# Welcome to the ENV245 Global and Regional Sustainability

# Exhibition

Heading towards a more sustainable world requires action on all levels, from the global right down to individual. It asks us to think and act differently: cooperatively, laterally and creatively. It also calls for stepping outside of existing models of development to consider the systems that are broader than or outside of our everyday spheres of interaction.

Students from the unit *ENV245: Global and Regional Sustainability* have put together creative works that explore a complex sustainability problem with multiple driving factors (a 'wicked problem'), which they have been researching. The creative works interrogate the problem from fresh angles, open up different ways of responding to the problem, and offer possibilities for moving beyond it.

While the issues it raises can sometimes be uncomfortable, sustainability at its core embodies hope for the future. This exhibition showcases problems, but we hope that in practice it will also inspire an awareness of how necessary and effective our own personal participation can be in creating a sustainable future.

# ENV245 Global & Regional Sustainability Exhibition
# Selected Pieces for AAEE 2020 Conference

**Each**

**Whittling of the World: The Supports of Sustainability**

Georgia Davis


This piece at its core aims to represent an easy visualization of the current damage being done to the environment supporting our world. Drawing from the concept of the Triple Bottom Line (where for businesses an economic, social and environmental balance is most profitable), the sustainability and future of our plant rests upon the strength of our economy, society and environment [1,2]. Under this system if the weight of the world and humanity's impact loses strength in one of its supporting pillars, the earth with us included will collapse. With current unsustainable practices such as the use of fossil fuels, deforestation and improper waste protocols, our current rate of environmental degradation requires urgent action [3,4,5]. Our impacts multiplying as population rises and we seek to expand. These factors, represented as a rasp, show how over time these problems are taking more and more away from such a key support (the environment) and take us closer and closer towards environmental collapse. The causes listed however are just the surface, global warming, ocean acidification and many more results of our pollution and over consumption help to move this rasp at greater speed. This limits the time in which we must change as we reach the thresholds of our ecosystems [6,7,8]. It is my hope this piece inspires others to look towards sustainable development goals such as the use of clean energy, climate action, responsible resource use, and the maintenance of life under water and on land, which as living beings we, are part of.

**Academic Contact:** Catherine Baudains c.baudains@murdoch.edu.au

In developable areas suitable for expansion and agriculture, extinction rates can be as high as two thirds of the local species [5]. As we make changes to the landscape, exploiting the local species and natural resources, catastrophic shifts towards ecosystem collapse form [6]. Even relatively small changes such as the clearing of a minor forests has impacts on the water cycle, soil erosion and species loss, the humidity, root structures and habitats being removes and changing the area in negative ways [4]. Using this visual expression of our impacts I hope that the problem of our improper environmental usage can be seen, understood and eventually prompt change towards sustainable practices to not only stop the damage to our planet but to repair and strengthen its supports.

**References**


1. Slaper T.F & Hall T.J. The Triple Bottom Line: What Is It and How Does It Work? IBRC [internet]. 2013, Dec 29. Available from http://www.ibrc.indiana.edu/ibr/2011/spring/article2.html
2. Kenton W. Triple Bottom Line (TBL). Investopedia [internet]. 2019, May 3. Available from: https://www.investopedia.com/terms/t/triple-bottom-line.asp
3. Choudhary M.P & Kushwah YK. Environmental Degradation: Causes, Impacts and Mitigation. [internet] 2015, Feb. Available from: https://www.researchgate.net/publication/279201881_Environmental_Degradation_Causes_Impacts_and_Mitigation
4. Bradford A. Deforestation: Facts, Causes & Effects. Live Science [internet]. 2018, Apr 4. Available from: https://www.livescience.com/27692-deforestation.html
5. Goudie A.S. Human Impact on the Natural Environment: past, present, future. Oxford UK: University of Oxford; 2018, August [2019, Oct 4]. Available from: https://www.wiley.com/en-us/Human+Impact+on+the+Natural+Environment%2C+8th+Edition-p-9781119403555
6. Valiente-Banuet A. & Verdu M. Human impacts on multiple ecological networks act synergistically to drive ecosystem collapse. Frontiers in Ecology and the Environment. 2013;11(8);408-413. DOI:10.1890/130002
7. Arowshegbe A.O & Emmanuel U. Sustainability and triple bottom line: an overview of two interrelated concepts. Igbinedion University Journal of Accounting. 2016[2019 Oct 4]; 2:88-126. Available from: https://www.researchgate.net/publication/322367106_SUSTAINABILITY_AND_TRIPLE_BOTTOM_LINE_AN_OVERVIEW_OF_TWO_INTERRELATED_CONCEPTS
8. WWF. Impacts of global warming [internet]. N.D. [2019, Oct 4]. Available from: https://www.wwf.org.au/what-we-do/climate/impacts-of-global-warming#gs.7dxnxd


Back to Contents

**Future Playgrounds of our Children**

By Erika Leana


"You have stolen my dreams and my childhood with your empty words," Greta Thunberg accuses past generations during UN Climate Action Summit speech this year[1]. The 16-year-old climate activist's words resonated in me as I worked on this project. She is right to assert that the issue of climate change strongly impacts our generation of children as they fight to save their future. The current issues are attributed to the careless and self-serving actions of past generations who took unsustainable paths to achieve the current economic status we have[2]. We are certainly beginning to feel the impacts of climate change[3] and as climate scientists project, it will only worsen in the future [4, 5]. Our consumption and waste continue to increase more than ever[6]. Currently, our waste management is reliant on landfills[7]. However, making more landfills only creates more unsustainable land—we would only be creating a more unsustainable world which our future children will be subjected to[8].

The relevant SDGs involved are *Goal 9: Industry, Innovation and Infrastructure, Goal 13: Climate Change* and *Goal 15: Life On Land* [9]. Goal 9 targets to "build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation", Goal 13 targets "urgent action to combat climate change and its impact", while Goal 15 targets to "protect, restore and promote sustainable use of terrestrial ecosystems" [10]. This project exemplifies the relevance and significance of these SDGs in relation to the concerning degradation of our Earth.

This project envisions an apocalyptic dystopia in which the playgrounds of future children are the very grounds where we dispose our unrecycled trash. I foreground the importance of taking serious climate change measures and developing sustainable solutions to recycle and reduce our consumption and waste by demonstrating the severity of the consequences if we fail to take action. Thus, I attempt to inspire the audience to be mindful of their waste and recycle when and where they can. Using 'waste' materials, I constructed the art project as displayed.
Here, a child is flying a kite on a landfill site—instead of a scenic and clean park as a child should be. I decided on this imagery because I want to appeal to the audience's emotional concerns and altruistic senses to do something about the future. Research shows empathy and sympathy strongly engage people's altruism and desire to help [11]. I recycled materials (mostly used paper, plastic and

textiles) to underline creative ways to recycle our waste, instead of throwing them out, which would hopefully inspire the audience to do the same. As more and more artists create sustainable art and art about sustainability [12], I too use art as an innovate way of communicating the issue of climate change to the audience. I used different textured materials to create a compelling artwork to engage their visual senses and attempt to draw their attention using a bright rainbow colour palette, thus trying to appeal to their aesthetic senses. Therefore, I use art as a means of both entertaining and educating the audience.

**References**


1) Kettley, S. 2019. "Greta Thunberg speech in full: Read the climate activist's damning message to the UN". *Express*, September 30, 2019. https://www.express.co.uk/news/science/1183377/Greta-Thunberg-speech-full-read-climate-change-UN-speech-transcribed-United-Nations
2) Baum, S. D., Haqq-Misra, J. D. & Karmosky, C. 2012. "Climate Change: Evidence of Human Causes and Arguments for Emissions Reduction" *Science and Engineering Ethics* 18, no. 2: 393-410. https://doi-org.libproxy.murdoch.edu.au/10.1007/s11948-011-9270-6.
3) Desonie, D. 2007. *Climate: Causes and Effects of Climate Change*. New York: Infobase Learning.https://ebookcentral-proquest-com.libproxy.murdoch.edu.au/lib/murdoch/detail.action?docID=366214.
4) Amnuaylojaroen, T. & Chanvichit, P. 2019. "Projection of near-future climate change and agricultural drought in Mainland Southeast Asia under RCP8.5". *Climate Change* 155, no. 2: 175-193. https://doi-org.libproxy.murdoch.edu.au/10.1007/s10584-019-02442-5.
5) Cheshmberah, F. & Zolfaghari, A. A. 2019. "The Effect of Climate Change on Future Reference Evapotranspiration in Different Climatic Zones of Iran". P*ure and Applied Geophysics* 176, no. 8: 3649-3664. https://doi-org.libproxy.murdoch.edu.au/10.1007/s00024-019-02148-w.
6) Xue, X., Hawkins, T. R., Schoen, M. E., Garland, J. & Ashbolt, N. J. 2016. "Comparing the Life Cycle Energy Consumption, Global Warming and Eutrophication Potentials of Several Water and Waste Service Options". *Water* 8, no. 4: 154. https://doi.org/10.3390/w8040154.
7) Klymenko, P. 2018. "Landfill is not a long-term solution for waste management in Australia". *ABC News,* November 18, 2018. https://www.abc.net.au/news/2018-11-18/now-is-the-time-to-scrap-landfill-in-australia/10487726.
8) Gow, K. 2009. *Meltdown: Climate Change, Natural Disasters and Other Catastrophes - Fears and Concerns of the Future*. New York: Nova Science Publishers, Incorporated. https://ebookcentral-proquest-com.libproxy.murdoch.edu.au/lib/murdoch/detail.action?docID=3019675#
9) United Nations. 2019a. *SUSTAINABLE DEVELOPMENT GOAL 13.* https://sustainabledevelopment.un.org/sdg13.
10) United Nations. 2019b. *#Envision2030: 17 goals to transform the world for persons with disabilities*. https://www.un.org/development/desa/disabilities/envision2030.html.
11) Rachlin, H. 2002. "Altruism and selfishness". *Behavioural and Brain Science* 25: 239-296. https://doi.org/10.1017/S0140525X02550056.
12) Tsui, E. 2019. "Artists make their art sustainable, and their art about sustainability as they catch up to 'ecological crisis'". *South China Morning Post,* July 24, 2019. https://www.scmp.com/lifestyle/arts-culture/article/3019718/sustainable-artists-taking-ecological-themes-all-new.


Back to Contents

**Little Shops and Plastic Oceans**

By Candice Shehan

Over the past few decades, plastics have become a huge concern for the globe [1]. Incredibly since 2000, our globe has produced an equivalent amount of plastic to all the previous year combined. With the production of plastic increasing 200% since 1950, it has been predicted that current plastic production could potentially increase 40% by 2030 [2].

With the rise in plastic production comes the pollution associated with plastic waste, this pollution affects the natural environment of most species on the planet. The accumulation of plastic in the world's ocean has become apparent [1]. The world's ocean covers 71% of the earth's surface and hold 97% of the earth's water, it has been discovered that even the remote parts of the ocean are now contaminated by plastic [3], with plastic having been found at the bottom of the Mariana trench and in Arctic seas ice[2]. Due to their very slow degradation periods they have become linked with entanglements and ingestion by marine animals[1], with wildlife entanglement being recorded in over 270 different species [2]. Animals also ingest large quantities of plastic and are unable to digest the plastic through their systems, this results in internal injury and death[2].

Whale species make up some of the largest animals in the ocean and the effects of plastic on them are devastating. In late March this year a pregnant Sperm whale washed dead up on a beach in Italy with over 50 pounds (22.7kgs) of plastic in its stomach[4]. Another whale washed up in the Philippines with over 88 pounds (39.9kgs) of plastic jammed in its stomach, it is believed the whale starved to death after the plastic stuffed its stomach [5]. It is with this in mind that I came up with my creative piece idea "Little Shops in Plastic Oceans". In July this year, Coles released its second round of little shops. A promotion involving giving away plastic toys with every $30 spent. The promotion not only coincided with plastic free July but also contradicted the companies move towards reusable shopping bags. According to Triple J's Hack[6] Little shops have already been found washed up on

beaches and it claims that waste management experts say the non-reusable items could be worse for the environment than plastic bags.

My project address a number of Sustainability Development Goals outlined by the United Nations. Those being Goal 11: Sustainable cities and communities, Goal 12: Responsible Consumption and production, and Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development [7].

I created my project using plastic items around my house, and collected little shops from family and friends. The aim of the project is to raise awareness of how the production of useless plastic products is harming the environment.

