemic the effects that overconsumption would have on the global economy would only be amplified and worsened.

Overconsumption was the leading cause of the Great Depression, factories and farms produced more goods than the people could afford to buy, so prices fell, factories closed their doors and workers were laid off, which led to a seemingly endless cycle of poverty and want.

Consumption can actually be beneficial to the economy but when there is overconsumption, it isn't beneficial. Overconsumption can cause lack of resources in certain areas that specialise in producing and then selling that product. For instance, if a country was known for exporting and selling bananas, but everyone was buying so many bananas and there wasn't enough bananas to keep up with the demand, the country selling the bananas would be in trouble as they would slowly lose sales as without the bananas, they can't sell any bananas. This means that they would then lose most of their national income as if their economy was based off of their banana selling, the country not being able to sell anymore bananas would then go into an economic spiral. And because of this economic spiral, prices for the bananas would either go very high or very low and everything would become imbalanced, affecting the countries economy and therefore also affecting the global economy. What is essential to an economy growing is what is called a circular economy, and overconsumption ruins the balance in that situation tipping the scale or the economy for the worse.

Overconsumption can badly affect economies in many different ways, so it is almost certain that overconsumption will affect our global economy in 2050, as we are currently overconsuming majority of the natural resources on earth. And if we continue to overconsume everything, not only will be run out of resources to be able to maintain our lifestyles and societies, but our local and global economies will be negatively affected, not only now but also in 2050.



<https://ourworld.unu.edu/en/why-do-we-over-consume>

The **circular economy** is an economic system aimed to eliminating waste and the continual use of resources. <https://www.portoprotocol.com/circular-economy-as-a-way-of-increasing-efficiency-in-organizations/>

7. HOW WILL OVERCONSUMPTION CONTRIBUTE TO THE AFFECTS/ BE AFFECTED BY CLIMATE CHANGE?

Overconsumption is an issue that is going to impact many different aspects of our lives. From affecting our economy, to our diets, to our resources and eventually affecting our environment. Overconsumption is causing a big issue for the environment as it creates a problem where resources are being used too quickly and are therefore diminishing at rapid speeds.

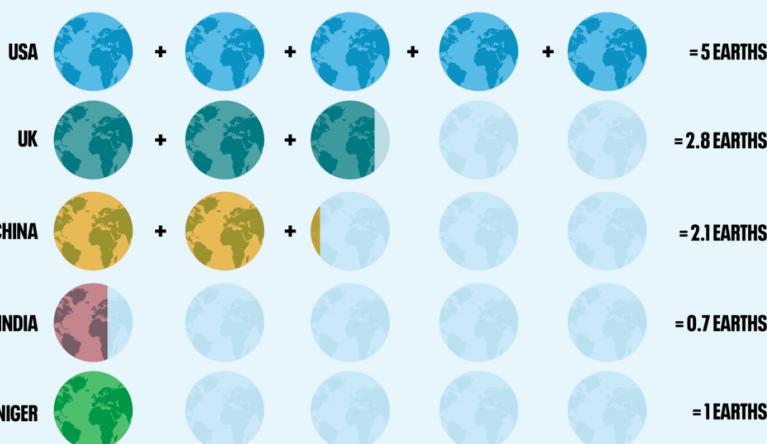
Since the effects of climate change are already beginning, from icebergs melting to trees being chopped down to plants and animals going extinct. The affects are all being worsened and amplified by climate change. Because of overconsumption, resources are being consumed and used at rapid rates and many necessary resources to staying alive are disappearing, which isn't at all sustainable especially not for future societies in 2050.

As previously said in this book, our carbon footprint is estimated to reach 2 by 2030 which means we will need a total of two earths to keep up our rates of consumption, which is definitely not sustainable and is having lots of bad affects on the environment. Because of resources being consumed so quickly, animals are losing their habitats, plants are going extinct from being used too much and forest land is being turned into farming land and the trees are being used. This means that less oxygen is being produced and more carbon dioxide is being produced when making these new products out of our earths natural resources.

Overall, overconsumption is heavily affecting not only our economy and our livelihoods, but also is enhancing and amplifying the affects and aftermath of climate change. We can once again help this situation by focusing on only using what we need to and trying to use more sustainable resources as often as we can instead of using rare materials that will go non-existent soon. While climate change may seem like a big issue, especially as it is being amplified and worsened by climate change, it really can be turned around if we are able to focus on being more sustainable and consumer-efficient.

CONSUMPTION OF EARTH'S RESOURCES:

Number of Earths needed if everyone used renewable resources at the same rate as these individual countries.



