Storying Perceptions of Climate Change in Wellington Shire

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Storying Perceptions of Climate Change in Wellington Shire

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Jacob Schran

An Interactive Qualifying Project submitted to the faculty of Worcester Polytechnic Institute in partial fulfillment of the requirements for the Degree of Bachelor of Science.
Abstract

With the help of the Gippsland Climate Change Network, our team interviewed farmers in Wellington Shire, Australia to collect their perceptions of climate change. We compiled 12 video interviews of the farmers, and one long-form video to add to the global collection of climate stories. Most of these farmers were skeptical of man-made climate change, but were still responsive to climate variations, with many using renewable energy and regenerative farming practices. Farmers living within the local irrigation district were mostly optimistic regarding the sustainability of their future. However, those living outside the irrigation district were generally much less confident about the long-term viability of their farms and community.

This report represents the work of WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review.
In Australia, concerns are rising over the effects of climate change. Analysis of studies conducted in recent years shows that “Australians are increasingly concerned about droughts and floods, extinctions and water shortages associated with climate change, and most people think all levels of government aren’t doing enough to combat the effects of global warming, according to new research.” (Murphy, 2019). While there are rising concerns, a survey conducted by the Common-wealth Scientific and Industrial Research Organisation (CSIRO) “showed a pattern of ‘optimism bias’ - the belief that one is less likely than other people to experience something negative” (Le-viston, Greenhill, & Walker, 2015). This pattern of “optimism bias” shows how the populace can become complacent. While knowing the world is warming, people believe that someone will fix the problem for them, or that they individually will remain unaffected. This idea has created a situation where there are rising concerns by the general populace, and yet little action is seemingly taken by federal and state governments (Merzian, et al., 2019).

While the scientific effects of climate change are often considered in public discourse, there is less focus on how the public perceives climate change (Yale Climate Connections, 2018). The Climate Stories Project is an organization working to gather perceptions of individuals around the globe in relation to climate change (Climate Stories Project, n.d.). Through the facilitation of Professor Ingrid Shockey at Worcester Polytechnic Institute (WPI) teams of students have conducted studies around the globe to gather such viewpoints. In India, students found that the farming intensive area of Himachal Pradesh is vulnerable to climate change. Farmers noted that seasons were shifting in intensity and duration (Padir & Bergeron, 2018). In Japan, a student team interviewed businessmen, professors, and individuals of various other occupations to understand what the Japanese think of living with climate change (Engel et al., 2019). To continue these efforts, our project team was stationed in Melbourne to collect the personal stories and perceptions of climate change from the farmers of Wellington Shire in the Gippsland region. As seen in Figure 1 the Gippsland region is a part of the state of Victoria in Australia.

Our project was co-sponsored by the Gippsland Climate Change Network (GCCN) which seeks to help educate, inform, consult, and facilitate Gipplanders to take measurable action on climate change, while also serving as an activist group for Gippsland on matters regarding climate change.

![Figure 1. Map of Gippsland (gold) relative to Victoria, Australia (navy blue)](image-url)
With the assistance of the GCCN, semi-structured video interviews were conducted at the homes of residents in Wellington Shire, Victoria (Figure 2). These interviews were compiled into 12, 2-7 minute videos, as well as one long form (25 minute) video that presented the varying perceptions of climate change in the region. These interviews were presented to report the stories and perceptions of how climate change has affected the community.

Australia is at a tipping point in addressing climate change and its effects. In order to address these concerns, Australians must reach a common ground to move forward. With these ethnographic videos, the GCCN can create a dialogue between residents and the local, state, and federal government to take action on climate change. These videos will also add to the global context created by prior studies in the Climate Stories Project.

Understanding and Presenting the Gippsland Climate Perspective

The Effects of Climate Change

The warming of the climate will have dire consequences for many of the Earth's species. Observations by the U.S. National Oceanic and Atmospheric Administration (NOAA) have found that as temperatures rise all over the globe, the northern and southern poles (comprised almost entirely of ice) have begun to melt. NOAA research also indicates that land-based ice such as glaciers and mountain ice caps are melting. The melting of the ice caps and warming of the oceans has led to global sea level rise. Since the beginning of the 20th century the sea level has been rising by 1.7 mm per year, with that rate increasing to 3.1 mm per year since 1993 (Sweet, et al., 2017). This sea level rise has increased both flooding as well as the severity and frequency of storms. An excess of greenhouse gasses has also led to the acidification of water around the world, in both the seas and through rain. Seawater acidification is particularly damaging to coral reefs, as the reduction in pH levels has led to coral “bleaching.” This process can kill coral reefs which are a vital part of the ocean ecosystem (Coral Bleaching on the Reef, 2018). Areas such as Australia's Great Barrier Reef have and continue to be affected by this phenomenon. Since the 19th century the Earth's average surface temperature has risen 1.1 degrees Celsius (2 degrees Fahrenheit), and continues to increase. More alarmingly, the U.S. National Aeronautics and Space Agency (NASA) reports that the bulk of the temperature increase has happened over the last four decades, with five of the hottest years on record occurring since 2010 (GISTEMP Team, 2020).