**References**


1) Ostle, Clare, Richard C. Thompson, Derek Broughton, Lance Gregory, Marianne Wootton, and David G. Johns. 2019. "The Rise In Ocean Plastics Evidenced From A 60-Year Time Series". *Nature Communications* 10 (1). doi:10.1038/s41467-019-09506-1.
2) de Wit, Wijnand, and Nathan Bigaud. 2019. "No plastic In Nature: Assessing Plastic Ingestion From Nature To People". Switzerland: WWF Worldwide fund for nature. https://d2ouvy59p0dg6k.cloudfront.net/downloads/plastic_ingestion_web_spreads.pdf.
3) Azoulay, David, Priscilla Villa, Yvette Arellano, Miriam Gordon, Doun Moon, Kathryn Miller, and Kristen Thompson. 2019. "Plastic And Health: The Hidden Cost Of A Plastic Planet". Washington: Centre for International Environmental Law. https://www.ciel.org/wp-content/uploads/2019/02/Plastic-and-Health-The-Hidden-Costs-of-a-Plastic-Planet-February-2019.pdf
4) Borunda, Alejandra. 2019. "This Pregnant Whale Died With 50 Pounds Of Plastic In Her Stomach". *National Geographic*, , 2019. https://www.nationalgeographic.com/environment/2019/04/dead-pregnant-whale-plastic-italy/
5) Borunda, Alejandra. 2019. "This Young Whale Died With 88 Pounds Of Plastic In Its Stomach". *National Geographic*, , 2019. https://www.nationalgeographic.com/environment/2019/03/whale-dies-88-pounds-plastic-philippines/.
6) Triple J Hack. 2019. "Coles Faces Boycott For Giving Away Plastic Toys, Again", , 2019. https://www.abc.net.au/triplej/programs/hack/coles-faces-boycott-over-giving-away-plastic-toys-again/11317904.
7) "About The Sustainable Development Goals - United Nations Sustainable Development". 2019. *United Nations Sustainable Development*. https://www.un.org/sustainabledevelopment/sustainable-development-goals/.


Back to Contents

**Mind the Gap: The wage disparity between women & men**

by Sophia Boccardo

Anita and Brett are full time employees who, although don't work the same workplace roles, both have a significant difference (other than their anatomy) that separates them from each other. Do you know what it may be? It is called the gender pay gap (GPG) which is represented as a percentage. It highlights the difference in the average weekly full-time equivalent earnings between women and men [1]. It is important to note that the GPG does not compare the like roles of women and men in the workplace. Men undoubtedly benefit from the gender pay gap which is a common characteristic of global economies[1]. There are a number of factors that drive the pay division that exists between women and men including, separation of men and women in different job roles and women spending more time away from work for reasons such as childcare or caring for elderly relatives, which influences women receiving fewer job promotion prospects and their chances of having a high position within the workplace is decreased [1, 2]. However, the main driver of the pay gap is gender discrimination, contributing 39% to the issue[2]. Moreover, female dominated industries attract lower wages[2].

In Australia, the current gender pay gap is 14%, with women earning $241.50 less on average per week than men, with Western Australia having the largest gender wage gap across the nation at 21.8%. In contrast, South Australia has the lowest gender pay gap of 9.2%. To put this in perspective, on average a full-time male employee will earn $1726.30 in a week[1], while, a full-time female employee will earn only $1484.80. This leads to the aim of my exhibition piece; to help people recognise the substantial pay difference between women and men which characterises contemporary Australian workplaces. This relates to several United Nations Sustainable Development Goals including, goal 5: gender equality[3], goal 8: decent work and economic growth[4], and goal 10: reduced inequalities[5] which all encompass the aim of empowering women young and

old through education, providing decent opportunities and abolishing discrimination to encourage women to participate in the workforce, which is currently dominated by men with a 94% participation rate[3, 4, 5]. All three goals contribute to the message of my project, with goal 5 highlighting that across the globe women have to tolerate discrimination, but to create a sustainable world, it requires gender equality by implementing laws to eradicate this behaviour within the workplace and end gender-based discrimination in all aspects of society[3]. Goal 8 also helps to define my project with the UN stating that it will take another 68 years to achieve equal pay with failure to take critical action, amplifying the importance of understanding the gender pay gap issue[4]. Lastly, goal 10 concerns income inequality denoting that across the world, universal policies need to address the requirements of those who are marginalised[5].

My exhibition piece provides a simple but powerful representation of the gender pay gap separating women and men in the Australian workplace without complicated stats confronting viewers, rather two stacks of money at different heights to represent the variance. It has a striking appearance with the use of coloured notes and figurines.

**References**


1) Workplace Gender Equality Agency. (2019) *Australia's Gender Pay Gap Statistics*. Retrieved from https://libguides.murdoch.edu.au/APA/internet
2) Ryan, P., & Pupazzoni, R. (2019). *Gender discrimination driving pay gap between Australian men and women, report finds.* Retrieved from https://www.abc.net.au/news/2019-08-22/gender-discrimination-driving-a-pay-wedge-between-men-and-women/11436612
3) United Nations. Sustainable Development Goals. *Gender Equality.* Retrieved https://www.un.org/sustainabledevelopment/gender-equality/
4) United Nations. Sustainable Development Goals. *Decent Work and Economic Growth.* Retrieved from https://www.un.org/sustainabledevelopment/economic-growth/
5) United Nations. Sustainable Development Goals. *Reduced Inequalities.* Retrieved from https://www.un.org/sustainabledevelopment/inequality


Back to Contents

**In Our Hands**

By Kirsty Mitchell

My creative piece is relating to biodiversity loss around the world due to industries such as agriculture. Agriculture is responsible for 80% of tropical deforestation [1]. As a result, biodiversity is decreasing due to habitat loss. The current extinction rate is 1000 times higher than the natural 'background' rate [2]. Agriculture is a wicked problem because it contributes greatly to the economy as well as supplying food and other products, however, it is at the expense of the environment. This causes an interruption in the three pillars of sustainability. Even though it is considered that the three pillars are to be equal there can be no society and economics without the environment. There are five main sustainability development goals that are relevant as seen below in figure 2. These goals show it is important that people are earning money and food to survive as well as growing the economic growth of countries while being responsible with consumption and use of products all while maintaining and protecting life on land. This makes it extremely difficult for a solution.


Figure 2. relevant sustainability development goals to biodiversity loss due to agriculture

In the creative piece, it is shown that the globe is in mine, yours, and everyone's hands not just one individual. We are all responsible for our planet and protecting the biodiversity that is found within. Even though you and I might not be able to stop farms directly or create new laws, as consumers we are influencers. As mentioned above agriculture is causing major problems for biodiversity and just stopping the industry isn't a viable option. However, alternative and sustainable practices are necessary for our future. Consumers can influence the agriculture industry and businesses, through selective purchasing. As shown around the hands there are logos or symbols that represent certification or approval. Many everyday items have these symbols and this means they meet a standard and the brand can have the symbol on their approved products. Not many people would

even notice these symbols, as most of the time consumers look for the cheapest option or use regular products. However, if we took the time to select products bearing these symbols it will force other companies to become certified or approved.
For example, in the Amazon 70% of deforestation is for cattle ranching [3]. If consumers choose vegan alternatives instead this would reduce the pressure on expanding cattle ranching and ultimately reduce or even halt deforestation to increase the ranches and save habitats.
Showing the public that they do have a choice and can help redirect businesses is why my creative piece is presented this way. The sculpture shows that by working together to protect and 'hold responsibility of the earth' it is possible to make a difference. This is OUR earth in OUR hands make the right choices!

**References**


1. Agriculture causes 80% of tropical deforestation. Mongabay [Internet]. 2012 [Cited 2019 October 4]. Available from: https://news.mongabay.com/2012/09/agriculture-causes-80-of-tropical-deforestation/
2. Centre for Biological Diversity. The extinction crisis [Internet]. [cited 2019 October 4]. Available from: https://www.biologicaldiversity.org/programs/biodiversity/elements_of_biodiversity/extinction_crisis/
3. Charts and graphs about the Amazon rainforest [Internet]. Mongabay. [Cited 2019 October 4]. Available from: https://rainforests.mongabay.com/amazon/charts.html.


Back to Contents

**Sustainable Cities: Which would you choose?**

By Amy Carmignani


The intention of this submission is to highlight comparison between the stereotypical developed city and a sustainable biophilic city. Rapid population and urbanisation is unsustainable in most current modern cities [1]. Main issues in modern cities are automobile dependence, urban sprawl, land clearing and inefficient land use. Right here in Perth we can see the intense effects of urban sprawl, stretching over 150 kilometres[2] and having cleared almost 900 hectares of native fauna over 6 years[3]. This model shows a contrast between current inefficient cities and sustainable biophilic cities of the future.

This addresses sustainable development goals of:

- Sustainable cities and communities;
- life on land;
- climate action;
- responsible consumption and production; and
- good health and well-being.

---

**Features of the Unsustainable Modern City**

**Automobile Dependence:** Modern cities were built around the automobile. Its automobile dependence means alternative transportation systems can become insignificant, more greenhouse gasses are emitted and more vegetation is cleared for land use[4].

**Urban Sprawl:** Often occurs from affordable land being developed on beyond the suburban fringes, constantly expanding and commonly defined by the poor use of land[5]. This is low density urbanisation[6]. Sprawled suburbs have the highest costs to accessing daily needs[4] and less environmental degradation tends to occur when people live at high densities than low densities[7]. Modern forms of cities can have negative effects on human interaction[4].

**Loss of Nature:** According to experts, Australia is number 2 in the world for biodiversity loss[8] and populations are being pushed further outwards[9]. In addition, people are losing touch with nature.

---

**Changes needed to achieve a Sustainable Biophilic City**

With changes in land use and urban design, cities can be an inviting, wholesome and happy place for any citizen.

**Biophilic design (people and nature):** There is power in biophilic designs and human interaction with nature is being rapidly recognised as a daily essential for living happy, healthy and meaningful lives[10]. In addition to social benefits, new examples of ecological areas, such as rooftop gardens, have found to host a range of biodiversity[11]. Further, planting more trees in an area creates a carbon sink and removes carbon from the atmosphere through carbon sequestration[12] to defend in climate change.

**High density living:** Apartment living is high density living and is more efficient and encourages urban fill as opposed to sprawl. High density living also allows for transit systems to run efficiently[13] which discourages automobile use.

**Interactive layout:** Having mixed land and building use and communal areas aims to create an inviting and interactive neighbourhood[4]. Transit zones that encourage positive interactions between people produce happier and more trusting communities[14].

**Active transport:** Sustainable cities focus land use on people and exchange, away from automobile use. This promotes active transport which has numerous social and environmental benefits. Exercising in nature has beneficial impacts including the reduction of stress, increase in cognitive performance and enhancing moods[15]. Environmentally, carbon emissions will decrease. 30% of WA's greenhouse gas emissions are from transport, with 250,000 daily car trips in Perth being for distances under 1 kilometer[3], leaving significant opportunities for active transport to help climate change.

**Where would you live?**

Suburban living is still the popular option for many Australians. Privacy and open spaces tie into the 'Aussie lifestyle"[15]. This project aims to demonstrate the appeal of well planned, sustainable, biophilic urban living. By contrasting it to a typical modern city it highlights the inefficient use of land and lack of natural interaction with the intent to open peoples' minds to alternate forms of future urban living.

**References:**


1 Allan, A. and You, N. (2011) Sustainable urbanization – Bridging the gap between green and brown agendas. United Kingdom: Jenner City Print Ltd

2 Young, E. and Allan-Patale, D. (September 2018). Halting Perth's urban sprawl is not as easy as it sounds *WA Today*. Retrieved from https://www.watoday.com.au/national/western-australia/halting-perth-s-urban-sprawl-is-not-as-easy-as-it-sounds-20180830-p500t1.html

3 Weller R. (2009) Boomtown 2050. Scenarios for a Rapidly Growing City. University of Western Australia Publishing, Nedlands.

4 Schiller P.L., Bruun E.C., Kenworthy J.R. (2010) An Introduction to Sustainable Transportation. Earthscan, London. *pp. 7-21*.