WE ARE CURRENTLY USING UP THE RENEWABLE RESOURCES OF 1.7 EARTHS – UNLESS THINGS CHANGE, WE'LL NEED THREE BY 2050



CLIMATE CHANGE

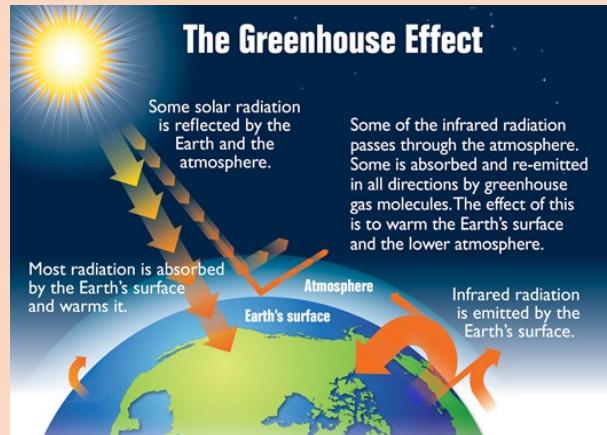
1. WHAT SOLUTIONS ARE THERE TO CLIMATE CHANGE?

Climate change is defined by scientists as an extreme long-term change in weather patterns and is more commonly associated with Global warming. The gradual increase of the Earth's temperature due to the greenhouse effect, is identified as global warming and can have a severe impact of the lives of future generations.

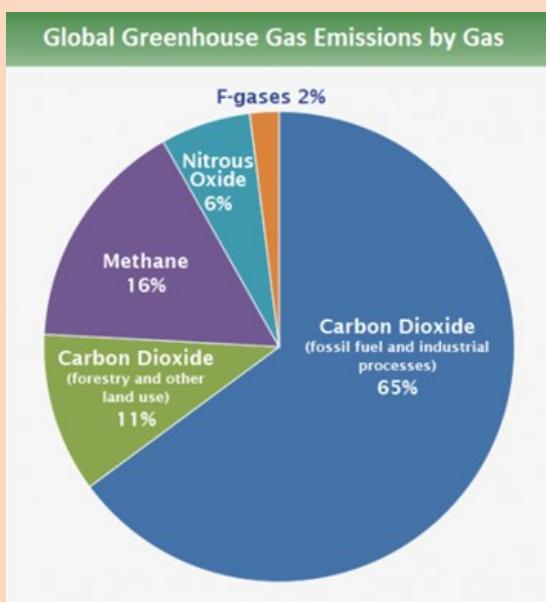
When the sun radiates its heat and energy, it reaches Earth's atmosphere and is either partly absorbed, or reflected back into space. Due to the fact that there is a huge amount of unnatural greenhouse gases affecting the atmosphere, over time more and more heat is absorbed rather than reflected. This means that the heat from the sun stays on Earth, eventually warming it to unliveable conditions.

Many solutions have been suggested' by scientists, to contain and eliminate the risk of climate change but many politicians are still in denial about the presence of climate change, consequently not much has been done to solve this issue. Our first step would be to acknowledge the existence of climate change and understand that more must be done in order to solve it. Once responsibility is present, action can finally be taken.

Next, we would have to put a stop to the burning of fossil fuels (see page 30 for a better understanding on fossil fuels) and find a replacement, then to find more sustainable energy sources. In addition, deforestation could be stopped to help speed up the recovery process as the trees would suck up excess CO₂ and release oxygen. Once these solutions are put into place, we are on our way to a sustainable future.



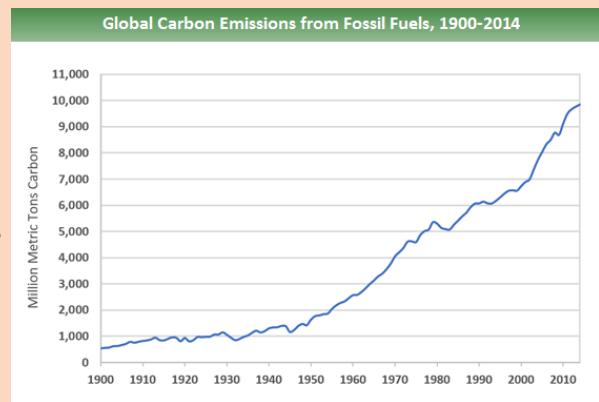
<https://phys.org/news/2013-10-thy-neighbor-game-theory-climate.html>



<https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>

2. WHAT ARE FOSSIL FUELS AND HOW CAN THEY BE REPLACED?

Fossil fuels are an extremely common way in which energy is generated to power appliances we use every day. Since the industrial revolution (when fossil fuels started becoming a primary source of energy) Fossil fuels provide on average 80% of our energy needs, this including the use of cars, lights, and the overall power source in our homes. The burning of fossil fuels all contribute to air, water and land pollution and on top of that are the leading cause of climate change. Oils, coal and natural gases are dictionary defined, fossil fuels giving just an idea of what is burned to create our main source of energy.



