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INQUIRY INTO LONG-TERM SUSTAINABILITY OF THE DAIRY INDUSTRY IN NEW SOUTH WALES

Name: Sonakshi and Emma

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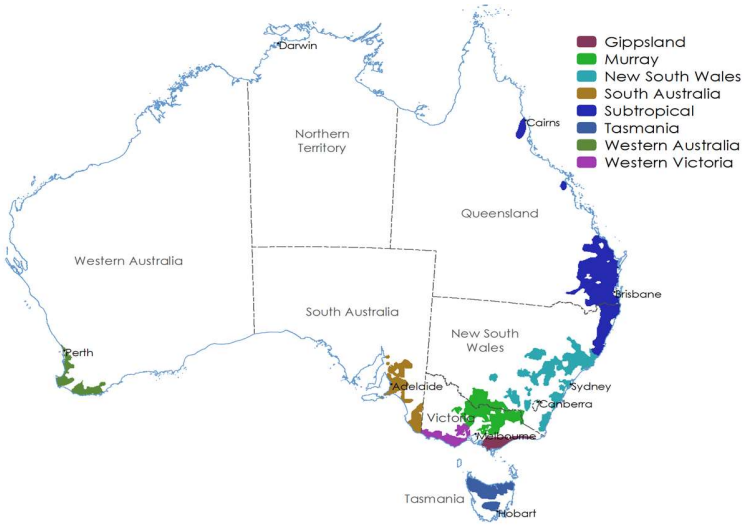
Authors: Emma and Sonakshi 29Sep2020.

For years, our one-dimensional approach towards economic development has forced the fundamentals of modern governance to be rooted in the concept of maximization of capital. This narrow vision of growth does not align with the principles of socio-political equity and environmental sustainability. It has made the relationship between human and nature almost unnatural; by commodifying several species of animals and plants, a distinct line between human and nature has been formed. With the advent of the Anthropocene epoch, 'loving-nature' became a personality trait and 'health and wellbeing' became a lucrative industry. These behavioral changes influenced by socio-economic factors have far-reaching consequences, which is evident from the current status of dairy industries all across the world. The perverse relationship between society and nature manifests itself in its worst form in this industry – which adversely impacts animals, humans, the environment as well as the economy in direct and indirect ways. This report aims to highlight the complex issues that the dairy industry in New South Wales is riddled with and explores in-detail a sustainable model for the industry.

The dairy industry of New South Wales

The Australian Bureau of Statistics details that the Animal Agriculture Industry in total was worth $28 billion in 2018/19 (ABS 2020). This means within Australia's $1.448 trillion economy as reported by the World Bank (29Sep2020), animal agriculture makes up approximately 2% of GDP. Of that 2%, the Australian dairy industry accounts for 7% of the gross value of agricultural production in the nation in FY 2017-18 (ABS 2019). Therefore, the dairy industry only accounts for a small percentage of Australia's total GDP, at approximately 0.0014 %.

With the export of 36% of the total dairy production, Australia is the third-largest exporter of milk in the world (Australian Dairy Industry 2018; PwC 2011). New South Wales is responsible for production of 8% of the national total and is a vital contributor to the domestic dairy market (DairyNSW 2018).



Australian Dairy Regions. Source: ABARES

While the industry contributes somewhat to the economy of the nation, over the past few decades it has been mired in a wide range of problems. The prowess of the industry has failed to sustain the livelihoods of many dairy farmers who have been directly affected by prolonged drought and market volatility.

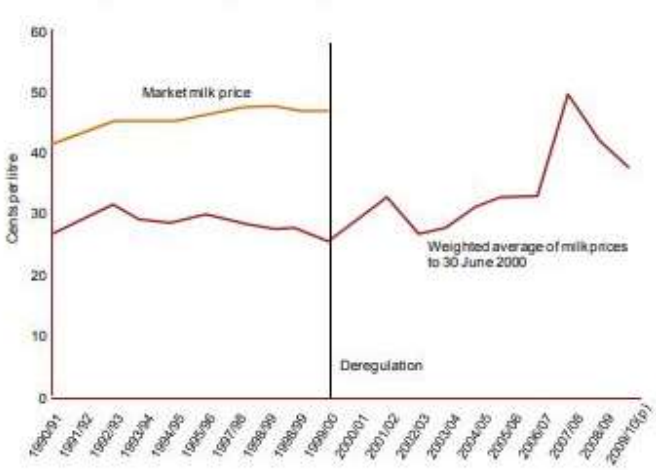
It has now become extremely crucial to take a step back and examine the industry in the context of the fast-changing socio-environmental conditions of Australia – and the world. The major problems which ail the industry currently, including drought, market instability etc. , must be linked to a larger array of issues which can potentially impact the environment, local communities as well as the growth of the industry, in the near future.