Figure 2. View of Wellington Shire, Victoria
Studies conducted by scientists in Australia have created comprehensive models and predictions for how climate change has and will affect the country in the coming decades. As seen in Figure 3, data collected by the CSIRO over the last few decades shows an increase in the average temperature in Australia. The grey shaded segment in the left portion of each plot demonstrates the historical data, while the colored shaded regions work off three distinct prediction models. Yellow represents low emission predictions, blue represents medium and purple (a typical climate model) represents high emission predictions (Commonwealth Scientific and Industrial Research Organization [CSIRO], n.d.).

All of these predictions indicate a number of common changes. Heat waves will become more frequent and intense. As sea levels rise and the water’s temperature increases, storms will become more severe, and flooding will escalate (CSIRO, n.d.). Bushfires will increase in intensity and frequency as hot, dry and windy conditions increase over time (The State of Victoria, 2015). Mean-while, rainfall is projected to decrease, and the duration of droughts will rise, damaging the agricultural industry to the south of the continent both for the growth of crops and livestock (CSIRO, n.d.).

Australia

These changes are represented in Figure 4, which was created by the Victorian state government to represent changes to the Gippsland region. On average, rainfall in the Gippsland region has declined since the 1950s, while temperatures have increased since the 1960s (The State of Victoria, 2015). These effects will have a profound impact on the quality of life and economy of Gippsland. How these changes affect the local community will influence the perceptions of climate change in Gippsland.

Perceptions of Climate Change

Families and farmers experience agricultural problems and issues due to severe changes in climate with studies demonstrating patterns of climate change worsening farmers’ worries about the weather (Ellis, 2017). In western Australia, a brief report specifically interviewed the youth Australian community and focused on capturing their perceptions and opinions on climate change. One youth interviewee explained: “I’m quite worried about my future being destroyed due to climate change. Sometimes, I couldn’t sleep - keep thinking of it.” (Chiew & Ling, n.d., p. 14).
In 2017, the Victoria State government produced a report on the perceptions of the state's population in regards to climate change. The government found that of those interviewed, 91% believe that humans are at least in part responsible for climate change. Additionally, 78% believe that climate change requires urgent action, however only 30% of those surveyed believed it was a “top three” issue for the Victorian government. The surveys also reported that Victorian's biggest climate change related concerns were crop failures or decline in agriculture, and water shortages and droughts (71% and 72%, respectively). Of those surveyed, 80% said they were “willing to take action” while 19% said they were unwilling. Those who were unwilling reported the following major reasons: they did not believe climate change was occurring, they didn't think they could make an impact on climate change and they didn't want to spend money to combat climate change (Sustainability Victoria, 2017). These climate change perceptions held by the public will have an impact on major corporations and governmental decisions (Chiew and Ling, n.d.).

**Gippsland’s Perceptions**

The Sustainability Victoria survey data collected from the Gippsland region (displayed in Figure 5) specifically showed that 49% of those interviewed believed that climate change was both man-made and natural. Nearly a third of the interviewees were unconcerned about climate change, while 42% were either “very concerned” or “quite concerned” about climate change. This divide in perspectives shifted in responses about action on climate change. Around 39% felt strongly that urgent action was needed on climate change with another 32% agreeing that action on climate change was needed (Sustainability Victoria, 2017).

These statistics collected by the Victoria state government show a general awareness of climate change but also a larger skepticism from many in the region in regard to the causes of climate change. It is clear however that a large section of the population interviewed also feel that climate change is an urgent issue regardless of its causes.

Figure 4. Gippsland’s key climate risks (The State of Victoria, 2015)
Gippsland and its regions (including Wellington Shire) are at risk of many of the effects of climate change. Research done by Victoria’s State Department of Environment, Land, Water and Planning found that potential impacts include reduced water security, damages to the farm industry due to bushfires, increased flooding damage, reduced snow and shorter winters and changes in disease occurrence (The State of Victoria, 2015).

These effects could be particularly damaging to not only the Gippsland region, but Australia as a whole.

Multiple areas of Gippsland’s production are vital to Australia. Gippsland’s economy consists largely of agriculture, with over a third of its businesses involved in agriculture and fishing (The State of Victoria, 2015). A total of 15.4% of Gippsland’s exports (1.48 billion AUD) are associated with sheep, grains, beef and dairy cattle, and the processing of the goods they produce.