<https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>

The burning of fossil fuels is entirely preventable as many solutions for renewable energy have been put forth but as fossil fuels are the cheaper and easier alternative, many big companies are unwilling to change their ways. Replacements include solar energy, wind energy, hydropower energy and battery energy.

Solar energy is an expensive but sustainable way to retain energy from the sun and use it within your house. It is not ideal for people with small energy uses as the smaller the usage, the smaller the savings, and it does not suit some roof types but disadvantages aside, it does reduce a households carbon footprint dramatically.

Wind energy is an efficient use of land space, but can be aesthetically displeasing as it is both noisy and does not blend in with its environment very well. Like solar energy, wind energy remains unreliable as it is highly dependant on the weather forecast and therefore will be unable to function perfectly 24/7. On the contrary it is low cost, economically bettering solar energy.

Hydropower energy is expensive, hard to create due to the lack of reservoirs available, and it could overall have a negative impact on the surrounding environment. But looking at the positives we can see that hydropower works well with other renewable energy sources and meets the energy demand.

Lastly, battery energy includes the action of storing energy collected from solar panels, and saving and distributing it when you need it. This allows individuals to become more independent with their energy usage, encouraging them to save and only use what is completely necessary for a green and sustainable future.

There is no right answer on how fossil fuels can be replaced, but rather a variety of different solutions where people can decide what works best for them. When we consider all aspects of safety, environmental impact, cost and difficulty to install, every energy source has its flaws and good points, and certain aspects that may be in favour of certain people, may be bad for others. It all depends on your financial situation, ability to run an energy independent home and the environmental needs of your area.

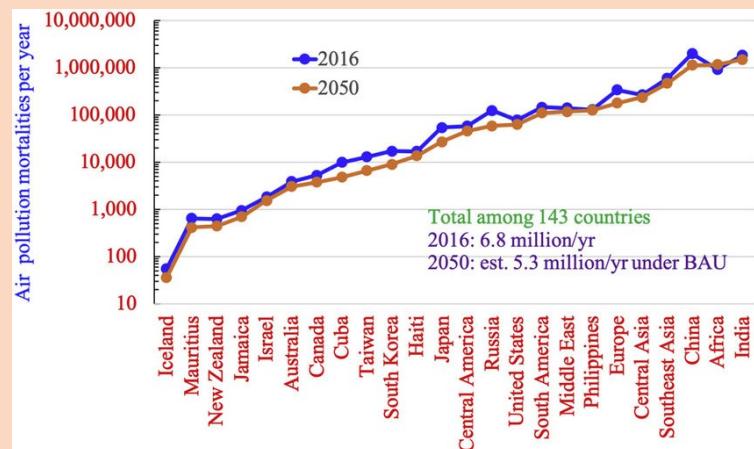
Scientists have strong opinions on this and advise others to decide carefully when picking out new renewable energy sources. Solar energy is looked upon as one of the better replacements for fossil fuels as we know that the source (the sun) will never run out of sunlight and stop providing. This solar energy, paired with other renewable energy sources such as batteries for storing energy until it needs to be used would be extremely helpful as when it is a cloudy / rainy day, people will still be able to use energy from the battery. Upfront, these methods may be costly but as the years go on, humans will be saving money as they are being independent and only taking what they need.

3. HOW WILL CLIMATE CHANGE AFFECT HUMANITY IN 2050?

Studies from **Climate central** (an organisation in the USA which predicts weather patterns and their changes for the future) have shown that if nothing is done to combat climate change, cities such as New York and London will be partially underwater by 2050! (Figure 3) These rising sea levels have been created by the gradual melting of the arctic quarters where temperatures of both air and water are getting hotter.

2050 is only 29 years away and will negatively impact the lives of thousands. In addition, the risks of flooding will increase by over 100%, and heat waves will affect more than 1.5 billion people worldwide. As the ecosystem around us slowly deteriorates, many animals and plants will be driven to extinction due to habitat loss. Society in 2050 is scary to think about. Some may picture an ideal future where both humans and nature live in complete harmony, and technology has enriched and improved our daily life, but the sad reality is that unless dramatic action is taken, 2050 will not look so perfect.