The value chain

The dairy supply chain in New South Wales is formed by a complex network of stakeholders and is interdependent on several external factors. Between the farmer and consumer, lies the actual commoditization of milk into products – which involves processors, logistic companies, and retailers. The deregulation in 2000 forced the industry to become highly consolidated and a majority of dairy farms, now, are family-run businesses. The supply chain begins with the farmer sourcing resources and feedstock from several industries at competitive prices. 30% of the farms total expenditure is constituted by the investments made to acquire feedstock, whose price is regulated by international crop markets.

Now, for modern methods of breeding a complex array of technical equipment is required which is primarily provided by ABS and Semex. Despite the problematic practices facilitated by this equipment, they help farmers to obtain the best genetics and consequential high yield. 10% of the farm costs are also spent on fertilisers which are vital for proper pasture growth – provided mainly by Hi-Fert and Incitec Pivot.

After the production of milk, the prices are decided based on the fat and protein content in the milk. These prices are highly varied and are dependent on conditions of the state market, farm-productivity, individual penalty payments etc. The processing market in Australia also remains highly concentrated with Warrnambool Cheese & Butter (WCB) being the major player, along with Bega Cheese and Murray Goulburn. While processing companies are infamous for profiting off of dairy farmers, recent trends show that with increased price discounting by retailers these companies have also been hit badly (PwC 2011).



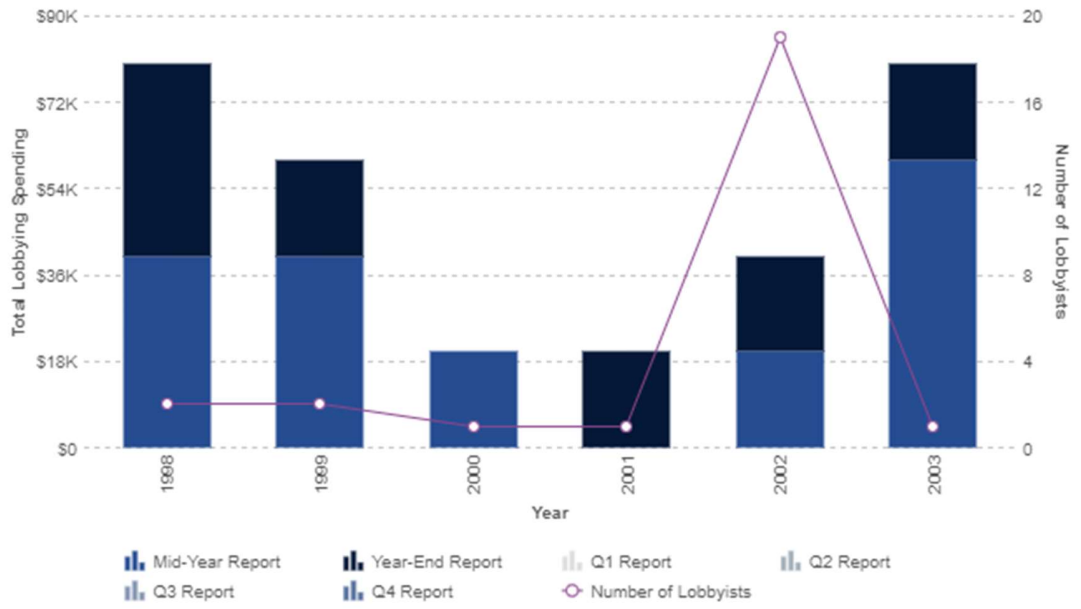
Farmers paid prices (cents/litre). Source: Dairy Australia, ABARES, PwC

A detailed study of the dairy supply chain presents us with a variety of problems – all of which impact a range of stakeholders involved in different levels of this chain. Plant-based milk industries provide us a contrasting look. Growth of the dairy industry has largely stagnated over the years whereas the annual growth rate of Soy and Almond milk (2015-2021) is around 7.2%. In a relatively small period of time, soy and almond milk has grown to a market size of $301 million. Such positive results reaped from plant-based industries must be used as a model to encourage a shift from conventional dairy farming. The supply chain of this industry is similar to dairy and can easily be adapted to by farmers, logistic operators and retailers.

Environmental impact of dairy industry

Given the ubiquity of the dairy industry, the general public often overlooks the rather severe environmental impact of the industry. It adversely affects consumers, cows, the producer and the regional ecosystem. The US spending of more than $7.8 million annually (2019) to lobby for its national dairy industry is telling of the vast potential of profit offered by the industry, across the world (OpenSecrets, 2019). Reports from 1999-2003 show that Australia has also been involved in lobbying for promotion of the industry, as a minimum of $80,000 was spent in that period (OpenSecrets, 2003). Detailed reports about the total stakes of different parties in this resource-intensive and exploitative industry do not meet the mainstream to prevent mass-intervention into

the operations of dairy farms. However, the following data about Australian Dairy Corp lobbying efforts bring to light the fact that the 'growth' of the dairy industry benefits a privileged few and its repercussions are felt by the larger public.