5 Ewing R.H. (2008) Characteristics, Causes, and Effects of Sprawl: A Literature Review. In: Marzluff J.M. et al. (eds) Urban Ecology. Springer, Boston, MA

6 Pendall, R. (1999). Do Land-Use Controls Cause Sprawl? Environment and Planning B: Planning and Design, 26(4), 555–571. https://doi.org/10.1068/b260555

7 Barley S. (2010) *Escape to the City*. New Scientist. November 6, *pp. 32-35.*

8 Kilvert, N. (2017). Australia among seven nations responsible for more than 50% of global biodiversity loss: ABC News. Retrieved from: https://www.abc.net.au/news/science/2017-10-26/australia-biodiversity-loss-conservation/8987696
9 Poon, L. (2018). Mapping the 'conflict zones' between sprawl and biodiversity. CityLab. Retrieved from: https://www.citylab.com/environment/2018/02/mapping-the-conflict-zones-between-sprawl-and-biodiversity/553301/
10 Beatley, T. and Newman, P. (2013). Biophilic cities are sustainable, resilient cities: Sustainability. 5(8), 3328-3345. https://doi.org/10.3390/su5083328.
11 Beatley T. (2014) *Imagining Biophilic Cities*. In Lehmann S. (Ed.) Low Carbon Cities.
12 UN HABITAT (2011) Cities and Climate Change. Global Report on Human Settlements 2011. Earthscan, London. Excerpts from *Chapter 7: Conclusion and Policy Directions*.
13 Newman, P. (2014). Density, the Sustainability Multiplier: Some Myths and Truths with Application to Perth, Australia. *Sustainability*, *6*, 6467-6487. Doi: 10.3390/su6096467
15 Beatley, T. (2011). *Biophilic Cities – integrating nature into urban design and planning*. Washington, DC: IslandPress.
14 Montgomery C. (2008) *The Happy City*. EnRoute. February.
15 Willing, R. and Pojani, D. (2017). Is the suburban dream still alive in Australia? Evidence from Brisbane: Australian Planner. 54(2), 67-79. https://doi.org/10.1080/07293682.2017.1296875

Back to Contents

**How We Choose to Live**

By Blake Rose


My creative piece for the Sustainability Exhibition is a 3D model showing two neighbouring properties. On one side is a 'McMansion' or a large project home, typically representing the current housing trend in Perth, Western Australia. The term 'McMansion' means 'bigger than the average home and flaunting status, being built to a generic plan with mass-produced materials, similar to hamburgers at a fast-food chain[1]. Essentially, it is a large double storey house, closed off from the community, taking up most of the site, using scheme water and connected to the (coal powered) electrical grid. It focuses on luxury items, cheap construction and has little consideration for the environment.

On the other side is a smaller (sustainable) house, utilizing the site for sustainable living through solar passive design, environmental technology, rainwater harvesting and is made from recycled or lower embodied energy materials. The land is used for food production and native landscaping for ecological benefits.

The 'McMansion' is occupied by a small family of 3, whilst the sustainable house is home to a family of 5. A parent from the smaller family notices how many children the larger family has and points out that they are 'overpopulating the earth'. A parent from the large family replies with a question about the size of their neighbour's ecological footprint.

I have been on the receiving end of the initial comment, being a father of three children. The comment came from someone who was living in a large house by themselves without implementing sustainable principles in their life. My family and I live sustainably in a small house, yet still have an ecological footprint of roughly 1.9 earths[2]. That is what inspired my piece 'The life we choose to live', exhibiting that overpopulation may be a problem, but the ecological foot print of the individual is also important. They relate as 'increased affluence exacerbates rather than ameliorates impacts and when combined with population growth, will substantially increase the human footprint of the planet.' [3]

My intentions were to show the contrast between a smaller family living well beyond their means and a larger family living sustainably to encourage sustainable decisions to be made when entering the housing market and to move away from cookie-cutter options.

The building industry has seen significant changes in recent years. There is now a registry

providing interested consumers with the ability to identify 'green' builders who are tracked as sustainable [4]. Mandatory implementation of energy efficiency reports, modifications to the BCA and energy star certifications have improved efficiency, however, although most project homes receive good star ratings, it doesn't always mean
they are using sustainable practices and materials.

'Buildings are directly responsible for the generation of pollutants during their construction and operation, for water and electricity use and waste generation and also, indirectly, for emissions due to the transportation of material and occupants to and from the building site' [5].

By building a smaller house using sustainable, local materials and technologies, we can reduce our ecological footprint immensely. The problems of overpopulation and increasing footprint are both contributing factors to global issues. Population growth 'keeps people in poverty, obliges them to destroy their environments, and leads to deforestation, soil erosion, water shortages, and desertification.'[6] It is estimated that the 'world population may top 8 billion in 2025.'[6] With forecasts of population increase, it is important people make ethical decisions on how they live and really consider how they consume to reduce their ecological footprint.

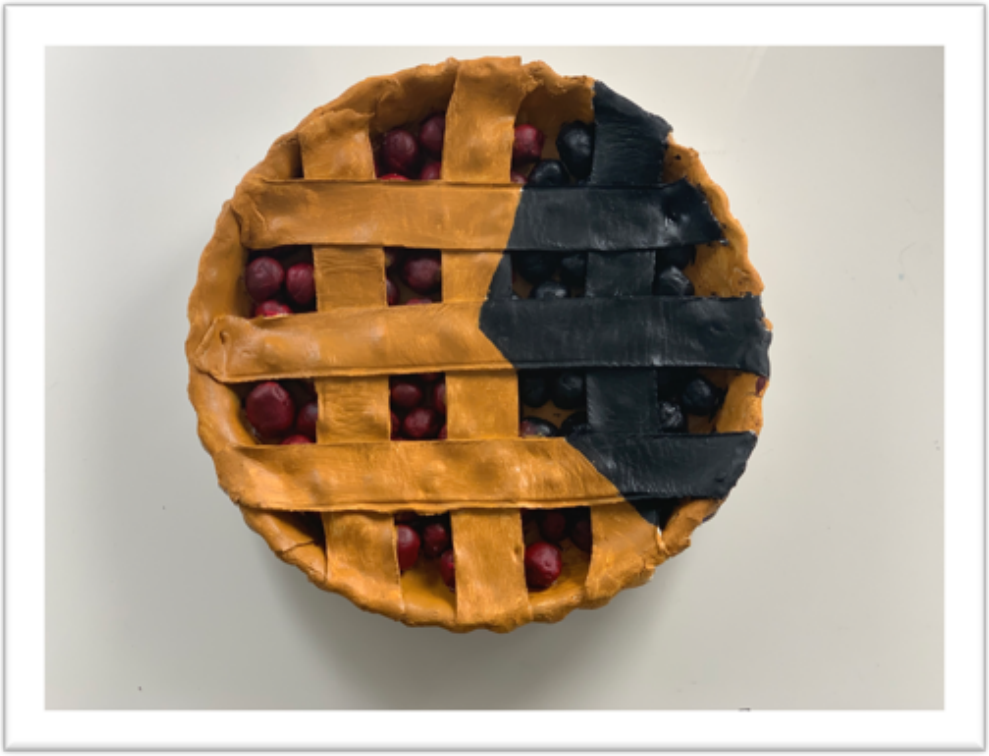
**References:**


[1] Hurley AK. Why we love to hate McMansions, but still buy them: Contrary to recent headlines, the McMansion is not dying. The Washington Post (Online). 2017.
[2] Ecological Footprint Calculator tps://www.wwf.org.au/get-involved/change-the-way-you-live/ecological-footprint-calculator#gs.8248iw
[3] Dietz T, Rosa EA, York R. Driving the Human Ecological Footprint. Frontiers in Ecology and the Environment. 2007;5(1):13-8.
[4] New Sustainable Home Registry introduced across Australia. BPN [Internet]. 2013.
[5] Solis-Guzman J, author, Marrero M, author. Ecological footprint assessment of building construction. Sharjah: Bentham Science Publishers, Limited; 2015.
[6] Smith R. Overpopulation And Overconsumption: Combating The Two Main Drivers Of Global Destruction. BMJ: British Medical Journal. 1993;306(6888):1285-6.


Back to Contents

**"Pie Chart"**

By Veronica Gelavis



My piece "Pie Chart" aimed to communicate the dramatic statistic that one third of all food produced for human consumption is wasted or lost, which equates to roughly 1.3 billion tonnes of food each year [(1)]. The use of an 'actual' pie as a pie chart was chosen to visually represent in a relatable form what one third of food actually looks like. The intention of this sculpture was to derive an emotional response from the audience, as food wastage is a wicked problem that can be managed a great deal by consumers. Consumers have the power to rectify the urgent issue of food wastage, as our own consciousness and daily habits are to blame, but can quite easily be changed too. It is this power that I hope would be encouraged by my piece, upon seeing the surprising amount of food that is wasted by mostly by people living in developed countries such as ourselves.

Food wastage ties into the UN Sustainable Developed Goals 2 (zero hunger) and 12 (responsible production and consumption) [(2)]. If food wastage was reduced, better distribution of food and resources to developing and war-torn countries could be achieved. Currently, 95-115kg of food is wasted per capita by people in North America and Europe, whereas consumers in sub-Saharan Africa, south and southeastern Asia throw away 6-11kg a year [(3)]. The gap between consumption of developed and developing countries is immense and needs to be rectified in order to maintain a sustainable future where all people have access to food [(2)].

It is important to highlight that some responsibility of food wastage and distribution lies upon government bodies and people in positions of power in order to regulate responsible and conscious production, especially food lost (not waste) [(4)]. Food loss is food that is lost in the supply chain in the production stages due to disruptions such as pest infestations, or problems in harvesting transportation and handling. However it remains that food waste by consumers as well as distributors (e.g. supermarkets) is the root cause of this wicked problem and is also more easily changed, which is why I chose to focus my piece thusly. Consumers are presented with statistics frequently about the consequences of their habits and how individually we actually have a major influence on the condition of our planet. However I believe the reason people do not act in response to these statistics is firstly because we have become accustomed to this type of news, and secondly

because these figures have no tangible representation to people and do not resonate with people effectively. Visual representation of statistics that are directly relatable to everyday people are effective in evoking change and progress in the community, since the motivation is derived internally rather than from others inducing guilt and shame. The most effective and efficient change that we will see for the environment and the general sustainability of our planet will be from everyday consumers that are the target of my "Pie Chart" piece.


1. wearethenest.com.au T. Food Waste Facts - OzHarvest [Internet]. OzHarvest. 2019 [cited 1 October 2019]. Available from: http://www.ozharvest.org/what-we-do/environment-facts/?gclid=Cj0KCQjw8svsBRDqARIsAHKVyqES2dcMw_d_5aBWvx5w2DvHU9m9yjThX8H_7aMisndy6_559Ea5IDgaAsAREALw_wcB

2. Goal 2 .:. Sustainable Development Knowledge Platform [Internet]. Sustainabledevelopment.un.org. 2019 [cited 1 October 2019]. Available from: https://sustainabledevelopment.un.org/sdg2

3. Key facts on food loss and waste you should know! [Internet]. Food and Agriculture Organization of the United Nations. 2019 [cited 2 October 2019]. Available from: http://www.fao.org/save-food/resources/keyfindings/en/

4. Food Loss and Food Waste [Internet]. Food and Agriculture Organization of the United Nations. 2019 [cited 2 October 2019]. Available from: http://www.fao.org/food-loss-and-food-waste/en/


Back to Contents

**If the Shoe Fits**

By Diane Godwin


The aim of my art project "If the Shoe Fits…" is an attempt to engage, shock and hopefully outrage the audience into examining their own role in environmental degradation through consideration of their individual ecological footprint. Ecological footprint assessments are a measurement of sustainability. They compare the intensity of human resource use and waste creation of a specific area to that region's ecological carrying capacity and can highlight environmental vulnerabilities[1]. This art piece focuses on the ecological footprint per capita, of people living in three very different countries. I chose to highlight the footprint of Australia in contrast to that of China and India because many people enjoying the comforts of this prosperous developed nation - with its reputation as environmentally sensitive, responsible and clean - have the perception that developing countries are more culpable for the ongoing damage of the Earth's environment.

The use of the large woman's shoe is a deliberate attempt to make a visual impression, capture attention, and to highlight the significant role that woman play in creating environmental impacts, especially as they make the majority of shopping purchases in Australia[2]. I want to challenge everyone to consider how their everyday decisions are creating significant environmental impacts. Much of our very large ecological footprint is due to our extravagant shopping habits and life of luxury that includes national/international flights, continuous air conditioning, swimming pools and meat consumption[3]. It is contrasted against the much smaller shoe representing the individual ecological footprint of China and the tiny shoe representing

India. These shoe size comparisons are placed alongside the corresponding number of Earth's which would be required to sustain the level of resources currently being consumed by that country's inhabitants if everyone on the planet lived the same way[4, 5].

The shoes contain pictures of common consumables within that country, with the 'Australia' shoe containing far more than the other shoes because it has a far larger footprint than the other countries and because that is the target audience and I wanted to highlight everyday items that everyone could relate to which are more luxury than a life necessity[6]. Studies have demonstrated that by introducing people to personal footprint calculators it has provided insight and knowledge on how daily activities can affect the global environment and consumptive behaviours can be altered to reduce impacts[7].