Pollution will fill the air, water will flow dirty and contaminated by the waste which found it's way into the solution and ecosystems will collapse leaving what once was a green and flourishing land, a dry, barren one. All of this will not only affect humans as the visual aesthetic of their home country is no longer pleasing, but it will also deeply affect their overall health and well-being.



https://www.researchgate.net/figure/Estimated-BAU-Air-Pollution-Mortalities-in-2016-and-2050-by-World-Region-2016-and_fig1_338093343

Annually, air pollution kills on average, 7 million people world wide. These figures are set to double by the time off 2050. Air pollution itself does not create death, but rather triggers asthma, lung and heart disease and respiratory infections. 5 million people die yearly from water pollution and this will only get worse similarly to air pollution. These issues are putting humans lives at risk and therefore must be given serious attention to.

If not, thanks to climate change life in 2050 will consist of many preventable deaths.

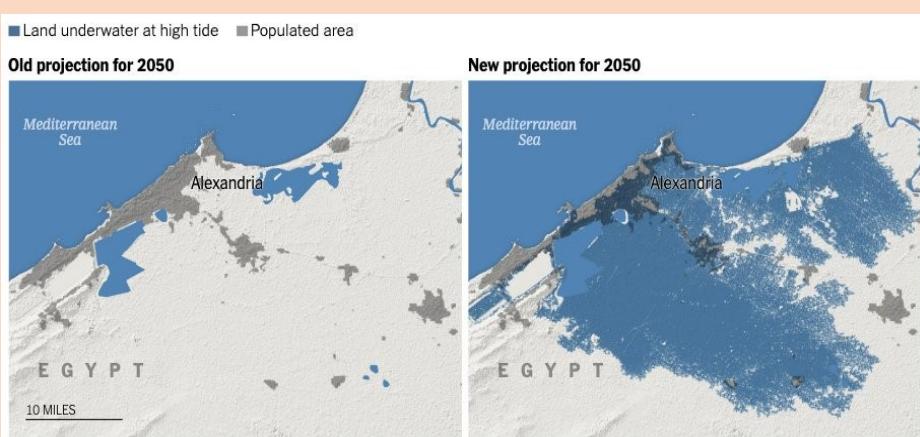


Figure 3: Predicted effects of rising sea levels on countries surrounding Egypt

<https://www.nytimes.com/interactive/2019/10/29/climate/coastal-cities-underwater.html>

4. IF WE DO NOTHING ABOUT CLIMATE CHANGE WILL THE WORLD BE IN DANGER?

The way in which climate change will affect both the Earth and its inhabitants is severely destructive and could alter the future of our species radically. This may seem over dramatic, but when everything is added up, it can potentially damage a big chunk of the human species population.

Firstly, the sea levels as mentioned before will rise by a minimum of 1.5 feet by the time of 2050. The melting of glaciers and ice in the north and south polar regions will contribute to this rising sea level, overall affecting coastal regions. This rise in sea levels will flood coastal areas damaging housing and other buildings within reach, destroying people's lives and potentially killing them too.



Natural disasters will become extremely relevant in the future if nothing is done to combat climate change once again bearing a huge risk to the human population.

As mentioned in my earlier question (what will society in 2050 look like), the environment and its flora and fauna will not be the only sufferers in this case. Many sicknesses and diseases can eventually evolve from the air pollution left behind by fossil fuels and greenhouse gases.



Over time the variety of species left on Earth will slowly decrease until the majority of animal's habitats have been destroyed. In this day and age it is pretty clear to see that infrastructure and modern day technology is put before the environment especially in politics where the direct focus would be on things like health and education. Therefore due to the lack of action we are currently taking, if nothing was to further be done, it's expected that by 2050 a land space the size of India, will have been left dry and deserted after severe deforestation. As forests hold 80% of the entire Earth's species, many of them will become homeless and then endangered / extinct. So as the environment around us decays, there is no question that Earth's inhabitants will be severely affected by this negative change.



5. HOW DO OTHER PROBLEMS CONTRIBUTE TO CLIMATE CHANGE?

Overconsumption and irresponsible production and feeding the world are two other issues which will have a severe impact on the future, and in their own ways, a distinct contribution to the onset of climate change and vice versa.

Climate change encourages the onset of natural disasters such as floods, droughts, fires and overall inconsistent weather conditions. Ultimately, these natural disasters, or even just an unstable climate can seriously affect the growth and production of crops all around the world. Once these crops have been permanently damaged due to the natural disasters, the domino effect continues and leads to famine or food insecurity. This is seen especially in poorer African countries such as Burkina Faso, Niger, Senegal, Ethiopia and Mali, where extreme droughts are frequent and detrimental to local farmers. (*Figure 4*) Many small villages within these countries are unable to import / export crops due to their extreme poverty and therefore they rely purely on the food of local farmers. As mentioned before when this is no longer a possibility, poorer families contribute to the countless amount of people who die each year due to starvation.