Gippsland produces 14% of Australia’s crude oil and 97% of Victoria’s natural gas. The supplies for fossil fuel resources are decreasing: 15% of Australia’s known crude oil reserves remain and 40% of known gas reserves remain in the Gippsland region (Regional Development Australia, 2014). According to research by the Victoria state government, the dairy industry in Gippsland produces 21% of Australia’s milk. Their research found Gippsland region also supplies 60% of the city of Melbourne’s water.
The Gippsland region is particularly vulnerable to bushfires and extended heat waves. These heat waves are projected to damage local infrastructure such as roads. These severe damages to the local infrastructure will require more frequent maintenance to prevent reduced safety. Additionally, the rapidly growing aging population and more frequent dry spells and heat waves will mean that hospital and emergency services will be put under greater strain (The State of Victoria, 2015). The bushfire season during the summer of 2019-2020 has been historically damaging to the continent. By December of 2019 over 130,000 hectares of land in East Gippsland alone were consumed by bushfires (as seen in Figure 6). The Guardian reported that thousands of people were evacuated from the region and many residents' homes and businesses were threatened by these bushfires and heat waves. The community of Gippsland has been affected by the drastic changes in climate in one way or another leading to major evacuations from their region (Wahlquist, 2019).

Wellington Shire is a local government area in the Gippsland region in the state of Victoria. It is governed by the Wellington Shire Council. A primarily rural region, Wellington Shire consists of three areas known the Northern Ward, Central Ward and Coastal Ward. These wards are represented by nine councilors (three for each ward). Wellington has a diverse economy which includes oil and gas production, manufacturing, defense, forestry and construction (“Our Organisation”, 2019). According to data from the Victoria State government within the Gippsland region, 12.1% of all jobs are directly related to the agriculture sector. The average household’s weekly income is around $905 AUD, which is lower than the averages in Victoria and Australia as a whole (as indicated in Figure 8). Starting from 2011, there is expected to be 13% population growth from a baseline of 42,064 through 2031 (Regional Development Australia, 2014). This growing population will have to grapple with the effects of climate change within the coming decades.

**Understanding Wellington Shire**

<table>
<thead>
<tr>
<th></th>
<th>East Gippsland</th>
<th>Bass Coast</th>
<th>Wellington</th>
<th>South Gippsland</th>
<th>Latrobe</th>
<th>Baw Baw</th>
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<td>$905</td>
<td>$920</td>
<td>$942</td>
<td>$1,025</td>
<td>$1,216</td>
<td>$1,234</td>
</tr>
</tbody>
</table>

*Note: for people aged 15 years and over Source – ABS 2011 Census

Figure 7. Map of Wards in Wellington Shire (“Our Organisation”, 2019)

Figure 8. Average weekly income for all Gippsland regions compared to Victoria and Australia in AUD (Regional Development Australia, 2014)
Methods to Present Gippsland’s Story

Continuing the Climate Stories Project effort, our team worked with the GCCN to conduct and record several video interviews. With their sponsorship we conducted interviews with the Wellington Shire farmers to gather their stories and perceptions of climate change. The wide range of perspectives provided a large view of the varying climate stories in Wellington Shire. These perspectives are important because the voices of individuals are often not given adequate representation in government policies or other official climate change stories. Climate change is often discussed in broad terms, around environmental policy, or in a political context. There is plenty of discussion surrounding which parts of the world are more affected than others, but almost no discussion about how people are experiencing these changes in their lifetime. In the past, the stories collected as a part of the Climate Stories network have revealed climate change implications that researchers and scientists have not considered. Unusual patterns were noticed in parts of the world that were once dismissed in climate change discussions. These stories give a voice in the climate discussion to people that may be more affected than others have anticipated (Shockey, personal communication, 2019).

Ethnography

Ethnography refers to the study of customs and cultural beliefs of individual people within a community. Our project team took an ethnographic approach to learn more about the culture of the regional community. This approach helped our team understand how the Wellington Shire community is reacting to climate change.

A key element to the ethnographic approach is being flexible to the environment of study (Flick, Kardoff, Steinke, 2000, p. 226). To ensure the team did not influence the stories gathered, the interview questions were carefully structured and reviewed to be neutral. Our project team developed a set of follow up questions to capture a wide range of viewpoints such as climate change denial or strong belief in climate change.

Figure 9. Dairy farmer Jonathan Ryan checking soil for his crops
When making ethnographic films “[you] look at the means employed in a given situation for the production of social phenomena from the perspective of participants” (Flick, Kardoff, Steinke, 2000, p. 225). The stories were recorded so the complete dynamic between the participants and their perceptions of climate change were represented. In reference to ethnographic films, Flick et al noted that “These films will “[use] an aesthetic of objectivity, and a technological apparatus which produces truthful statements about the world” (Flick, Kardoff, Steinke, 2000, p. 224).

The “aesthetic of objectivity” is when the filmmaker follows a set of principles to make the film be objective in what it is portraying. As our work was ethnographically focused it was critical that the ideas and perceptions of individuals were shown unfiltered, so the viewers can draw their own conclusions. Encouraging critical thinking through viewer analysis and interpretation entices people to discover more from the videos.