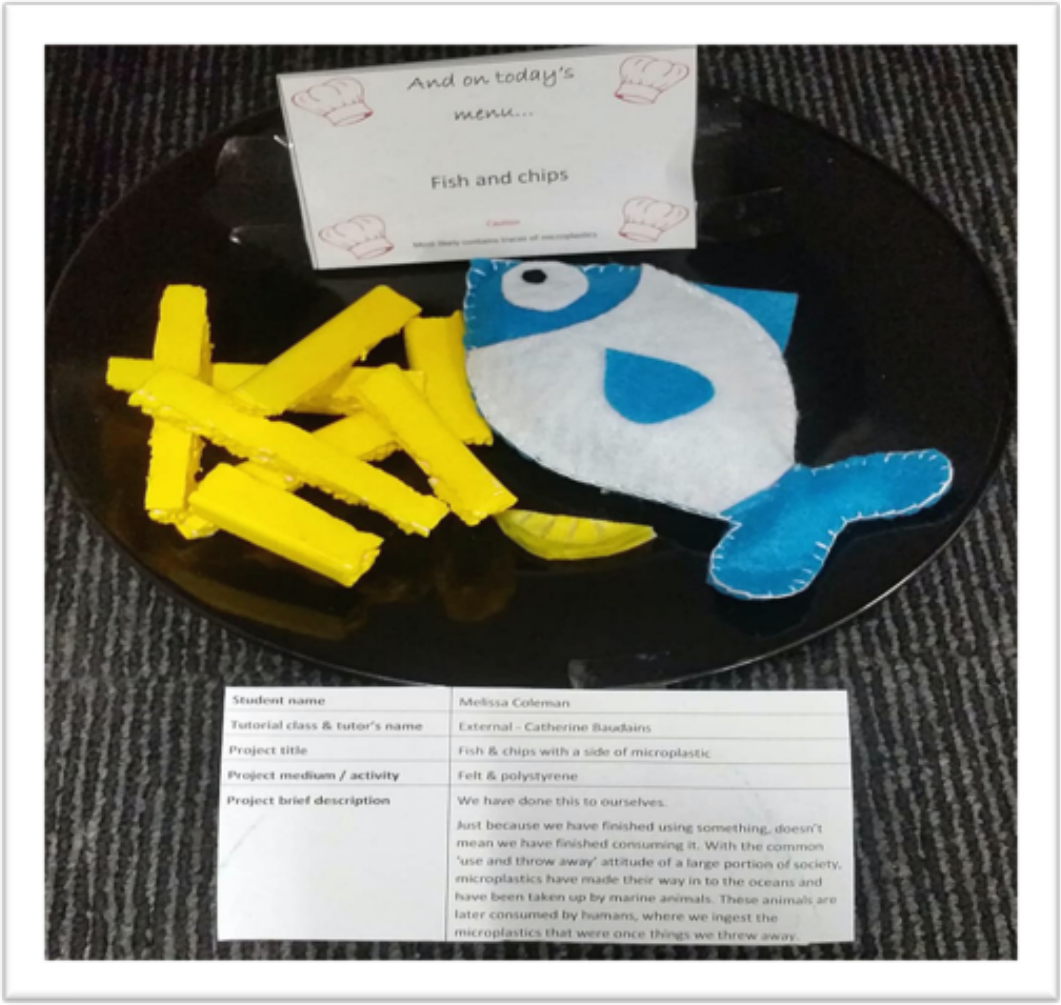
**References**


1) Wackernagel, Mathis, and J. David Yount. 1998. The ecological footprint: An indicator of progress toward regional sustainability. *Environmental Monitoring and Assessment* 51 (1): 511-29.
2) Han, Esther. 27/4/2016. "Women Driving three-quarters of all Retail Purchases, Going Crazy on Clothes." *The Sydney Morning Herald*. https://www.smh.com.au/business/consumer-affairs/women-driving-threequarters-of-all-retail-purchases-going-crazy-on-clothing-20160427-gofxs1.html
3) Moore, S. 2012. "Climate Change and Environmental Citizenship: Transition to a Post-Consumerist Future?" *University of Tasmania*. https://eprints.utas.edu.au/15930/
4) Global Footprint Network. "How Many Earths Would We Need if the World's Population Lived Like…". 2017. https://www.footprintnetwork.org/2017/06/27/earth-overshoot-day-2017-2/
5) ABC News. "Earth Overshoot Day: We Used a Year's Worth of Resources in Seven Months". 3/8/2017. http://www.abc.net.au/news/2017-08-03/earth-overshoot-day:-today-the-earth-goes-into-the-red/8770040
6) Ambrey, Christopher L., and Peter Daniels. 2017. "Happiness and footprints: Assessing the relationship between individual well-being and carbon footprints." *Environment, Development and Sustainability* 19 (3): 895-920.
7) Collins, Andrea, Alessandro Galli, Nicoletta Patrizi, and Federico Maria Pulselli. 2018. "Learning and teaching sustainability: The contribution of ecological footprint calculators." *Journal of Cleaner Production* 174: 1000-10.


Back to Contents

**Fish & Chips with a side of microplastics**

By Melissa Coleman




Microplastics have become a rising topic of interest in recent years. Microplastics are defined as microscopic plastic debris that are less than 5mm in size. These are a result of fragmentation of larger plastic waste, ropes and synthetic fabrics which end up in marine waters and are often consumed by marine fauna, which are then later consumed by humans[1, 2]. In Australia, the estimated consumption of seafood per caput is 7.5kg per year, which although is a small consumption in comparison to the rest of the world, non the less it is still subject to microplastics and being consumed[3].

My piece was a representation of an iconic meal that many Australians, and those all around the world consume, fish and chips. On first glace you see a fish and a pile of chips, triggering an association between the exhibition piece and something most viewers have consumed at some point. The menu sign makes it out to be regular dish, something that is on many restaurant menus. At the bottom of the sign in smaller writing reads: “Caution: Most likely contains traces of microplastics”. I made this section smaller to draw reference to the micro aspect of this large problem. As well as this, I omitted the implementation of larger pieces of rubbish on and inside the fish as I had first drafted to do as majority of microplastic are undetected to the naked eye, so I felt it more fitting to leave them out. The knowledge of microplastics is only recent, and the public awareness is slowing gaining attention. My piece was designed to bring microplastic awareness through a common meal that may viewers will be familiar with.

There are 2 United Nations Sustainable Development Goals[4] that my piece ties in to

1. Goal 3: Ensure healthy lives and promote well-being for all at all ages
2. Goal 12: Ensure sustainable consumption and production patterns

Although there are limited studies that have been conducted to understand the effects of consumption of microplastics will have on the human body, there has been research conducted on the effect microplastic have on fish. The study found that fish that ingested the plastics suffered from altered feeding habits resulting in reduce growth and reproductive output[2]. There was evidence that effects of the microplastics carried over to the next generation, which included decrease in offspring quality and growth rates. Although these studies are not a conclusive understanding on the effect of human ingestion of microplastics, it provides evidence that there are effects and it should be studied. This ties into goal 3 as consumption of plastics may compromise the health of humans.

The piece relates to goal 12 as we must come up with more sustainable ways of produce plastic and the way that we consume it. "Microplastics are, on the face of it, an easy problem to solve. It is a problem entirely generated by our own behaviour"[1]. There are significant issues surrounding patterns of consumerism, and waste-disposal not just in developing nations, but also in well-developed counties.

Just because you cannot see plastic in your sea food, doesn't mean it's not there.

**References**


1) Galloway, T., & Lewis, C. (2017). Marine microplastics. *Current Biology, 27*(11), R445-R446. doi:10.1016/j.cub.2017.01.043
2) Barboza, L. G. A., Dick Vethaak, A., Lavorante, B. R. B. O., Lundebye, A., & Guilhermino, L. (2018). Marine microplastic debris: An emerging issue for food security, food safety and human health. *Marine Pollution Bulletin, 133*, 336-348. doi:10.1016/j.marpolbul.2018.05.047
3) Food and Agriculture Organization of the United Nations. (n.d.). Consumption of Fish and Shellfish and the Regional Market. Retrieved from www.fao.org/3/T5816E/t5816e03.htm#1.3
4) United Nations. (2015). Sustainable Development Goals. https://sustainabledevelopment.un.org/?menu=1300


Back to Contents

**Unboxing Your People**

By Matthew Corcovelos


Modern slavery comes in many forms such as child labour, indentured servitude, and unsuitable and underpaid working conditions to name a few[1, 2]. This project aimed at addressing the issues of modern slavery regarding the production of technology such as smart phones, laptops, tablets, etc. The diorama was made for the exterior to resemble a new Google Pixel 3 XL case which would then be "unboxed" to display the interior. The interior had three sections within to highlight different aspects of the actual cost to produce new tech. The open pit mine showcases the artisanal miners in countries such as the Democratic Republic of Congo who use simple tools and child labour for the extraction of cobalt which is a common material used to make smart phone batteries[3]. The next section goes to highlight those who work in unacceptable conditions as well as those whom are trapped in a work environment through debt which eliminates any chance of escaping the poverty cycle[4]. Finally, we have the roads which lead to nowhere, this was meant to highlight the haziness and unclear supply

chains of some companies which only benefit companies whom may be sourcing materials from areas of the world where injustice may occur such as in conflict zones like the Democratic Republic of Congo.

While these are not exhaustive of the issue of modern slavery and don't highlight all relevant industries, which may use these practices, I think it is an effective way to bring attention to technology production. Modern slavery is not conducive to a sustainable future as it disenfranchises those in developing nations for economic gain of those in developed nations[5]. Modern slavery is most certainly a wicked problem and we can attribute a few Sustainable Development Goals (SDG) to this such as; Goal 1 of no poverty as these areas where slavery exists tend to be in developing nations, Goal 12 of responsible production and consumption as this wicked problem stems from the production of goods to the global market but tackling the manner in which its conducted would help to build a better future, Goal 9 of industry, innovation, and infrastructure which would create more suitable and acceptable working conditions for people and promote better health and wellbeing for peoples. While almost all SDG's could be applied to modern slavery, these are the goals which would have the most prolific effects in this wicked problem.

**References**


1 Humbert, F. (2009). *The challenge of child labour in international law*. Cambridge [U.K.]: Cambridge University Press.

2 Nolan, J., & Boersma, M. (2019). *Addressing modern slavery*. Sydney: NewSouth Publishing.

3 Higgs, G. (2018). The Endurance of Child Labour in Artisanal Cobalt Mining. Retrieved from http://csapiemonte.it/sites/default/files/The%20Endurance%20of%20Child%20Labour%20in%20Artisanal%20Cobalt%20Mining.pdf

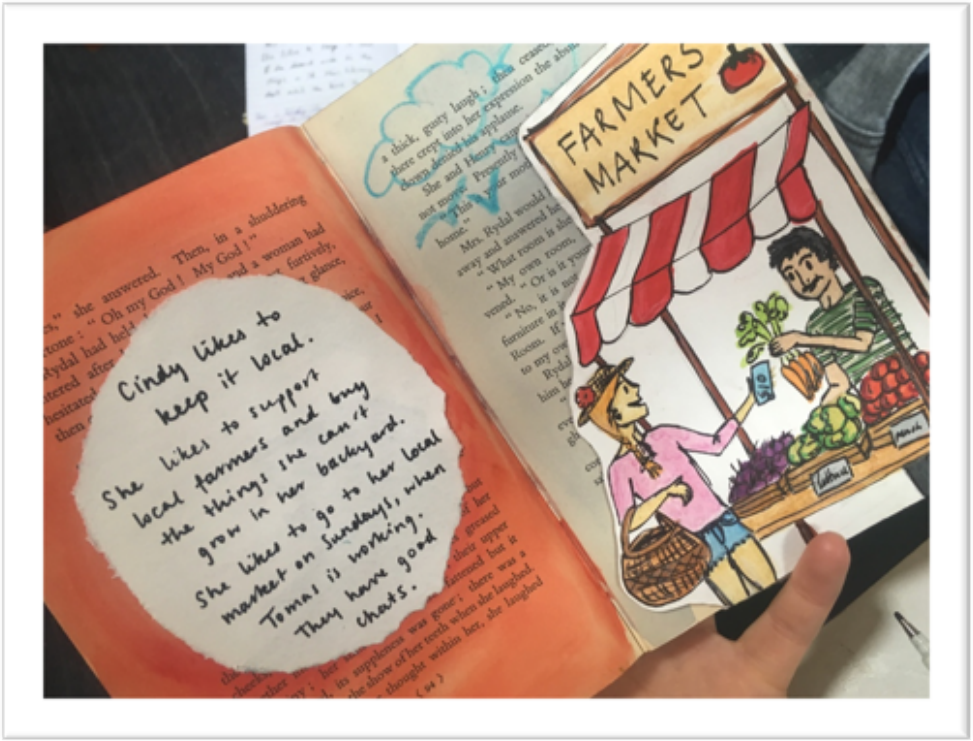
4 Autin, L. (2017). The exploited children who build smartphones in your pocket - Humanium. Retrieved 1 October 2019, from https://www.humanium.org/en/exploited-children-build-smartphones-pocket/

5 Global Slavery Index. (2018). Navigating the Index | Global Slavery Index. Retrieved 29 September 2019, from https://www.globalslaveryindex.org/2018/findings/navigating-the-index/


Back to Contents

**A How to Guide to cut back GH Emissions**

By Monica Holland




I wanted to address the climate crisis above all other sustainability issues because I felt as though it effects all environmental problems, therefore making it the most critical. Climate change is such a global and large-scale issue that it has the power to leave one feeling small and hopeless. These feelings can be amplified when the problem is expressed in an aggressive and negative manner, such as focusing on the overall doom of the planet[1]. The climate crisis is already overwhelming enough as it is, and when it is presented in this way it can cause people to turn away from the problem rather than accept the reality of the consequences. As a result of this, I decided to take a more positive approach and attempt to highlight the changes one can make in regard to greenhouse gas emissions. Instead of telling people what they are doing wrong, I wanted to hopefully give them ideas on what they can do right, and therefore focusing more on solutions rather than the problem. I chose to approach this idea in a positive way using bright colours and animated illustrations. I created a character, Cindy, with the intention for people to make a connection with her and maybe think about how they are like Cindy, or how they could be more like Cindy. The child-like picture book style was used to highlight the simplicity, yet effectiveness, of the steps one can take towards cutting back on their carbon footprint – it just depends on the individual's perspective.