The overall procedure of climate change is accelerated due to irresponsible production and overconsumption. The irrational need humans obtain where they take and use more than they need is gradually affecting the environment more and more as time goes on. The production of many items usually have the burning of fossil fuels somewhere along the line and therefore it is unhealthy to both humans and the ecosystem around us. This as mentioned before accelerates climate change giving us less time to try and turn things around. Not only do the production stages negatively impact climate change, but once a human has used the product to a certain extent and feel that there time with it is up, it is often thrown away rather than recycled. This unsustainable way of disposing of used items adds to the never ending pile of landfill, eating up land which could be regenerated for agricultural spaces or general natural environments. This pollutes the air and due to the fact that space for trees are not available, it slows down the cycle of generating oxygen, emitting more carbon dioxide into the atmosphere and in conclusion, contributing to the issue of climate change.

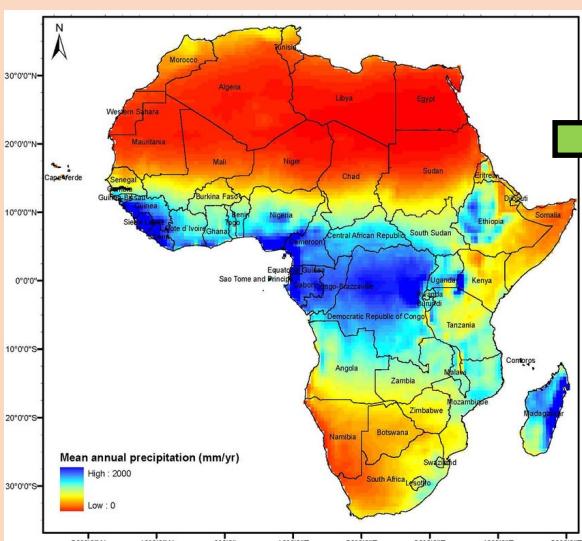


Figure 4: Africa's average rainfall patterns https://www.researchgate.net/figure/Map-of-the-African-continent-with-country-names-and-rainfall-patterns-Data-source_fig1_265726806

6. WHO'S RESPONSIBILITY IS IT TO FIX CLIMATE CHANGE AND WHY DO PEOPLE CARE?

The responsibility of solving climate change is often an overwhelming weight to carry. Responsibility is defined as the control and having of a specific duty. It is often debated whether or not climate change is a valid issue, and if it's importance to society trumps other political issues. Some regard climate change as a community issue, where every individual person has to work within their household to contribute to the solution, while others believe it is a broader issue in which the government and other large corporations / companies must control.

Within government, politicians have the right to debate on certain issues and come up with laws or bills which will enforce necessary ideas onto everyday civilians. This gives them the opportunity to come up with reasonable plans to solving climate change or atleast putting a halt to unsustainable lifestyle choices.

Governments have the power to introduce laws but the people of our world have to be willing to follow them in order to create a more eco – friendly planet. Although politicians create these laws, much of the time it is the people who begin to encourage change. Unless a politician is a member of a designated "Green" party, the majority of the time environmental issues will be bypassed until attention is drawn by the locals of their electorate. Protests, letters of concern and public announcements are all ways in which passionate people try and enforce politicians to take action.

Normal people should care because sooner or later, climate change whether they believe it is real or not, will start taking a toll on their lives or their childrens/grandchildrens. Future generations are most at risk due to the fact that they will have to be dealing with this potentially deadly issue. The human species is at risk of complete extinction if absolutely nothing is done. (see page 35 for further analysis on what could happen) Only 56% of the population of 55+ care about climate change. This is mainly because of the lack of education on climate change and the fact of feeling helpless, like they cannot see themselves having much of an impact on such a broad problem. Also there are selfish aspects toward this where people believe that they did not create it therefore they should not have to fix it and that if it won't affect them directly, they will not help everyone else. Everybody should help solve climate change as everyone's actions are valid even if it is as small as simply picking up a piece of rubbish. Afterall everybody has a moral compass, (a feeling inside which informs you of what is morally right or wrong) and therefore should be able to feel empathetic towards those who's lives could be extremely disrupted by the onset of global warming. Doing something about climate change should be a straightforward decision, as we know that it is morally right for future generations to be gifted a world in which they deserve.

So to answer my question, the responsibilities behind resolving climate change are not just in the hands of the government, or a protestor's, but it is rather the responsibility of everybody on this planet. We all must work cohesively to continuously improve our lifestyle choices in order to help solve climate change and provide a beautiful and eco – friendly planet to future generations.

7. WHY CAN'T WE JUST SIMPLY FIX CLIMATE CHANGE?

The overall complexity of solving climate change is way harder than it is portrayed to be. 90% of the world's politicians are still in denial of climate change, refusing to accept responsibility and initiate change. 97% of scientists say that humans have heavily contributed to the ongoing matter of global warming and yet besides all the evidence, most politicians still refuse to accept the truth and rather focus on other currently relevant issues.