**Establishing Trust**

While conducting interviews and gathering material in Wellington Shire, it was crucial that our team established trust with the local community. Trust is important for gathering truly personal stories and footage that gives insight into the plights and perspectives of the populace. In order to effectively establish trust, our team outlined a number of techniques that we used in conducting interviews:

- Establishing communication prior to interviews
- Receiving consent for audio and/or video recording
- Having a dialogue on site
- Sending the edited footage back to the interviewee

These techniques were established through discussion with the WPI Global lab, an organization designed to help student researchers around the world as well as through research of scholarly sources. The GCCN provided us with the interviewee contacts, and with their help and the help of the Wellington Shire Council we made first contact to establish a rapport with the participants. A short video introducing the team, our objectives and objectives of the Climate Stories project was created and shared with interviewees prior to our visit. Additionally, the questions created for the interview were sent to interviewees at their request prior to the interview, to ensure their comfort with the interview subject matter. With this communication established, the team was no longer an unknown party to the interviewees. This communication helped to boost the comfort of interviewees prior to the interview.

Once the team had traveled to the interviewee's location, a dialogue was established prior to interviewing (as seen in Figure 10). This practice further established the interviewee's comfort level as well as scoped out areas of interest for the interviewee so that the team could accurately reflect their views. Additionally, this practice helped us gather additional material such as footage of the interviewee's property when permitted. After the team had left the premises, we edited the interviews into videos to report the perceptions of the local community. The edited video was then sent back to the interviewees to ensure the video is an accurate portrayal of their perceptions.

![Figure 10. James Troedel talking on his farm](image)
The two most important elements in these interviews were that we ensured the interviewee has consented, and that we created an optimal environment for recording. A consent form was provided prior to our initial meeting with the interviewees, giving them ample time to read through the document. Prior consent was crucial, not only from a legal standpoint, but also to ensure that the interviewees would be comfortable and well informed about the questions they would be asked. This included the space being comfortable to all parties and equipment. This process is called “informed consent” and was key in ensuring the final presentation was produced in an ethical manner (Hopf, 2004). Everything was done at the convenience of the interviewee within our availability to promote good responses.

**Producing Stories**

We recorded the interviews with a DSLR (digital single-lens reflex) camera, a GoPro Hero7 Black, each mounted on a tripod. The equipment made for stable, high resolution footage along from at least two angles for support in video production. Lapel mics were used to ensure the highest quality audio possible along with a directional microphone (Tascam DR-40 Linear PCM). These were digitally tied to the footage to ensure the audio was synced to the video recording. The lapel mics were used to gather audio close to the person to remove background noise, while the directional microphone was used to record on the move while eliminating the unwanted effects of background noises. The Tascam was used after interviews as well, if the interviewee was comfortable with it, to record statements that may not have come up during the interviews. The equipment can be seen in use in Figure 11.

**Recording the Interview**

**Photography**

In addition, photographs were taken throughout our team’s stay in Wellington Shire. Our photography focused on capturing the unique landscapes, people and industry of the Gippsland region. We used well known photographic methods such as “the rule of thirds” as well as utilizing natural lighting or enhancing indoor lighting.
Editing

Our team used Adobe Premiere Pro to edit videos in post production. We worked to ensure the intent of the interviewee was not compromised through our editing process. For the short individual interview videos the interviewer’s voice was removed and the interviews were condensed in the best representative manner. In the longer form video thematic storytelling was used to group the perceptions of the individuals into a larger context. As seen in Figure 12, multiple interviewees and their responses were shown in both audio and visual formats to demonstrate varying perspectives in the Wellington region. Additionally “B-roll”, or video of related scenery, was incorporated into the long form video from recordings taken by the team during the stay in Wellington Shire.

Presenting Climate Stories

The stories collected and the perceptions of the effects of climate change on the local community were conveyed in a number of formats; both audio and visual, including videography, photography, and audio recordings.

Ultimately the material gathered was compiled into 12 videos presenting individual interviews and one long form video. The multiple short form videos consist of two to seven-minute personal interviews. The long form video is 25 minutes in duration, including pieces of the interviews in Gippsland. These videos aim to accurately relay the concerns, perceptions and stories associated with climate change in and around the Wellington Shire community. The short form videos will be presented as individual “profiles” on the WPI Global Labs website to give the viewer a breadth of information and opinions on climate change in Gippsland.

Figure 12. Edit of the long-form video in Adobe Premiere Pro
Summaries of the Gippsland Interviews

Our team spent a week in Stratford, Victoria where we travelled to 13 different farms over the course of the week to conduct interviews. This section briefly summarizes the viewpoints and backgrounds of each farmer interviewed in Wellington Shire. Many of the farmers we talked to live in the Macalister Irrigation District (MID) an area that uses water from the Glenmaggie dam for irrigation of crops and feed. The Glenmaggie Dam (Figure 13) directly supplies water for irrigation, with the MID covering about 53,000 hectares of land ("Lake Glenmaggie", n.d.). The majority of farmers we talked to were dairy or beef farmers with two sheep farmers and one vegetable farmer.