The key ideas which I was attempting to communicate were; what the main contributing emitters are (agriculture, waste, transport, industry, energy) [2], how it relates to us (our lifestyles), what we can do to change our part (as Cindy does) and to highlight the need to stay optimistic in order to face this issue (colourful, playful drawings). I also wanted to communicate that we can't just simply sit around and wait for the government to make changes, but in the meantime make our own changes because we create the demand which is driving this crisis.

Climate change directly relates to multiple sustainable development goals because it is an issue that is affecting the environment on a global scale. The main SDGs include; climate action, zero hunger, good health and well-being, clean water and sanitation, affordable and clean energy, sustainable cities and communities, responsible consumption and production, life below water and life on land [3].

However, it can be argued that the climate crisis relates to all of the sustainable development goals because human society depends on a functioning environment for survival.

Although the book does not call for 'dramatic' changes, it will hopefully make the viewer reflect upon how the issue may be more directly related to them than they thought and that they can be part of the solution with small everyday decisions, reminding them that everything we do essentially effects our environment if not done in a sustainable manner.

**References**


1) McBain, S. (2019, June 5). Should we be practising 'climate change optimism"?. New Statesman. Retrieved from https://www.newstatesman.com/culture/books/2019/06/given-half-chance-edward-davey-review
2) Climate Council. (2018). Australia's rising greenhouse gas emissions. Retrieved from https://www.climatecouncil.org.au/wp-content/uploads/2018/06/CC_MVSA0143-Briefing-Paper-Australias-Rising-Emissions_V8-FA_Low-Res_Single-Pages3.pdf
3) United Nations. (2015). Sustainable development goals. Retrieved from https://www.undp.org/content/undp/en/home/librarypage/corporate/sustainable-development-goals-booklet.html


Back to Contents

**Dinner Time**

By Kailee Wrighton

The drawing that I have created depicts a dinner plate with a steak meal on a table, but also a deteriorating environment with cleared land, paddocks of livestock and farming pollution on one half of the image. It seeks to portray the wicked problem of the resource intensity required in raising livestock for the purpose of meat. The complexities of this issue are often overlooked and are not very apparent to most people. It is because of this that I chose to represent the wicked problem in this way, with two seemingly separate images in one. It demonstrates a connection between two realities, and the consequences that we are facing without most people even thinking about.
Production of meat and other animal products is contributing to climate change and has other substantial environmental impacts[1]. The livestock sector produces greenhouse gases, and it is estimated that it accounts for 14.5% of anthropogenic emissions globally[1]. Livestock being raised for meat require large amounts of land, with forested areas often being cleared and turned over for grazing, and arable land to grow feed for the livestock[2]. This consequence is probably one of the more evident, with a prime example being the clearing of the Amazon Rainforest, where 65% of the deforestation can be attributed to cattle ranching[3]. A consequence probably much less evident to most is the vast amounts of water required in raising livestock and producing meat for consumption. Most of the water required in the process is used to produce the animal feed, with drinking and service water accounting for only 1% [4]. Giving an idea of just how much water is consumed in the process, the global average water footprint of beef is 15400 litres per kg (Water Footprint Network, 2017). This is much higher than that for other animals[4], one of the reasons I chose to include a steak in my drawing.
The problem of intensive resource consumption in production of meat can be linked to multiple of the United Nation's Sustainability Development Goals, including goal 6: clean water and sanitation; and goal 15: life on land[5]. This is evident from the amount of water that is required in the process of

raising livestock and meat production, and the amount of land required for raising the livestock and growing the crops required to feed them. Considering meat consumption and the methods used in raising livestock for meat is therefore an important issue in terms of future sustainability.
I feel that presenting this wicked problem as a drawing is a good way to get people's attention. It is quite colourful and attracts attention at first glance. It is possible to create different images as the piece does not have to conform to any conventions. It appeals to people by presenting something seemingly normal at first glance, with a deeper message upon deeper inspection that draws on emotions to evoke a response and hopefully enlighten the audience and encourage them to review the choices they make throughout their daily lives.

**References**


1 Macdiarmid, J. I., Douglas, F., & Campbell, J. (2016). Eating like there's no tomorrow: Public awareness of the environmental impact of food and reluctance to eat less meat as part of a sustainable diet. *Appetite, 96*, 487-493. Doi: 10.1016/j.appet.2015.10.011

2 Godfray, H. C. J., Aveyard, P., Garnett, T., Hall, J. W, Key, T. J., Lorimer, J., … Jebb, S. A. (2018). Meat consumption, health, and the environment. *Science, 361*(6399). Doi: 10.1126/science.aam5324

3 Recanati, F., Allievi, F., Scaccabarozzi, G., Espinosa, T., Dotelli, G., & Saini, M. (2015). Global meat consumption trends and local deforestation in madre de dios: Assessing land use changes and other environmental impacts. *Procedia Engineering, 118,* 630-638. Doi: 10.1016/j.proeng.2015.08.496

4 Water Footprint Network. (2017). Retrieved from: https://waterfootprint.org/en/resources/interactive-tools/product-gallery/

5 United Nations. *Sustainable development goals.* Retrieved from https://www.un.org/sustainabledevelopment/sustainable-development-goals/


Back to Contents

**Ocean Pollution Albatross**

By Darcy Cluney

The wicked problem I chose to base my creative piece on is ocean pollution, as it is a widespread complex environmental, economic and health issue which does not have a simple solution. There is estimated to be more than 5 trillion pieces of plastic which weighs more than 250,000 tons afloat in the oceans[1]. Marine pollution enters the ocean in a variety of different avenues including littering, sewage, ocean mining, oil spills, agricultural runoff, toxic chemicals, air pollutants maritime transportation with plastic being the most common element found in the ocean today [2]. Ocean pollution can enter the ocean in a variety of ways; it degrades ecosystems and is profoundly harmful to marine life.

100,000 sea mammals and over 1 million seabirds are killed by pollution each year[3]. The impact of marine debris on marine life is a surreal consequence of our collective choice to continue to use and manufacture these materials. There have been hundreds of publications which document encounters between marine pollution and nearly 700 species of marine wildlife, specifically, 95% of 1,295 seabird carcasses in the North Sea contained plastic in their stomachs and 83% of 626 North Atlantic whales examined in 29 years of sighting photographs demonstrate evidence of at least 1 entanglement in rope or netting[4].
I chose to convey *one* of many the impacts of ocean pollution; the effect it is it having on marine life, specifically seabirds. Seabirds are massively impacted, with 39% of 312 species digesting marine debris[5]. Many seabirds feed from the sea and often mistake pieces of debris for food, adult seabirds may unknowingly feed their young with anthropogenic debris collected from the ocean. Ingested debris can have a variety of consequences for the consumer, having a large amount of debris is said to reduce storage capacity in the stomach and to cause false satiation, leading to a reduced appetite; debris can also cause internal injury, such as a perforated gut, ulcerative lesions, or gastric rupture which can lead to death[4]. Plastic ingestion can also impact the physical condition of bird's due to toxin transfers, which can reduce reproduction potential as well as cause mortality[6].

Ocean pollution has many different origins and comes in many different forms, I chose to focus on the impact of marine debris on marine life. Plastic waste affects wildlife via two means: entanglement and ingestion[7]. My focus was ingestion. Seabird ingestion of debris can occur when it is mistaken for food, which can remain in their stomach giving the false sense of being full as well as a variety of internal damage. I feel that my exhibition piece was a good way to communicate the wicked problem of ocean pollution, I was aiming to create a piece that raised a sort of emotion in

the audience. To do that I collected debris from beaches in Perth and aimed to use items found that may be familiar to the audience, as well as used colors and textures on the bird to portray younger chick.

**References**


1 Eriksen, M., Lebreton, L., Carson, H., Thiel, M., Moore, C., & Borerro, J. et al. (2014). Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea. *Plos ONE*, *9*(12), e111913. doi: 10.1371/journal.pone.0111913

2 30 Ocean Pollution Facts That Will Blow Your Mind: Rubicon Blog. (2019, September 12). Retrieved from https://www.rubiconglobal.com/blog-ocean-pollution-facts/.

3 11 Facts About Pollution. (2019). Retrieved 4 October 2019, from https://www.dosomething.org/us/facts/11-facts-about-pollution#fnref4

4 Law, K. (2017). Plastics in the Marine Environment. *Annual Review Of Marine Science*, *9*(1), 205-229. doi: 10.1146/annurev-marine-010816-060409

5 Tavares, D. C., Costa, L. L. D., Rangel, D. F., Moura, J. F. D., Zalmon, I. R., & Siciliano, S. (2016). Nests of the brown booby ( Sula leucogaster ) as a potential indicator of tropical ocean pollution by marine debris. *Ecological Indicators*, *70*, 10–14. doi: 10.1016/j.ecolind.2016.06.005

6 Cartraud, A., Le Corre, M., Turquet, J., & Tourmetz, J. (2019). Plastic ingestion in seabirds of the western Indian Ocean. *Marine Pollution Bulletin*, *140*, 308-314. doi:10.1016/j.marpolbul.2019.01.065

7 Wilcox, C., Van Sebille, E., & Hardesty, B. (2015). Threat of plastic pollution to seabirds is global, pervasive, and increasing. *Proceedings Of The National Academy Of Sciences*, *112*(38), 11899-11904. doi: 10.1073/pnas.1502108112


Back to Contents

**One Pair of Jeans**

By Nicole Maher


This piece seeks to raise awareness about the fast fashion industry and the detrimental impacts this lucrative business has on the environment and people, while dually encouraging the audience to think about their own fashion habits. Fast fashion is defined by low-cost, low-quality items that move quickly from consumer to landfill[1, 2] and usually has environmentally degrading impacts[3]. Using an old pair of jeans as my canvas, I have chosen to display various statistics about the fast fashion world, primarily with regard to environmental effects. I have chosen this medium because it is unusual and I feel that the piece has a shock factor and will encourage the audience to rethink their choices surrounding textile consumption.

The issues that arise from the fast fashion industry impede on numerous Sustainable Development Goals, including Goal 8 (Reduced Inequalities), Goal 12 (Responsible Consumption and Production), Goal 14 (Life Below Water) and Goal 15 (Life on Land).

This multi-faceted issue is particularly prevalent in Australia. The annual average consumption of new clothing is 27kg per Australian, making Australia the worlds second largest textile consumers[4]. Additionally, 6,000kg of textiles are landfilled or incinerated every 10 minutes in Australia[5]. I chose to display these two statistics because the audience, as Australians, can relate to them. They are also quite surprising, which I believe will aid in the reshaping of the audiences view about fast fashion.

Fast fashion is a global issue, not an isolated one. Governed by cheap labour, primarily sourced from the exploitation of female workers (who account for 80% of the clothing industry workforce)[6] in the developing world, production costs are kept at a low. Due to the lack of regulations and laws surrounding workplace safety, what results is horrendous working conditions. Long hours, no

security benefits, low wages and abuse, often characterised by assault and even fatal incidents at the workplace[6, 7]. In 2013 the minimum wage for Bangladeshi garment workers was raised to 5,300 taka per month[8], which equates to approximately $3AUD per day. These abhorrent conditions are merely a result of the insatiable textile consumption of the developed world, and I believe there is little light shone upon these problems, which deserve to be heard.

Furthermore, the fast fashion industry is extremely draining on the earth's finite resources, especially water. Contamination from chemicals during the production process[9], microfibre pollution from washing these poor-quality garments[10] and the large amounts of water required (e.g, 10,000L water needed to grow 1kg of cotton, enough to make 1 pair of jeans) all have harmful consequences for global water security[9]. The detrimental impacts that fashion has on the environment is also highlighted through the 70 million trees that are felled annually to make clothes and that the fashion industry accounts for 10% of global greenhouse emissions[9].

Fast fashion is a complex, global issue that requires changes in consumer habits if we are to protect the social well-being of individuals and protect the environment.