If close to every country's government were to accept the threats of climate change and bond together to form solutions, even then it would be much more difficult than a quick resolution. The main contributors to climate change as mentioned before, are from burning fossil fuels and deforestation. These all create greenhouse gases which are the fundamental source of climate change. The burning of fossil fuels is a money making business, and has been since the early times of the 1880's. The economy of massive oil companies would be severely damaged without the constant need to purchase more of their fossil fuels and they would most likely become bankrupt. If you were asked to think about countries in the world and their contributions to the fossil fuels industry, many would have named countries such as Saudi Arabia, UAE and Iraq. All middle Eastern countries with significant oil sourcing industries. Although these obligations would be true to some extent, the leading country on Earth for production of fossil fuels from natural resources of oil, coal and gases, would in fact be Australia. Our home country, despite its democratic approach to sustainable development, has had the government continuously invest in environment-degrading projects and companies. Although Australia prides itself on a "democratic" system, there is often bias in favour of great companies within government. Bias within parliament is illegal but when done is secrecy it is bypassed such as when larger corporations donate money towards the funding of election campaigns for a certain party and then get bills or laws passed in return for their favour. For example, If the Liberal party were to receive great funds from a large Australian oil company such as BHP, then the politicians within the Liberal party would do their best to try and return the favour when laws affecting BHP are trying to be passed by opposing parties. This prevents government officials from progressing into an environmentally – friendly, and sustainably responsible country.

Alongside the threat of bankruptcy to major companies within the fossil fuels industry, a significant amount of innocent families lives will be disrupted due to this. If fossil fuel companies were to be closed down by government, hundreds of workers would return home unemployed. Yallourn power station in Gippsland Victoria, is set to close down 4 years ahead of schedule, and to be replaced with a humongous 350 megawatt battery. Within Yallourn power station there are about 500 workers. All 500 people will now lose their jobs putting their families in a place of financial hardship. This is mainly the reason in which political parties do not want to take immediate action toward climate change as many people losing their source of income will be outraged, not to mention the overall unemployment rates for Australia will increase dramatically. Quite simply they are doomed if they do, and doomed if they don't.

It isn't all dreadful news though. Many new job opportunities will be opening up for those unemployed within the new battery operated power plant. The construction and constant maintenance will be enough to restore the income of some job – losers within the Gippsland region.

On a greater scale, global subsidies regarding fossil fuel extraction are on average around 4.7 trillion dollars every year. This means the entire world's economy flourishes when the fossil fuels business does well. To eliminate all fossil fuels at once is unreasonable and would result in financial instability in almost every country.

In conclusion it is extremely hard for both government and individuals to make dramatic alterations toward climate change as many things could negatively impact people's lives and the overall economy.

WHAT IS OUR INTERPRETATION OF AN IDEAL FUTURE IN 2050?

From our point of view, we think that the ideal future in 2050 would be one where equality is prominent throughout society and everyone is treated equally, regardless of their background, physical appearance or social status. Certain people aren't discriminated or judged against, and there is no division between the well off and the helpless.

An ideal future would be a place where climate change is no longer an issue, and things like self-driving cars that don't use petrol and instead use electricity are the only ones being used. More public transport that is also electric. More housing that is spread out and not just compacted into the area surrounding the CBD's and also have more public housing. There would also be more schools and also more childcare centres. More hospitals and free public healthcare as well as more fire stations would also be a factor in an ideal future. There would also be more access to financial aid for people who need it and there would also be more plants and flora planted within suburban areas which would mean more parks, more trees and more nature strips to increase oxygen production and therefore increase the air quality and living environment

And lastly, we think that an ideal future would also have less resource scarcity and therefore have less problems such as hunger and lack of water in certain countries that currently suffer from those issues. Overall, we think that the ideal future is a tough goal to reach that will most likely not be achieved in the next few years. But, it is a future that is possible as all the aspects that I see as key features in an ideal future of 2050 are all aspects of our current society that either already exist and can be implemented into our societies more to create a better future. Or, they are already features in our society that are in development and are being proven to be extremely beneficial to our future societies. I simply think that the ideal future is one where the best aspects of our current world are amplified, and the worst aspects are turned around and improved.

HOW CAN WE ACHIEVE THIS IDEAL FUTURE IN 2050?

There are a lot of interrelated aspects that are necessary to achieve an ideal future, with many of these being people related.

This would mean that worldwide, people would have to begin to work in collaboration and harmony to ensure that everyone benefits equally.