Denis Reynolds and Millie Hookey are beef farmers who have lived in Wellington Shire their whole lives. Both studied at university and received degrees in agriculture. They both feel that the climate in Australia has become warmer and drier in recent years. They expressed concern over changes that may be necessary in the irrigation systems around the MID in order to combat climate change. In recent years they have received help from the government during the drought, buying water that the government offered to ensure they had good grazing areas for their cattle. They do however feel they are lucky in terms of the effects of climate change that they have seen. Denis mentioned that places such as Pakistan have seen devastating floods that have displaced many people, and he worries about larger global trends. Comparatively both he and Millie feel that Wellington Shire is a safe and secure place to live for the foreseeable future.

Graeme Anderson is a dairy farmer who has lived in Gippsland all his life. Graeme has received both traditional3 and formal4 training from an agricultural college. He has seen the number of farmers in the region decline over his time in Wellington Shire.
Farms are becoming more consolidated due to the increase in agricultural industries moving into the area. Over his years farming he feels that technology has improved significantly, making the lives of his family easier and their practices more precise.

Graeme did not think that he had seen any effects of climate change in his life, saying that he had long records of rainfall and other metrics over time that did not point to any significant changes in weather. He has a recycling system that utilizes excess water efficiently to help him save money and time during droughts. He feels his practices are becoming more commonly used by farmers in the MID and have had a significant impact on water policy in the area. He has not changed his practices as they still are as efficient as they were in the past. Graeme is excited for the future of both the community and his farm.

Jonathan Ryan

Jonathan Ryan is a dairy farmer who has owned his dairy farm for five years and lived in Wellington Shire for 10 years. Growing up and living on a dairy farm in Princetown, Victoria, Jonathan has had formal training at an agricultural university and has also received traditional training through his family. Jonathan has taken notice of the recent droughts and fires, the increase in the number of hotter days as well as hotter days happening earlier in the spring and summer seasons. He has also noticed that summers have gotten drier and hotter in his hometown, but notes that weather there has been good lately.

As for Jonathan’s farm, he mentions that cows do not handle the heat very well. Jonathan feels that his mental health has taken a toll due to climate change and is concerned for his peers who have significant debt because a lot of them have young families. He is also concerned about the recent changes in the dairy industry which have driven prices of dairy down, making production less profitable. Jonathan feels that people need to take action now to avoid reaching a tipping point on climate change. To Jonathan the environmental, societal and economic benefits make combating climate change worth the effort.
Jane Gurling

Jane Gurling is a beef farmer who grew up in Gippsland on a dairy farm and has lived in Wellington Shire for 60 years. Jane finds that over the years technology has improved significantly. She explained that the sharing of information between farmers is easier now due to the internet as well as accessibility of vehicles. Jane studied biology in school and feels that she is more of a biologist than a farmer. Jane believes she is witnessing climate change happening, as in recent years she has seen the water table drop significantly. She does however believe that her quality of life is still good.

Paul Bourke

Paul has lived in Wellington Shire all of his life and learned his practices traditionally. He is a former dairy farmer and currently owns beef cattle. He does not farm himself but pays workers to manage the cattle he currently owns. Paul also leases part of his land for a vineyard. Paul currently works in farm real estate.

Steve Stead

Steve has lived in Gippsland for a number of years and worked on other farms before purchasing his own in 2002. He is a dairy farmer who received traditional training from his prior employment in New Zealand.

Steve notes that the varieties of grass in paddocks are different than 30 years ago, due to needing a heartier cover seed from the more erratic weather patterns. Steve has invested in a chemical tanker for the movement and deployment of chemical fertilizer, which he notes he has quickly paid off since the chemicals have increased production. He also heavily invested in solar energy for his farm. Steve says that electricity from the panels cut his monthly electrical costs in half. He expects these solar panels to pay for themselves in about three years.

"Farmers here, farmers everywhere— they love the land, they’re not going to do something that is detrimental."

-Paul Bourke

Figure 17. Jane Gurling
Steve also installed a 125 ft dam, to leverage the extra water he gets from rainfall. This dam helps mitigate the effects of drought by ensuring consistent water outflow even during drier times.

Steve does not believe in climate change as he believes the earth operates in cycles and we are just in one of the warming cycles right now. He is aware of the current weather trends and believes he has extremely high sustainability in the future because his current investments will insulate him from the whims of the weather which may heavily affect other farmers in the MID.

Scott has lived in Wellington Shire for the past five years. He originally came from Canada and has worked there and in South Australia growing fruit. Currently he works as a small greens and root vegetable farmer in the MID. Even though Scott has previous climate records of the region he personally does not make conjectures about the effects of climate change in Gippsland, since he is new to the area.

He does note however that current erratic weather patterns heavily affect his business as it changes his farming cycle for each crop by a matter of months. Temperature is the primary cause for these crop shifts. These temperature changes are an issue as they order seed up to six months in advance of their planting cycle. Recent heavy rains have had detrimental effects on his crops as well. Scott said he lost about a third of his current planted crop to the heavy rains four weeks prior to our interview.