**References**


1. Sull, D., & Turconi, S. (2008). Fast fashion lessons. *Business Strategy Review*, *19*(2), 4-11.

2. Claudio, L. (2007). Waste couture: Environmental impact of the clothing industry

3. Ben-Eli , M.U. (2018) . Sustainability: Definition and five core principles, a systems perspective. *Sustainability Science* (13)5, 1337-1343. doi:10.1007/s1125-018-0564-3
4. Liu, M. (2019). For a true war on waste, the fashion industry must spend more on research. [Internet]. [Cited 2019 October 2]. Available from from http://theconversation.com/for-a-true-war-on-waste-the-fashion-industry-must-spend-more-on-research-78673
5. Australian Waste Statistics from ABC's War On Waste (2019). Same-Day Rubbish Removal. [Internet]. [Cited 2019 October 2]. Available from https://www.samedayrubbishremoval.com.au/War-On-Waste-Statistics.php
6. Chua, JM. The environment and economy are paying the price for fast fashion - but there's hope. [Internet]. [Cited 2019 October 2]. Available from https://www.vox.com/2019/9/12/20860620/fast-fashion-zara-hm-forever-21-boohoo-environment-cost
7. Ahmed, N., & Peerlings, J. H. M. (2008). Addressing workers' rights in the textile and apparel industries: consequences for the Bangladesh economy. *World Development, 37(3). doi:* 10.1016/j.worlddev.2008.06.003
8. Clean Clothes. (2018). Full support for Bangladeshi garment workers' demands on minimum wage. [Internet]. [Cited 2019 October 2]. Available from https://cleanclothes.org/news/2018/07/06/full-support-for-bangladeshi-garment-workers2019-demands-on-minimum-wage
9. Rakib. M. I., Saidur, R., Mohamad, E. N., & Afifi, A. M. (2016). Waste-heat utilization - The sustainable technologies to minimize energy consumption in Bangladesh textile sector. *Journal of Cleaner Production, 142*. doi: 10.1016/j.jclepro.2016.11.098
10. Pirc, U., Vidmar, M., Mozer, A., & Krzan, A. (2016). Emissions of microfiber fleece during domestic washing. *Environmental Science And Pollution Research*, 23(21), 22206-22211. doi: 10.1007/s11356-016-7703-0


Back to Contents

**Plan Bee**
(Amanda Curci)

My exhibition piece (images below) focusses on the wicked problem of declining bee populations. Bees are essential to human life, creating a global annual economic value of $500 billion[1], encouraging plant growth, with 35% of human consumption dependant on pollination[2], and environmentally, bees allow ecosystems to thrive, pollinating the flora that fauna either consume or live within. Bee populations currently face threats that include climate change, pesticide use and habitat loss due to agricultural clearing[1].

My piece identifies these threats and depicts a model bee standing upright on 'hot' pebbles, as its natural floral habitat has been cleared for agricultural use. These pebbles appear to be 'oozing' at their seams (due to use of hot glue) showing that the Earth beneath is dangerously heating due to climate change, harming the bee. The bee also holds a flower constructed from wire and tissue paper, showing the flimsy nature of the bee's unsatisfactory protection. The flower represents an umbrella that the bee must use to shield itself from pesticides with.

Statistics show a 20% mortality rate in honey bees in North America and Europe over past winters[3], so change *must* happen immediately in order to restore bee populations. Some solutions include bee-friendly agricultural practices, education and research into invasive plants/animals/chemicals to minimise threats[4]. For these solutions to be possible, humans must take a moral responsibility to induce this change.

**My model features the bee "hand"cuffed and holding a letter into the air, as if trying to hand it to viewers**. These two elements work together to represent the Letter from Birmingham Jail which

Martin Luther King Jr. penned while in jail (hence the handcuffs) prompting individuals to accept moral responsibility to take action in pivotal situations[5]. This element is crucial to the intention of my exhibition piece; that we have a moral responsibility to save bee populations. The letter reads "Plan Bee" – to communicate it's message in a more direct sense; a take on the phrase 'Plan B'.

By handing the letter to viewers, it is assumed it contains a cry for help as conveyed through the bee's facial expression (eyes angled sadly upward), as conservation methods are thwarted by lack of data, which is why education efforts aim to increase knowledge of bee identification and taxonomy[6]. By doing this, population genetics can be more widely gathered and understood and can help prevent Colony Collapse Disorder (CCD) where bee immune systems collapse, leading to contagious infections and whole colony deaths[2]. CCD is so far attributed to use of pesticides, however, more data is needed to confirm this.

In these ways, my exhibition piece depicts the issue of bee population decline; a growing wicked problem that has significant impact on all forms of life, including economic, social and environmental impacts on human life. By addressing this issue, we will work towards achieving the United Nation's Sustainability Development Goals[7] of Good Health and Well-being (Goal 3), Sustainable Cities and Communities (Goal 11), Responsible Consumption and Production (Goal 12), Climate Action (Goal 13), and Life on Land (Goal 15).

**References**


1 Home. (2019). Retrieved 21 September 2019, from http://sos-bees.org

2 Stindl, R., & Stindl, W. (2010). Vanishing honey bees: Is the dying of adult worker bees a consequence of short telomeres and premature aging?. *Medical Hypotheses*, *75*(4), 387-390. doi: 10.1016/j.mehy.2010.04.003

3 Situation. (2019). Retrieved 21 September 2019, from http://sos-bees.org/situation/

4 Brown, M., & Paxton, R. (2009). The conservation of bees: a global perspective. *Apidologie*, *40*(3), 410-416. doi: 10.1051/apido/2009019

5 *Letter from Birmingham Jail* (1963). [Ebook]. Retrieved from https://web.cn.edu/kwheeler/documents/Letter_Birmingham_Jail.pdf

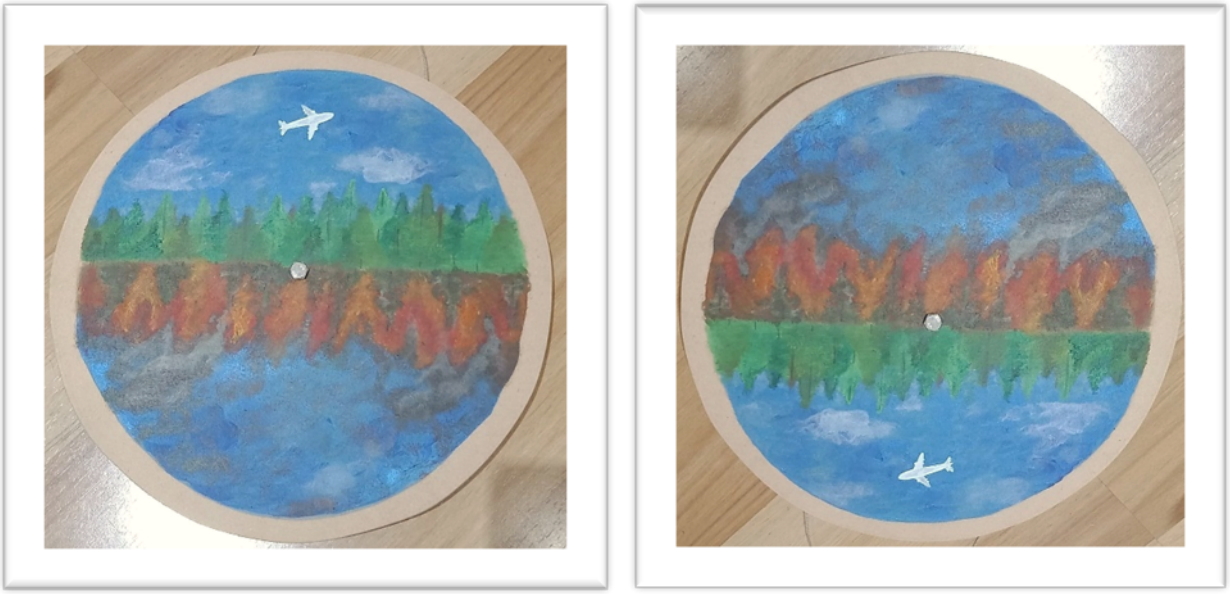
6 Greenpeace (2013) *Bees in Decline*. Amsterdam: Greenpeace. Retrieved from http://sos-bees.org/wp-content/uploads/2014/04/BeesInDecline.pdf

7 About the Sustainable Development Goals - United Nations Sustainable Development. (2019). Retrieved 4 October 2019, from https://www.un.org/sustainabledevelopment/sustainable-development-goals/


Back to Contents

**The Upside Down: Flying as a Wicked Problem**

By Lydia Ellwood



*Interactive, rotating painting with the two realities of flying: the left being what we experience and the right being what impact this transport has.*

Globalisation has caused an increase in world interconnectedness, with cultures, people and produce circling the Earth in their millions every day. From the invention of the first airplane by the Wright brothers in the early 1900's, this form of transportation in contemporary society has become of paramount importance, with over 4.4 billion people carried across the globe in 2018[1]. 65 million people rely directly and indirectly upon the aviation industry, with engineering of planes, airports, control and global handling of goods[2].

With the importance of flight in mind I wanted to prompt audiences to imagine the number of airplanes in the air around the globe and how much this can affect the climate with every time they witness a plane flying overhead. "The Upside Down", as the creative piece is called, shows an image of a plane flying above forest, and on the "Upside Down" or 'flipside' that same forest engulfed in fire. "The Upside Down" is a pop culture reference to the Television series 'Stranger Things'. In the series' world, there are two alternate dimensions, the real world and the "Upside Down", which is a dark and horrifying reflection of reality[3]. With this culturally relevant and interactive piece, the audience can rotate the picture to show either the 'normal' image of a plane flying over forest, or the terrifying image of that same forest burning due to global warming, the "Upside Down." I wanted to dramatize the image to shock the audience and perhaps cause change to their thinking or behaviour, as all individuals can have an impact on the climate and carbon emissions.

In 2018 alone, over 895 million tonnes of carbon was emitted by the aviation industry worldwide, and 22 million was produced by Australia's aviation industry in 2016[2,4]. Aviation contributes 2% of all human-induced carbon (CO2) emissions, enhancing the greenhouse gas effect and causing warming of the Earth [2]. Anthropogenic climate change is the largest issue facing Earth and humanity today. As such, this art piece addresses Climate Action, the United Nations 13th Sustainable Development Goal[5]. Global emissions of CO2 have increased by close to 50% since 1990, oceans are warming and expanding and global biodiversity and food security is decreasing as the surface temperature of the Earth rises towards 1.5˚C[6].

With unchecked climate change comes the risk to lives, property and every ecosystem on the planet becoming effected. The Earth's temperature has already increased 1˚C above Pre-Industrial baseline

temperatures causing an increase in frequency and intensity of natural disasters and extreme weather events[5]. The intense forest fire depicted in this piece reflects the alternate but truly imminent reality of climate change and the contribution of aviation emissions to loss of biodiversity and life. An estimated 1.3 million lives were lost between 1998 and 2017 due to climate related disasters[6]. This piece aims to address the audiences conscience in their choices in airplane travel by evoking sympathy and understanding for those that are impacted by climate change disasters.

**References:**


1 Wright Brothers Aeroplane Company. 2010. *A History of the Airplane.* http://www.wright-brothers.org/History_Wing/History_of_the_Airplane/History_of_the_Airplane_Intro/History_of_the_Airplane_Intro.htm

2 Air Transport Action Group. 2018. *ATAG Facts and Figures.* https://www.atag.org/facts-figures.html

3 Bigmouse. 2016. "An in-depth analysis of 'Stranger Things.'" *Baker Brother Tv.* http://bakerbrothertv.com/2016/08/21/stranger-things-analysis-review/

4 Australian Government. Department of Infrastructure, Transport, Cities and Regional Development. 2019. *Aviation.* https://www.infrastructure.gov.au/aviation/environmental/emissions/index.aspx

5 United Nations. 2019. *About the Sustainable Development Goals.* https://www.un.org/sustainabledevelopment/sustainable-development-goals/

6 The Intergovernmental Panel on Climate Change. 2018. *Global Warming of 1.5˚C*. https://www.ipcc.ch/sr15/


Back to Contents

**Global Waming**
by Sundas Bi Bi

The earth releases natural greenhouse gases such as nitrous oxide, carbon dioxide and methane into the atmosphere. However, the human activities in this industrial revolution have increased the number of greenhouse gases, mostly carbon dioxide, into our atmosphere as pollution[1]. The effect of human-made Carbon dioxide pollution and all of the other extra amounts of greenhouse gases on earth traps the heat from the sun which causes the planet's oceans and surfaces to be warm[1]. This is known as global warming. This wicked problem also impacts the earth's climate patterns that affect the oceans, climate, and ecosystems.