Alongside our population having to work together, a focus is also required on improving the state of our society in relation to housing, schools, hospitals, public transport and job opportunities.

The issue of climate change also needs to be combated to ensure that our air quality and waterways are cleaner and safer to allow our food sources and population to continue to thrive.

The establishment of more non for profit organisations, including better access to these, would provide people in need with the necessary requirements to live a fulfilling lifestyles and have the same opportunities as others.

Overall, the steps to achieving an ideal future in 2050 require the need for collaboration and unity from population as a whole. We need to work together to create an ideal society for future generations that ensures equality for all, through access to better education and healthcare systems, more job opportunities and safer environments and ecosystems with cleaner air and waterways. If this can be achieved, then we may have an ideal future in 2050.

WHO CAN HELP US ACHIEVE THIS IDEAL FUTURE?

While we may begin to know how we can achieve an ideal future, the bigger question is who is going to help us achieve this ideal future. Other than the fact that our whole population will have to work together as one, who in particular will help us achieve the ideal future?

Based on what we think the ideal future is and how we can achieve that future, we think that the main people who can help us achieve this ideal future would have to be government officials and prime ministers/ presidents of the different countries across the world as well as celebrities and influencers.

We think that these people can help us achieve an ideal future because they are not only the type of people in our society with the money and power that can allow them to make a change but also have the ability to influence and spread awareness through their authority, convincing and making people informed of the possible actions that need to be put into place in order to achieve this ideal future.

Overall, we think that achieving an ideal future is based on our population working together as a whole, but it can be affected heavily by people such as government officials and prime ministers/ presidents as well as celebrities and influencers as they have the money, power and influence to make a change in our world and help our society achieve an ideal future.

STELLA'S REFLECTION

Before the beginning of this unit, I didn't have many major expectations, as I have never experienced such a diverse subject before. However, I was willing to keep an open mind, despite the fact that people had said that this unit was the most challenging and I was excited and eager to learn and research something new and different that was solely on what I was interested in.

I chose my topic of food security in 2050 after listening to Monika Doblins "food for thought" lecture, as she raised some issues regarding food supply for future generations that resonated with me and made me want to explore this topic further.

My group worked extremely well together and was able to successfully collaborate to ensure that this project was done to the best of our abilities. As we all were interested and passionate in different areas, we were willing to compromise with one another and merge all of our ideas together to form our big question which was "might feeding the world be our biggest issue in 2050?". We ensured that our class time was used effectively, and would encourage each other to stay on task whenever we were getting distracted. We were all extremely pleased that we each pulled our weight and contributed equally, and even helped each other out if we were struggling to find information about a certain question.

During the course of this project, I often found myself overwhelmed and stressed due to the workload and limited time frame that we had to complete this task, whilst competing with demanding deadlines for other subjects. Perfectionism is one of my flaws when it comes to presentation which is why I decided to help out my group with formatting the book, adding extra pressure on myself to make sure that it looked good and the content was all there. If I was to redo this project, definitely ensuring that I have good time management through planning out what I need to get done in lessons and at home, as well as taking into account other deadlines, will be essential to alleviate my stress and allow me to get everything done in the given time frames. I can achieve this through using my diaries note section more effectively, which can benefit me in my future Inquiry units in regards to managing my time and keeping on track.

Overall, this unit has expanded my knowledge about what the future holds in terms of food security and opened my eyes to the possible ways that this issue could be combated to ensure that the future generation has an adequate supply of food, whilst meeting the food security guidelines. Whilst I found this assignment a challenge, it was an experience that provided me with new skills of how to properly plan and structure a project in terms of time management whilst providing insightful and sufficient content to my readers, which will benefit me in future tasks and assignments.

LIV'S REFLECTION

For this TDU unit of Science of life, I was pretty excited as it sounded like an interesting subject with a pretty interesting topic that we would be studying first. I personally thought that this unit would be one of the harder ones out of all the topics and I think I am correct as it's definitely required a lot of work and effort for both the projects and also going to the lectures. My topic is based around the 2040 movie and our question is: Is feeding the world in 2050 going to be our biggest problem? And I chose that topic because I was really interested in learning more about how different problems such as climate change, food security and consumption are going to affect our future and if feeding the world is going to be a bigger problem than it currently seems to be. My personal favourite out of the two projects we have done would have to be the Cards we have been dealt letter as I found it really interesting to write a letter in someone else's perspective about the problems in their life and how it is vastly different from mine. With the main project however, I think it went pretty well in terms of research and getting my work done as I am pretty good with time management and I got my work done in class and with a little bit of homework and was also able to finish off extra pieces of the project that my friends needed help with such as some of their questions for their part. I also think myself and my group worked pretty well together as I was good at helping my group members out when they needed it and I feel like overall we were able to work pretty well together and get a lot of work done while still having fun while doing this project. I think that everyone did pull their weight in this group project as everyone had their set questions to do, and everyone got those questions done and while Stella formatted the book, I finished a few of her questions and I also did the bibliography, the glossary and the final reflection questions for our group, so it all together evened out. While we were only in lockdown for a small part of this unit, I don't really think that it affected my learning or anything as I was still able to get all my work done etc and I don't really think that there was anything necessarily good or bad about being at home, other than I couldn't see my friends or teachers.