Scott also has worked to rapidly increase the carbon content of his soil. Over his time at the farm he has increased the percent soil carbon from 1% to 4-5%. In comparison, other farmers we interviewed on the subject felt that such an increase would take a longer period (around 15 years) to achieve similar results on their farms. He also mentioned that many other farmers, not including himself, in the MID schedule their water usage based on the Glenmaggie dam overflow release at the end of the water allotment timeframe. That release did not happen the past two years leaving many farmers in a bind for water usage.

Matthew has lived in Wellington Shire since he was two years old. He feels that it has become drier over his lifetime with a lot of dry years over the last two decades. He runs a beef farm, as his parents did. In addition to his traditional training he received formal training from an agricultural college. He has been planting trees in the area and his parent’s property since he was 15 and continues to plant trees to promote the growth of Australia’s native plants. He thinks rainfall has reduced over time and worries about climate change. He noted that the farming community has grown older and that there are now bigger farms than when he was a child. In general Matthew feels that climate changes have been drastic.
John has lived in Wellington Shire all his life, and his family has been on the same plot of land since 1873 — for five generations. John’s farm is mostly focused on farming sheep for Merino wool, and a small herd of beef cattle. He received traditional training, and his land is located outside the irrigation district.

John has noticed that seasonal patterns tend to be getting later, but he has not had to make any changes to his farming practices. According to John, the current drought has had a big effect on his land, but this is not the first time he has experienced similar conditions and the government has provided some assistance in helping ease the pressures. John mentioned that his quality of life had probably been affected because he had to feed the sheep far more often due to a lack of grass. Feeding takes time away from his other duties and contributes to his stress. Additionally, the amount of dust and smoke in the air reduces the quality of his wool.

While John acknowledges that climate change has done a lot of harm, he believes that the media’s fear mongering is having great negative effects. John spoke about how people need to learn how to control the environment and listen more to the wisdom of their elders.

Peter and Kate are dairy farmers who have lived in Wellington Shire for 20 and 30 years respectively. Both studied agricultural science at university. They were reluctant to ascribe recent weather patterns to climate change. However they both have become more aware of climate change recently and are working to make adjustments on their farm as they have seen some effects of climate change, such as soil degradation. They have been working to mitigate changes and avoid drops in production. Kate and Peter have been trying to increase biodiversity in the cover crops on their farm in order to increase carbon in their soil which will help trap more moisture. They are trying to address climate change with rotational paddock grazing as well. They feel that there is growing concern over climate change in their community.

Figure 20. John Freeman

Figure 21. Peter Neeves (left) and Kate Mirams (right)
Sandra Jefford

Sandra has been living in Wellington Shire for the past eight years since moving from West Gippsland, and she has been a dairy farmer all her life. She learned her trade through her family. Her farm is located just outside the MID. She has certainly seen the effects of climate change on her farm but has not had to make any changes to her farming calendar. Climate change and the long-term viability of her farm are both large concerns for Sandra. She plants a variety of grazing crops in each paddock to help increase biodiversity and carbon content in her soil. Sandra is working to add solar and wind power as it would not only help her farm financially but get her closer to her goal of being carbon neutral. While Sandra remains cautiously optimistic, she noted that climate change will continue to make farming more difficult.

James Troedel

James is a sheep farmer who produces Merino wool and lamb meat outside of the MID. He has been in Wellington Shire for 40 years and is traditionally trained. When he started farming he followed industrial practices, but as he noticed the climate becoming drier and hotter he changed his practices to regenerative farming. There have been recent price changes to his products, but these have largely been due to changes in the market in his view. He believes that the farming community has a huge role to play in climate change. He also believes that farmers have the ability to increase carbon in the soil and feels that all farmers should be taking steps to combat climate change.

Lisa Mumford and Aaron Thomas

Lisa Mumford and Aaron Thomas are both dairy farmers living outside the MID. Lisa has lived in Wellington Shire for her entire life, while Aaron has lived in the Shire for most of his life. Lisa grew up on a dairy farm and received traditional farming training through her family. Aaron was a nurse until he switched to farming. He received formal farm training at university as well as on-farm training. Currently Lisa runs the business side of the farm while Aaron acts as a farm manager for Lisa and her husband. With the recent changes in climate, Lisa thinks that she has seen some effects of climate change, while Aaron is not entirely sure. With the recent effects, they mentioned that their farming calendar has changed. From the recent drought in the region, dry grass has affected their cows’ milk production. Without the constant supply of water coming in from the MID to water their grazing crops, the farm has had to ship in feed to help with production. They also explained that financially, climate change has had a big impact on their business needs. Lisa and Aaron also mention that last year was their worst year with production and are concerned about the future. Together, both Lisa and Aaron are happy to move forward with new ideas in their farming practices.

“...I think farming—the farming sector, has a huge role to play in climate change.”
-James Troedel
General Trends and Observations

A number of patterns emerged from our interviews. The majority of the farmers interviewed expressed skepticism or uncertainty in relation to the concept of man-made climate change. Those skeptical were noticing weather changes, but they were either unsure of, or indifferent to, the causes. This trend of skepticism, though drawn from a small sample size, did align with results from the Victorian government's surveys on perceptions of climate change.