**Consequences**

Climate change has become a global issue in the 21st century as it was recorded as the warmest period since 1880. Comparing to pre-industrial levels, in 2015, the temperature of the earth was recorded as warmed by 1°C [2]. The high heat is:

- **Melting sea ice and glaciers:** Ice is continuously melting worldwide including the West Antarctica and Greenland ice sheets covering, arctic sea ice and the mountain glaciers[3]. In 1910 there more 150 glaciers in Montana's Glacier National park but now there are less than 30.
- **Rising seas:** The high speed of melting ice directly contributes to the rise in sea levels. Around 3.2 mm of global sea levels are raised each year and the speed of the sea level rises is also increasing each year[4].
- **Changing precipitation patterns:** The amount to snowfall and rain has increased which has led to increasing wildfires, drinking water shortage and lost crops ("Global Warming Effects", n.d.).
- **Affecting wildlife and their habitats:** The animals are struggling to survive in their own habitat due to the heat vanishing ice. The animals such as Adelie penguins, foxes, butterflies, all have moved to north and cooler areas to survive[5].

**Solutions**

We should put an effort to keep the earth's temperature below 1.5°C to avoid any long term effects[6]. In order to do, we need to "Tackle climate change"[7]:

- Make use of renewable energy and use the energy system that is less dependent on fossil fuels or coal.
- Have limitations to the amount of carbon that polluters are allowed to emit.
- Build efficient energy industries, technologies, and approaches to have a clean energy economy.
- Measure vehicle fuel efficiency to reduce oil use.

- Decrease tropical deforestation as it involves 10% of worlds heat-trapping emissions

**3D art work**

I used ice cream on a cone to grab people's attention to something everyone will be familiar with. The audience will feel a sudden realization that no flavour in the world looks like the earth melting. I coloured the contents with brown and black shades to show the human activities and industrial revolution effects on earth from distance. Earth melting will help audience visualise what exactly global warming is doing to earth.

Representing global warming with ice cream cone is innocently powerful as it sends the first message to stop the dripping and clean it up. I wanted the audience to feel the urge to save the earth by being frustrated by its dripping and take action in stopping the melting of ice caps and clean up pollution.

**References**


1 Hopwood, N., & Cohen, J. (2008). Greenhouse Gases and Society. Retrieved 4 October 2019, from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.510.8971&rep=rep1&type=pdf

2 Przyborski, P., & Levy, R. (2010). World of Change: Global Temperatures. Retrieved 4 October 2019, from https://earthobservatory.nasa.gov/world-of-change/DecadalTemp

3 Greenland and Antarctic ice sheets. (2016). Retrieved 4 October 2019, from https://www.eea.europa.eu/data-and-maps/indicators/greenland-ice-sheet-3/assessment

4 Meehl, G. (2005). How Much More Global Warming and Sea Level Rise?. *Science*, *307*(5716), 1769-1772. doi: 10.1126/science.1106663

5 Global Warming Effects. Retrieved 4 October 2019, from https://www.nationalgeographic.com/environment/global-warming/global-warming-effects/

6 Allen, M.R., O.P. Dube, W. Solecki, F. Aragón-Durand, W. Cramer, S. Humphreys, M. Kainuma, J. Kala, N. Mahowald, Y. Mulugetta, R. Perez, M. Wairiu, and K. Zickfeld, 2018: Framing and Context. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

7 Tackle climate change. Retrieved 4 October 2019, from https://www.natureaustralia.org.au/what-we-do/our-priorities/tackle-climate-change/?gclid=CjwKCAjw29vsBRAuEiwA9s-0B1dVwim9ubLx9FaOYJSh82oMUDHGFEp6sC8GtMdAYBeqMlsVCLaCyBoCPDcQAvD_BwE


Back to Contents

**The Environmental Crisis in your Wardrobe**

By Julie Morrissey


***"There's a problem growing in the world's waterways, and it's coming from an unexpected place: your wardrobe!"***

The entire production process of the Fast fashion industry, right through to the high disposal rate of the end product, is both socially and environmentally harmful[1]. The fashion industry has an underestimated impact on the planet; however this was too challenging to represent and communicate in one art piece. Therefore this art piece was created with a focus on the environmental impact of water pollution through the use of toxic chemicals to colour clothes. The art piece communicates the problem of contaminated lakes and rivers by wastewater runoff from the textile factories. The use of the Barbie doll wearing the world globe as part of her dress was to highlight the effect of what people are wearing is having an impact on the world. Everyone is partly responsible as people are influenced by magazines and advertisements; making the latest fashions highly sought after[2]. Fast fashion is aimed at women; by offering specials and sales to ensure the consumer's closet is always full, which are represented by the full shopping bags in the art piece [3].

Fast fashion focuses on delivering the latest trends at affordable prices, yet globally textile dyeing is one of the largest polluters of clean water[4]. Through the pressures to reduce the production costs most of the manufacturing has been outsourced to developing countries throughout Asia[5]. However, most of this is achieved through the use of toxic chemicals, where many of the rivers have been destroyed through the unregulated textile industry[4]. There are many harmful dyes used in the production of textiles which are causing a serious threat to the environment[6]. The vibrant colours portrayed at the back of the dress represent the colourful fabric finishes that are an appealing feature of fashion[6]. These bright fabrics stem from the countries on the globe to show the worst areas of waterway degradation from textile dyeing.

Many of the chemicals used in the dying process are toxic to the aquatic environment and can be passed up through the food chain and eventually to mankind[7]. The warning signs in the back of the art piece represent how toxic the chemicals are; not just to fish but also humans. Sustainable Development Goal six calls for clean water for all, yet through the increase of mass produced inexpensive fashions the waterways are being destroyed[4].

There is a need to drive environmental reforms to stop the toxic destruction of the natural environment. There are many opportunities to make changes in the manufacturing process practices; action is required to remove toxic chemicals from the apparel supply chains[8]. Not only radically change the production systems but also consumer consumption patterns[9]. Consumers need to make better purchasing decisions and ensure they are buying products that don't harm the environment.

The art piece can be used to overcome people's disconnection from what is happening in other parts of the world and the part they play in this. This piece of art was created to raise awareness of fashion and its negative impact on the environment. The art piece represents one element of the environmentally destructive practices of fashion: rivers and lakes being contaminated by wastewater from the textile industry. People who look at this piece of art can hopefully go away and think more about this issue and shift their perspective to make more informed fashion choices in the future.

**References**


1 Kaisa, Vehmas, Anne Raudaskoski, Heikkilä Pirjo, Ali Harlin, and Mensonen Aino. 2018. "Consumer Attitudes and Communication in Circular Fashion." *Journal of Fashion Marketing and Management* 22 (3): 286-300. doi:http://dx.doi.org.libproxy.murdoch.edu.au/10.1108/JFMM-08-2017-0079.

2 Bhardwaj, Vertica and Ann Fairhurst. 2010. "Fast Fashion: Response to Changes in the Fashion Industry." *The International Review of Retail*, Distribution and Consumer Research 20 (1): 165-173.

3 Bruce, Margaret and Lucy Daly. 2006. "Buyer Behaviour for Fast Fashion." Journal of Fashion Marketing and Management: *An International Journal* 10 (3): 329-344.

4 Greenpeace. 2018. "Destination Zero: seven years of Detoxing the clothing industry." https://www.greenpeace.org/international/publication/17612/destination-zero/.

5 Sull, Donald and Stefano Turconi. 2008. "Fast Fashion Lessons." *Business Strategy Review* 19 (2): 4-11.

6 Perry, Patsy. 2018. "The Environmental Costs of Fast Fashion." The Independent (Online). https://www.independent.co.uk/life-style/fashion/environment-costs-fast-fashion-pollution-waste-sustainability-a8139386.html

7 Hossain, Laila, Sumit Kanti Sarker, and Mohidus Samad Khan. 2018. "Evaluation of Present and Future Wastewater Impacts of Textile Dyeing Industries in Bangladesh." *Environmental Development* 26: 23-33.

8 Desore, Anupriya and Sapna A. Narula. 2018. "An Overview on Corporate Response Towards Sustainability Issues in Textile Industry." *Environment, Development and Sustainability* 20 (4): 1439-1459.

9 Schipani, Sam. 2019. "The Environmental Cost of Your Clothes." https://hellohomestead.com/the-impact-of-textiles-and-clothing-industry-on-the-environment/


Back to Contents

**Green Renewable Energy Building**

By Bill Riches

A green building or sustainable building, is a structure that is designed, built and operated in an ecological and resource efficient manner. Similarly, to the sustainable development maxim, we can frame the purpose of a Sustainable building as "meeting the housing and infrastructure requirements of today, without compromising the earth's resources that will be available for future generations". With high rates of urbanisation, population growth and the sustainable development objectives such as climate change mitigation and adaptation, conservation and enhancement of biodiversity, energy consumption and efficiency[1]. Improved energy efficient, renewable energy solutions and ambitious green vegetation approaches offer great potential in dealing with these challenges. By addressing these challenges in this way, we are engaging in environmental stewardship with social responsibility, economic and energy efficiency. This piece focuses on the concept of combining renewable energy and a green roof on residential housing. The motivation was to challenge our energy consumption patterns, water use and emissions of greenhouse gases with green and renewable energy solutions[1]. According to the *Deadline 2020* report (ARUP & C40 Cities 2016) enhancing the energy efficiency of buildings has the potential to improve local economic development, air quality, and public health but is also one of the fastest and most cost-effective ways of reducing carbon emissions[2, 3].

The largest surface area on the house is dedicated to a green roof, green walls, vegetation beds and a green house. The main advantages to greening a house would be it can absorb rainwater, provide insulation, create a habitat for wildlife[4], help to lower urban air temperatures and mitigate the heat island effect. In terms of energy efficiently, greening can improve and reduce energy consumption[6]. An additional environmental benefit of greens roofs is the ability to sequester carbon. The second part of the house is the use renewable energy technology. The two renewables in the house are solar panels and a wind turbine. Wind turbines are usually away from urban environments due to the noise and motion of the turbines, more aerodynamic wind generators are being developed and show promise in overcoming wind turbulence and noise problems in urban use. Both wind and solar PV can be used individually or together[1].


The two main sustainable goals I have concentrated on are Goals 7 and 13 of the sustainable development goals, affordable and clean energy and climate action. In order to reach SDG 7 by 2030, bettering energy productivity by investment in wind, solar, and thermal power is critical. Likewise, the need to improve infrastructure and upgraded technology to provide clean and more efficient energy. The transition to achieving SDG 13 is further assisted by changes heading towards people turning to renewable energy and a range of other measures to reduce emissions and increase adaptation efforts. Standalone technology advancements may not represent a larger form of a wicked problem, however, if we can understand the principles behind energy efficiency, energy management, and energy policy programs as technology-related and process-related improvements, then collectively, it presents a case as strong forms of wicked problems[5]

Reference:

1. Zuo, Jian & Zhao, Zhen-Yu. (2014). Green building research–current status and future agenda: A review. Renewable and Sustainable Energy Reviews. 30. 271–281. 10.1016/j.rser.2013.10.021.
2. Becqué, R. et al., 2016. *Accelerating Building Efficiency: Eight Actions for Urban Leaders*, Available at: http://publications.wri.org/buildingefficiency/#sec2 [accessed on 21 December 2016].
3. ARUP & C40 Cities, 2016. *Deadline 2020: How cities will get the job done*, Available at: http://www.c40.org/researches/ deadline-2020
4. Vandermeulen, Valerie; Verspecht, A.; Vermeire, B.; Van Huylenbroeck, G.; Gellynck, X. (30 November 2011). "The use of economic valuation to create public support for green infrastructure investments in urban areas". *Landscape and Urban Planning*. **103** (2): 198–206. doi:10.1016/j.landurbplan.2011.07.010.
5. Thollander, P.; Palm, J. *Improving Energy Efficiency in Industrial Energy Systems: An Interdisciplinary Perspective on Barriers, Energy Audits, Energy Management, Policies, and Programs*; Springer Science & Business Media: Berlin, Germany, 2013.
6. Li, W. (2013). A scenario planning approach for school green roofs to achieve stormwater management benefits: A case study of Brier's Mill Run Subwatershed

Back to Contents

**Time is Running Out on Water Security**

by Alice Mckinnon

The wicked problem portrayed in the exhibition piece "Time is Running Out on Water Security" is the impending water security crisis driven by the unsustainable use of the limited resources of freshwater. The centrepiece is a large hourglass filled with stones to represent water falling through it. The stones are staged to have the hourglass in motion demonstrating that while there is an impending water security crisis, there is also still time remaining in which to mitigate its impact by transitioning to more sustainable water usage. Around the edge of the piece are six eco-pots which display an everyday item and a label disclosing how much water it takes to make this item. These are designed to shock the viewer and stimulate thought of making more sustainable choices as a consumer. Overall the aim of this piece is to draw attention to the importance of conserving water and the greater impact that common consumer products have on water consumption.

Of all the water on earth, only 2.5% is freshwater but most of that is unavailable. Of this 2.5%, 30% is groundwater and only 1.2% if surface water. Of this 1.2% approximately 21.5% is found in lakes and rivers[1]. These figures are hard to envisage on a global scale but the underlying message is clear; available freshwater is a scarce resource. In today's fast-paced, consumer driven society mass production of goods is rife but more importantly it is expected. Consumers expect to be able to go into any given store and buy any given good at any time, and few people think about the journey of that product from raw material to the product you purchase at the counter. Every product has an environmental footprint which is generally far larger than one would expect, especially when it comes to the water footprint. The water footprint is the amount of water that was required to produce this product and the reality of it can be staggering, for example, one kilogram of beef can take over fifteen thousand litres of water to produce, most of which is through the water used to grow the livestock feed. Another example is cars, it can take fifty-two thousand litres of water to

manufacture a car. These water footprints become important to consider when the amount of freshwater available is dwindling.