Overall, I think a few things that I learnt from this unit were that I can work well in a group and that it is often beneficial to let back and not try and do all of the work myself as having faith in other group members is very beneficial. And I think that in the upcoming inquiry units I will continue to use that knowledge to help me remember that working in groups can be very beneficial. I also think that one thing I learned from this unit was a specific way to research and how to take on big projects such as these which is to come up with a big question and then build smaller questions off of that and then research to answer those questions and begin formatting your project, and I think this will be very helpful in the other tdu units. I also think that one thing I learnt from this project would be how issues such as feeding the world may not seem like a big problem compared to climate change, but really it is and all these problems do relate in a sort of larger problem. If I were to do this unit again, one thing that I think I would do differently would be to maybe take more notes in class and in the lecture as I think that would've helped me more in terms of beginning my projects and starting my research process. In conclusion, I personally liked this unit a lot as I found it very interesting and I think that I learned a lot from this unit and I think that there are a lot of skills and information that I will take away from this unit and then apply it into future units and subjects. And I think this unit was not only very beneficial for my learning, but I also had a lot of fun doing it.

EMILY'S REFLECTION

At the beginning of this unit I was excited to get started on this topic but also quite nervous as I had heard a lot of things from other people in older year levels. My friends had said that science of life was one of the more challenging units and therefore influenced my opinion before I had even started on my projects.

I chose my topic because ever since I was little, I have always had a passion for the environment and helping to preserve it for future generations. My connection to nature is very emotional and I feel that if nothing was done to save our one and only Earth, it just wouldn't be morally right or in favour of any species. As I wanted to focus my topic more on climate change, and Liv and Stella preferred other areas of expertise, we decided to merge all our three topics (sustainable production / consumption , feeding the world and climate change) together to form one big question of : "might feeding the world be our biggest issue in 2050?"

Our group was very good working together. For the majority of our class time within this unit we all stayed on task and focused rather than chatting which I believe took a lot of self control as we are all very good friends. They were very good teammates as they both pulled their weight within the group and even helped me out with certain tasks when I was struggling.

If I was to redo this project, I would do multiple things differently. One would definitely be my management of time. Next time for big TDU assignments I will be creating a workload schedule so I can divide the work that needs to be done within certain weekdays, keeping in mind that I have after school commitments. This will help me keep on track and not leave the bulk of work until the last week.

During the main part of this project I started to get very stressed out as the work load I had to get through was piling up, not just from science of life but also from other subjects. Tests I had to study for and other assignments that were due before TDU took my priority so I did not do much in the first week and took the time to mostly plan out the project with my group members. Once the second week arrived I started to really feel the pressure as after school commitments ate up most of my time for homework and once I finally got started on answering some of my questions, Stella and Liv were already, much further ahead of me.

Overall, although I found this task difficult, it was a good experience to learn more about my passions and a learning curve for me to understand how to properly plan and structure a project time and content wise.

ANSWER TO OUR BIG QUESTION

We believe that feeding the world in 2050 is certainly going to be a the biggest problem. Feeding the world has many contributing factors to it, causing hunger, necessary dietary changes, and can even affect the way our bodies will be able to function in the future, as if we cannot feed our population, there is no way to sustain or even continue our population in the future.

With a current rapid population increase, feeding the world in 2050 is certainly going to be a hard task, and alongside the population increasing and being expected to reach a total of 10 billion people worldwide by 2050, issues such as overconsumption and climate change are meaning that lots of resources, especially food are becoming more and more scarce, especially as time goes on.

In essence, we think that feeding the world is our biggest problem as while it may seem like a small issue at first, it can create bigger issues such as overconsumption to be able to keep up with feeding such a large worldwide population. Feeding the world in the future is also going to be a massive problem as if we are not able to feed our current population, with many countries having people die every day from hunger, we will certainly not be able to feed our population in the future. As our population will have increased by an even large amount than it has increased by in the past, and our food production will have to have increased by at least 69% {double} to even have a chance with keeping up with food and population demands. Overall, feeding the world in 2050 is certainly going to be a big issue, and if we are not able to work out how to keep up with food demand with an increasing population, our society in 2050 is looking far from ideal, and maybe not even possible.



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