Gippsland residents who completed the Sustainability Victoria survey also showed initiative to take action on climate change with 71% strongly agreeing or agreeing that it required urgent action despite their skepticism toward climate change and its causes (Sustainability Victoria, 2017). Similarly, despite the farmers’ skepticism many farmers were implementing renewable energy and regenerative farming practices on their property. Some of these practices included increasing biodiversity on their farms through the use of multiple crops. Farmers such as Peter and Kate mentioned that they were using plants with symbiotic relationships in order to improve the soil. Sandra had a beehive to promote the natural pollination, while James was beginning to use his sheep to spread seeds of the naturally occurring saltbush, allowing it to grow over currently bare ground. Graeme, who does not believe in climate change, utilized a water system that reused excess water to avoid waste and reduce expense.

Another major practice was carbon sequestration, the process of capturing carbon from the air adding carbon into the soil (Jain, et al., 2012). The emphasis on sequestration was surprising to see initially, but as we talked to more farmers about the practice, the economic and environmental benefits became clear. Sequestration promotes healthier soil and more efficient water usage. With more carbon in the soil, more moisture is held in the soil and less water evaporates from the soil bed (Jain, et al., 2012). These factors help reduce or eliminate the need for buying feed and water. The methods to accomplish carbon sequestration varied from farm to farm, with two farmers using a natural approach. Jonathan Ryan and Sandra Jefford, both dairy farmers, are trying to encourage an increase in the dung beetle population on their farms in order to increase carbon in their soil. Jonathan Ryan can be seen checking for dung beetles in Figure 23. Dung beetles drag manure down into the soil, naturally enriching the soil with nutrients and increasing carbon. These practices help contribute to the overall health of the soil, animals, and reduce costs in the long term. Newer farmers saw this economic benefit as being crucial, as many of them are in debt and need to be as efficient in spending as possible.
On other issues, the opinions of our interviewees diverged from those residents who completed the government survey. While a portion of those interviewed were making conscious efforts to both combat climate change and improve their farm, many were simply working to maintain economic viability. Many mentioned that recent government subsidies had made the incorporation of renewable energy into their property economically beneficial. The advantage of these investments encouraged the farmers to take steps towards renewable energy and environmentally sustainable practices. In the Victorian government survey, one of the top reasons for unwillingness to take action on climate change was an unwillingness to spend money (Sustainability Victoria, 2017). However, our experience shows that this unwillingness to take action can be circumvented by government action, as one of the farmers, a self-proclaimed climate change “denier”, had installed a $160,000 AUD solar farm in anticipation that it would pay for itself within three to five years. An example of a solar farm can be seen in Figure 24. The farmers were all willing to innovate and make changes in their practices in order to adapt to new circumstances and were especially keen to make changes with economic benefits.

Farmers, both older and younger, who had lived in the Gippsland region since a young age informed us that the number of farmers had reduced over the years, with farms instead increasing in size and more people moving towards the towns nearby. Though some expressed concerns over the future of the community and consequences climate change, the majority of farmers (including those who believed in climate change) were optimistic about Wellington Shire’s future.

It is important to distinguish though, that these answers came from farmers primarily inside the MID. The irrigation district relies in part on the Glenmaggie dam. Figure 25, a map of Wellington Shire (shown to the right) displays the MID as well as the areas around it. However, multiple farmers noted that in the last two years water supply had not come in as expected.

![Figure 24. Solar Farm in Victoria (Johnston, 2017)](image-url)
The lack of rain led to some farmers using up their allotment of water too quickly leading to water shortages.

Despite the lack of rainfall, most of the farmers interviewed in the irrigation district mentioned that this region was one of, if not the best district for farmers in Australia. Interestingly, this trend of confidence in the district could be attributed to “optimism bias” (Leviston, Greenhill, & Walker, 2015). The farmers have relied on the irrigation system for many years to great success, but if droughts become more frequent and rainfall reduces, this system could be jeopardized.

**Limitations**

There are two major limitations in this study that could be addressed in future research. The first limitation in our study was the statistically small sample size. When analyzing our findings, it was difficult to identify significant relationships due to the given sample size of 16 farmers (13 farm sites). Additionally, the farmers interviewed were not uniformly distributed in regards to the regions they came from, meaning that distinctions drawn between one region and another could not conclusively be made. As described above, the majority of farmers came from within the MID.

The second limitation in our study was that the farmers interviewed all volunteered to be a part of the project, with recruitment being taken care of by the GCCN. Thus, our data collection was skewed based on who volunteered to take part in the interviews. Due to our project being ethnographic in nature, this data could seemingly create bias towards certain viewpoints within the larger community based on our represented sample.
Conclusions from Gippsland

With the assistance of the GCCN, our team travelled to Wellington Shire, VIC and spent a week interviewing dairy, beef, wool and vegetable farmers. We conducted semi-structured interviews which were recorded and edited into individual videos and a long form video summarizing our findings. The farmers we interviewed from Gippsland were largely skeptical as to the causes of climate change, but many were implementing sustainable and renewable practices because of their economic benefits. There were divisions in opinions regarding the future of their community between those living in the MID and those outside it, which could be associated with the supply of water from the Glenmaggie dam to the MID. However, the portion of interviewees living outside the MID were far less than those within, so a clear conclusion as to the region’s security cannot be surmised.