80% of the world's population is a high risk of threat to their water security[2]. An ever-increasing population means that demand for food will continue to rise, with the global agricultural output estimated to increase 70% by 2050 to meet global demand[3].

The sustainable development goals involved in this wicked problem are displayed below and include clean water and sanitation as well as responsible consumption and production.


**References**

1 Shiklomanov, I. (1993). World fresh water resources. In P. H. Gleick (Ed.), *Water in Crisis: A Guide to the World's Fresh Water Resources*. New York: Oxford University Press.

2 Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., . . . Davies, P. M. (2010). Global threats to human water security and river biodiversity. *Nature, 467*(7315), 555-561. doi:10.1038/nature09440

3 Wheater, H. S. (2019). Delivering Water Security in a Changing World. *The UNESCO Courier, 1*.

Back to Contents

**Mother Earth Provides**
by Brielle Clark


My creative project was inspired by a combination of the film Moana and by a quote by Mahatma Gandhi to create a scene that would present my wicked problem which is the use of non-renewable energies juxtaposition against renewable energies and showing the effects that they have on the earth. The quote from Mahatma Gandhi that had inspired me to think was "*The Earth provides enough to satisfy every man's need, but not every man's greed* "[1]. The way that I interpreted this quote was that the earth has provided us with energy sources that are clean, renewable and plentiful but due to greed we have continue to use non-renewable energy sources that are polluting the world and will eventually become completely depleted.

The 2016 film Moana[2] was used as a base for my project as the film had two characters that were in my opinion the best representations of what mother earth would be like. The two characters were Ti Fiti and Te Ka and both were used as inspiration for my project as Ti Fiti is a Polynesian goddess with the power to create life and provide for humanity and the demons Te ka  who seeks to bring death and corruption to humanity, in the belief that man is undeserving of the gifts given to them by Te Fiti.

I believe showing the contrast of renewable energy and the positive impacts that is has on the Earth as compared against non-renewable energies and the negative impacts that they have is the best way of bringing the wicked problem to attention.

The intention of my project was to show a clear contrast of the two types of energy sources that are available for human use that being renewable energies such as solar, wind, biomass, hydropower and geothermal and the non-renewable energies like fossil fuels, coal, petroleum and natural gases. I also tried to show the consequences that the continued use of non-renewable energy sources will have on the earth that being pollution, the heating of the earth and death as compared to renewable energies that are exponentially better for the world and will decrease greenhouse gas emissions quite significantly.

If we were to switch from non-renewable to renewable energy sources four of the seventeen sustainable development goals[3] will be achieved to an extent. That being number 3; good health and well-being, with more energy available and Less pollution produced, resulting in better health and well-being all round, number 7; affordable and clean energy that is the use of renewable energies that are extremely clean and better for environment, number 11; improving the sustainable development of cities, that means less pollution produced per city and no shortage of energy as it is renewable and number 13; climate action, with the use of renewable energies resulting in significantly less pollution being produced overall.

**References**


1 Mahatma Gandhi

2 Osnat Shurer (Producer), Ron Clements & John Musker (Directors). (2016). Moana [Motion Picture]. USA: The Walt Disney Company.

3 SDGs .:. Sustainable Development Knowledge Platform. (2019). Retrieved 4 October 2019, from https://sustainabledevelopment.un.org/sdgs


Back to Contents

**Action for Climate Change**

By Hyuga Ichikawa

The wicked problem that I have chosen is climate change. Human induced activities such as the burning fossil fuels, deforestation, and agricultural production, are major cause of climate change. These activities are responsible for the increase in CO2, and other greenhouse gases. The increase in CO2 and other greenhouse gasses makes it difficult for the solar radiation hitting Earth to escape, which in turn keep the heat in the atmosphere and raise the temperature of the Earth's surface[1]. This issue is extremely complex because it requires cooperation from every single country in order to deal with this issue, and there is no single and simple solution to it. United Nation has included "climate action" in Sustainable Development Goals (SDGs) as no.13. Its general target is "take urgent action to combat climate change and its impacts." Its target in relation to my intention of this assessment would be no.13.3 which is "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning." [2]

I personally enjoy taking pictures, so I have come up with the combination of the creative art assessment and what I am passionate about, which is mosaic photography. I have decided to choose Greta Thunberg, who is a prominent environmental activist, for my main photo. The reason why I have chosen her is that I wanted to appreciate the work that she has been doing, and wanted people who looked at my work to engage more in current environmental movements spreading around the world. The photos that consists of her portraits are all related to climate action at some point. For example, using paper strews, reusable bags and cups will help to reduce the use of amount of plastics. Taking public transportation or bicycle can enables to mitigate the CO2 emission. I believe that everyone can relate to those photos because they are daily practices that individuals can do and start doing immediately. I have also travelled to wind power farm which called. Wind energy is an electricity generated by harnessing the power of wind, which is sustainable and clean energy. Wind power plays an important role to produce electricity as an alternative to burning fossil fuels which has the significantly adverse impacts on climate change. In 2018, Australian's wind farms generated 33.5 percent of the nation's clean energy and accounts for 7.1 percent of Austrian's overall

electricity supply[3]. If short, by putting those photos, it can insist on needs for climate actions that individual can do, and inform people of how to approach and contribute to climate actions even if they are small actions. By putting Greta Thunberg as a main photo, it raises the awareness of the current situation of the environmental movements taking place around the world.

**References**


1 Earth Hour. 2019. *What is climate change: the climate of a region is its average or typical weather over a reriod of time.* https://www.earthhour.org.au/discover/what-is-climate-change

2 United Nations. *Sustainable Development Goal 13: Take urgent action to combat cimate change and its impacts.* https://sustainabledevelopment.un.org/sdg13

3 Clean Energy Council. 2018. *Wind.* https://www.cleanenergycouncil.org.au/resources/technologies/wind


Back to Contents

**Who Killed the Earth?**

by Lily Robertson


The piece I have made is entitled 'Who Killed the Earth?'. It is a version of the board game Cluedo where instead of working out who was the murderer, we can work out who killed the Earth and with what. This focuses on the current major factors that are contributing to climate change, but also largely how climate change is a global issue that not just one country can solve, but in fact requires each country to assess their own impact and work together to combat climate change. My project piece can be seen in figure one.

The main anthropogenic causes of climate change, or the biggest factors influencing the increasing speed of which it is occurring are displayed in my project[1]. These include non-renewable energy, greenhouse gas emissions, mining, deforestation, pollution, transport emissions[2], agriculture as well as climate change deniers[4]. Greenhouse gas emissions that are released through the burning of non-renewable energy sources such as fossil fuels are the main drivers of climate change[5]. The countries that I have included in my project are the USA, China, Russia, India, Australia, Japan, Germany, Brazil, and Indonesia. All of these countries have significant and different negative impacts on the Earth. While all of these countries have major issues with greenhouse gas emissions and the use of non-renewable energy, each country also contributes to climate change in ways unique to themselves. For example, in Brazil another devastating factor effecting climate change is deforestation that occurs in the Amazon Rainforest[3]. In Indonesia there is a significant issue surrounding rubbish pollution due to the vast amount of recycling plants across the country where rubbish is often not properly recycled and ends up either polluting the villagers or the ocean. Australia has major issues regarding its agricultural and mining industries, with agriculture causing the clearing of land and the depletion of ecosystem services, and mining also causing major issues with land clearing and the health of the surrounding environment. Not to mention that many of the mines that have opened in Australia are coal mines leading to even more fossil fuel burning[5].

I have also included the figureheads and influential leaders of the countries that I have included, as boardgame characters, that have the power and the potential to change the practices and policies that these countries currently have in place.

My project highlights the importance of how countries need to recognise the anthropogenic issues they have that lead to increased effects of climate change, but then work together to come up with a solution that rather than sitting around pretending they do not have any issues but instead blaming others.

**References:**


1. Baum, S., Haqq-Misra, J., & Karmosky, C. Climate Change: Evidence of Human Causes and Arguments for Emissions Reduction. *Science and Engineering Ethics.* 2012;18(6): 393-410.
2. Chapman, L. Transport and climate change: a review. *Journal of Transport Geography.* 2007;15(9): 354-367.
3. Loiselle, B., Graham, C., Goerck, J., & Ribeiro, M. Assessing the impact of deforestation and climate change on the range size and environmental niche of bird species in the Atlantic forests, Brazil. *Journal of Biogeography.* 2010;37(7): 1288-1301.
4. NSW Department of Planning,Industry, and Environment. Causes of climate change. Adapt NSW; [cited 2019 Oct 1]. Available from: https://climatechange.environment.nsw.gov.au/About-climate-change-in-NSW/Causes-of-climate-change
5. Sommer, A. Burning Fossil Fuels: Impact of Climate Change on Health. *International Journal of Health Services.* 2016;46(1): 48-52.


Back to Contents

**Fading Hope**
By Sam Burges


"Probably the most visible example of unintended consequences, is what happens every time humans try to change the natural ecology of a place." Margaret Wheatley [1]

How can we meet the necessity of protecting the precious orangutan population and their habitat with the current demand of natural resources for humans? This is the focused wicked problem at hand, however, my visual poster of an orangutan fading away is aimed at the consequence of this wicked problem, which is the loss and endangerment of orangutans as a result of human activity. By focusing on this loss, this project directly correlates to the 15th sustainable development goal, 'Life on Land'[2], with biodiversity loss being the main focus.

The threat to orangutan populations is revealed in one study between 1999 and 2015, showing numbers of over 100,000 Bornean orangutans being lost in this time frame[3]. This is supported by another study which shows a decline in the orangutan population in Borneo by 25% in the past 10 years.[4] A loss this great needed a project that directly reflected this loss in a visual and creative way.

When thinking about how to approach this awareness of declining orangutan populations, I knew a picture says a thousand words, since some of the most powerful messages have been from still shots. This is why I decided to use my own photograph of an orangutan. Not only is this an original photo, but more importantly it portrayed particular ideas that correlated with what I was trying to explore with this project. At the time of the photo, the orangutan looked like it was longing for something while it was hanging in limbo on these ropes. I used this photo with some creative editing twists to visually represent the disappearance of orangutans and represent the following ideas:

The first idea I appealed to is that the orangutans are fading away rapidly, which is my main idea in my creative piece. It's represented by two things in this poster: the first being the progressively fading title that says: 'Don't let them fade away' and the second being the orangutan itself which is fading away like flakes in the wind. Not only is this tactic simple, it's also visually effective in allowing for an immediate understanding of what's happening in the poster. Additionally, I found that it's quite upsetting to see this beautiful creature fading away, meaning the emotional connection to the

creative piece is to create awareness to the audience on the loss of life in the overall orangutan population.

The second idea presented is the strain that the orangutans are being subject to as a result of human activity. Hanging in the centre of the ropes, the orangutan in the picture is at the crossroads of its path, looking back on something, reflecting (as portrayed by its eyes), whilst being caught in a 'limbo' position as it stands on these ropes. This ultimately comes down to the audience's personal perspective on how to interpret the picture, but either way it shows a revealing side of the orangutan through simple image composition and body position of the orangutan.

The third idea is that humans are responsible for the orangutans' future survival. It's agreed that becoming connected to orangutans and their world is essential to allowing them to regain their numbers in the future[5], since their numbers are predicted to drop even further by a devastating 45,000 by 2050[3]! This is why I included the words 'don't let them fade away', because this way the challenge is directly aimed at the audience, since humans have the largest impact on orangutans [6]

I'm proud of my piece, it will enlighten me to hopefully raise awareness of the orangutan population decline in this creative project.

**References:**


1. Wheatley, M. *It's an Interconnected World* 2002; Available from: https://www.brainyquote.com/topics/unintended-consequences-quotes.
2. *SUSTAINABLE DEVELOPMENT GOAL 15*. 2019; Available from: https://sustainabledevelopment.un.org/sdg15.
3. Voigt, M., et al., *Global Demand for Natural Resources Eliminated More Than 100,000 Bornean Orangutans.* Current Biology, 2018. **28**(5): p. 761-769.e5.
4. Santika, T., et al., *First integrative trend analysis for a great ape species in Borneo.* Scientific reports, 2017. **7**(1): p. 4839-16.
5. Spehar, S.N., et al., *Orangutans venture out of the rainforest and into the Anthropocene.* Science advances, 2018. **4**(6): p. e1701422.
6. Ancrenaz, M., et al., *Impacts of Industrial Agriculture on Ape Ecology.* 2015.


Back to Contents