

Student 4: High Achieved

NZQA Intended for teacher use only

New Zealand Greenhouse gas emissions are worsening, with New Zealand being among the 5 highest emitters per capita in the OECD (organisation for Economic Co-operation and Development)...failing to meet their 1990 Kyoto commitment...

The main greenhouse gases being emitted are carbon dioxide, methane and nitrogen oxide with the two areas that are contributing the most being from Agriculture and Energy sectors... The reason that these excessive greenhouse gas emissions are of concern and are important to be aware of is because it has a significant number of effects on all aspects of sustainability... the gases are trapping extra heat and contributing to global warming. Rapid change in the weather will push some plants and animals over the edge to extinction. because they are already stressed out by deforestation and overharvesting. So it is not environmentally sustainable to just keep adding greenhouse gases into the atmosphere. ①

Rapid climate change will also cause damage to the economic aspect of sustainability, ...the climbing amount of greenhouse gases in the environment and that resulting in consequences such as global warming and ... sea level rise the economy potentially could suffer... it is likely that coastal properties could be lost totally or their value be lessened severely. Rising sea levels and warming of the oceans is leading to coral bleaching where the coral dies and then the food chain collapses and many fish could no longer be caught to make a profit for the fishing industry. ②

...I went to myclimate.org website and answered questions about what I do in my day to day life and...this is my results

My annual emissions (mobility 3.4 t, consumption:3.1t, Household 1.7 t) Total 8.2t of CO₂ I went to another website <http://footprint.wwf.org.uk/home/> that asked more questions. The results that I got were extremely similar but the total was 7.6 t. This time food (39%) was ahead of transport (31%)

Options

1. The WWF site suggested I eat more seasonal and local food and <http://www.greeneatz.com/foods-carbon-footprint.html> said the carbon footprint of a vegetarian diet is about half that of a meat-lover's diet. So that would reduce my food footprint by 1.5 t. As I am living at home and doing a lot of training, this is an option I might do later when I do more of my own cooking and have time to start a garden.
2. Transport. Lots of travel in a petrol car is either the biggest or second biggest part of my footprint making up to 3.4 t of CO₂ but because I have already purchased a vehicle that is ran by petrol and there is no bus service or safe bike lanes available yet. In the future when I am going on to buying a new car it would be interesting to consider buying a used electric car.
3. Plant trees. Our local Stream Planting Project is aiming to plant 1,250m of stream bank so I have decided to explore the value of planting trees to offset my CO₂ emissions. The Trees that Count website says that the native shrubs being planted would sequester 250 t of CO₂ per hectare. It definitely means I could make a useful contribution to balancing my carbon emissions by tree planting ③ ④

As the Project is already existing, I planned an action to collect seeds for it. I already did some planting there with my Year 11 Horticulture class. (...Other people...) in my class are going to organise the planting in seed-trays and cuttings going in and another planting day at the stream.

Outline of plan

March; Contact DoC and F at the Regional Council and D at the project nursery to scope the possibilities.

Early April; Check with Mr B on class times available and transport options. Get DOC or For D to talk to our group about what to collect...

Mid April; Organise gear...

April 27th; Seed Collection day...

5 April- May Review and write Conclusions

Data to Collect How many species of trees we can get seeds and cuttings from... we

6 need to know so we can look up how big they grow so how much CO₂ they absorb.

We got permission from the Council to collect the seeds because the trees are on their

7 land. They explained it was important to check especially if we wanted to collect on DoC

land.

Data: We collected seeds from 6 species; Karamu (enough for 3 trays), Mahoe (enough for 1/2 tray), Rangiora (1/2 tray), Ngaio(1 tray), Taupata (1 tray) and 5-finger (1 Tray).

8 Taupata was an extra because we saw it on the road side and I thought it would be good and we probably wouldn't need permission because it is where they spray anyway.

Doris agreed, she estimated that you can get about 200 seedlings germinating in a tray (average) so I calculated that we may have about 1400 seedlings.

How many trees I would have to plant in my life to offset my carbon emissions? Using the Statistics New Zealand website, I calculated how long my average life expectancy is. I got 91.9 years (roughly 92). This is just a rough estimate which means the validity of the data isn't extremely reliable. Multiplying this by my annual carbon emissions (8.2 tonnes)... I would have an overall carbon emission of 754.4 tonnes.

9 On the Trees That Count website our trees are mostly classified as native shrubs which according to the website reach maturity at 25 years and have a carbon sequestration rate of 250 tonnes per hectare this means that to plant enough hectares of native shrubs to sequester my lifetime expectancy of expected emissions (754.4 tonnes) I would have to plant roughly 3 hectares of native shrubs. The calculation is $754.4 / 250 = 3.0176$ ha. On the Waikato Regional Council website, they recommend 900 to 1800 plants per hectare so the number of seedlings we collected for fits in that range but we have only done one step. As the saying goes every journey starts with a single step so if we keep going on these projects it can make a difference.

10 Conclusions...for environmental sustainability the planting project will eventually sequester some of the carbon we are emitting... if everyone could do it, it should prevent climate change getting worse. ...also environmentally we have added to the stability of the riverbank, provided food and nest spaces for birds and insects ... given the stream shade...and protection from run-off. Economically, there is a cost in fencing off the area and planting it but the cost of doing nothing about climate change would be greater still.

11 (as explained above)