Closing Thoughts

The farmers in Wellington Shire are a tight-knit and proud community. They were all willing to share their practices and beliefs with relative strangers and were very welcoming and hospitable. Even though many of the farmers are skeptical of man-made climate change, all of them were adaptable and willing to make changes to their farm as the need arose, with a deep love for their work and environment.

Our goal is that sharing the perceptions of Gippsland farmers will enable larger discussions about climate change. The work that these farmers do is critical not only to Gippsland, but to Australia as a whole. The people of Australia have an opportunity to make changes on a local, state and federal level in order to ensure that crucial communities such as Wellington Shire and major cities such as Melbourne remain prosperous.
This project resulted in the creation of 12 individual interview videos (one video per farm), and one long form video that compiled the multiple perspectives and lifestyles of the different farmers in Wellington Shire. In order to view this report in its digital form, as well as these videos please go to https://digitalcommons.wpi.edu/studentprojectsandresearch/. (If this link is unavailable, please navigate in your web browser to the Gordon Library web page of Worcester Polytechnic Institute, then complete your search under the topic of Student Projects.)

Using the search tool on that page, enter the report title (listed on the title page), or any of the names of the authors of this report to find this report and supplemental materials. Scroll down to “additional files”.

Figure 27. WPI Digital Commons Student Projects and Research Page
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No matter how these stories are told, ensuring the story has an impact on the audience is difficult. Through writing, audio, or video, each style of storytelling has its own nuances which require care to ensure the story hits home. Videography has multiple facets which must be taken into consideration. “You must not come lightly to the blank page.” (King, On Writing: A Memoir of the Craft, p. 106). Every second of footage presented counts, so techniques must be used to ensure the audience is engaged.

**Techniques for Impact**

A major technique for impact is surprising the viewer in presentation or style. Making the product outside of the norm garners interest in the product; as viewers will be naturally curious about new experiences (Duarte, Resonate, p. 12). Once the audience is interested, the video has completed the first element in investment: engagement. Next, the filmographer has to make the audience empathize by choosing elements that are emotional. Emotions, manifested in stories, are the most powerful tools in driving viewer engagement (Duarte, Resonate, p. 22). These emotions facilitate peoples’ connection with the work and become invested in the deliverable. In the short videos compiled by our team, the reflections, hopes, and fears of the individuals were focused on creating a brief but intimate portrayal of the subject. Whereas in the longer form video, these observations are used to compare and contrast the different perspectives of these farmers.

**Ethical Representations**

As representatives of WPI and reporters of climate perceptions in Australia it was our responsibility to present the audio and visual material recorded in an accurate and ethical manner. Therefore, interviews, photography sessions, and video recordings were only conducted when consent was given by the interviewed party. Additionally, prospective interviewees were informed of the nature of the interview as well as any requests for additional photography or videography. This process is called “informed consent” and was key in ensuring the final presentation was produced in an ethical manner (Hopf, 2004).
Appendix B: Interview Questions

**Warm-up Questions**

a. What is your name? Could you spell it for us?
b. How long have you lived in Wellington Shire?
   - What has been your connection to Wellington Shire? Have you always lived here? How long have you lived on this farm?
   - (If yes) How is growing up in Wellington Shire different today than when you were a child?
c. What type of farming do you do?
   - Where did you receive training for farming? Through your family or through agricultural colleges?

**General Questions**

1. Have you seen or experienced any effects of climate change here?
   - (If yes) What kind?
   - (If no) Ask about individual effects such as drought, bushfires in East Gippsland etc.
   - Have you seen any changes in the farming calendar? Do crops appear later or earlier?
   - (For dairy producers) Have you noticed with extended heating periods any changes in milk production?
   - (For dairy producers) Have you received any support from Gippsland Dairy?
   - (In general) Have you received any support from outside organizations such as partners in production or sale?

2. Has your quality of life ever been affected by climate change?
   - Has your farming practices changed as a result of recent weather or environmental changes?
   - Has the value of your crops decreased in recent months?
   - Has climate change affected any aspect of your day-to-day life?
   - Has climate change affected your community or friends? How?

3. Have you or your community worked to adapt to climate change in any ways?
   - (If yes) How?
   - (If no) What, if anything, do you think you should be doing?

4. What do you think about the future of this community?
   - Are there concerns you have?
   - Do you think things will stay the same?
Footnotes

[1] Regenerative farming refers to techniques that promote biodiversity, soil rebuilding, and increase nutrient density (Regeneration International, n.d.).

[2] Cover crops are the crops used to cover a paddock to revitalize the soil so feed grass will grow better.

[3] Traditional farming education is training through family experiences growing up on a farm.

References