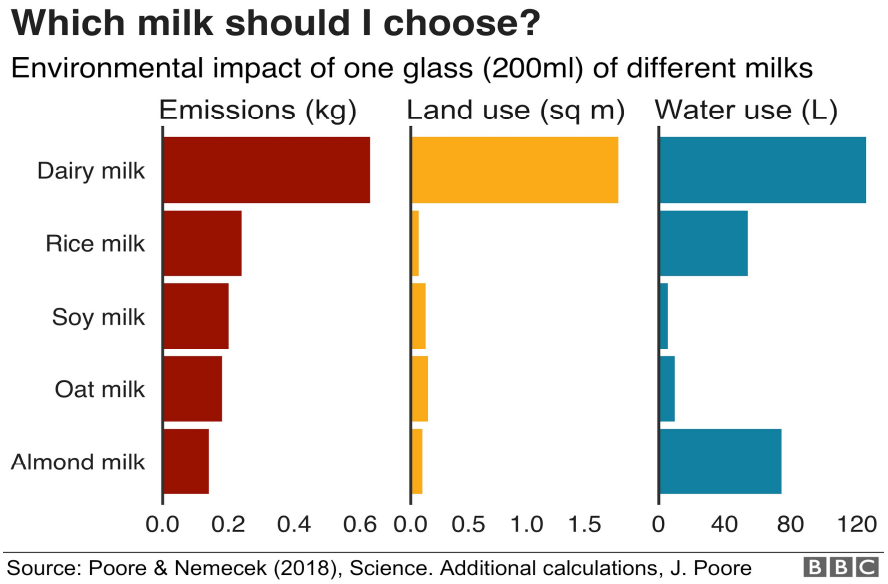


Annual lobbying by Australian Dairy Corp (1998-2003). Source: OpenSecrets

To gain an understanding of the extent of ecological impact of milk production, we need to take a look at the basic requirements for proper functioning of a dairy farm. It involves the usage of large quantities of water and feedstock, and the presence of pasturable lands as well as proper transportation networks and dairy processing channels. As per the Australian Dairy In Focus Report 2018, the average herd size has increased to around 270 cows per farm, while it is not uncommon for large farms to employ 1000 cows for their operations. Around 60% of cattle feed requirements are fulfilled by grazing of pasturable lands, however each cow requires a minimum of 1.6 tonnes of supplementary feedstock per year (Dairy Australia 2018). These large numbers are 'justified' by the need to achieve optimum results, but upon closer evaluation, we observe that these practices put a huge burden on the local ecosystem and deprive it of its vital resources.

Cattle grazing is known to alter the natural growth of native vegetation and cause soil erosion. Under the Environment Protection and Biodiversity Conservation Act (1999), over 1180 plant species are listed as threatened (Department of the Environment and Heritage, 2004). Orange-flowered Wattle, Spalding Brown-Grass, Davies Waxflower are some of the plants which have been directly impacted by intensive grazing (Department of the Environment and Heritage, 2004).

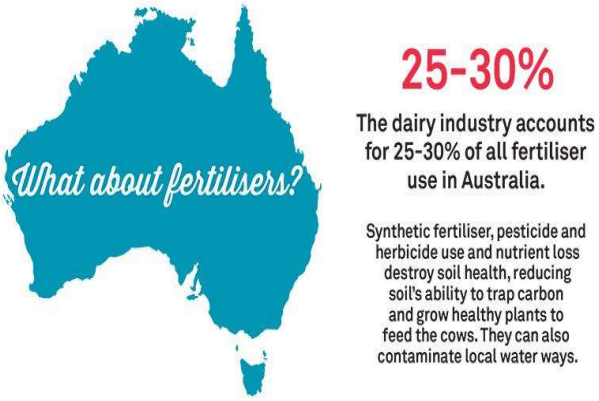
Climatic disturbances in Australia as well as large-scale industrialisation have contributed greatly in the erosion of fertile soil i.e. destruction of pasturable land. Farm animals are forced to rely on hay bales which are purchased from plant farms instead of being allowed to graze on nearby land. This practice leads to nutritional deficiency in dairy cows and consequently in humans. Feed-conversion ratio is measured to be the rate of efficiency with which farm animals convert feedstock into the desired product (here: dairy milk). Having completely altered the natural pattern of animal grazing, this ratio comes out to be much worse than the scientifically approved value of 1:30 to 1:70, in Australia.



Comparison of environmental impact of dairy milk and plant-based milk. Source: BBC

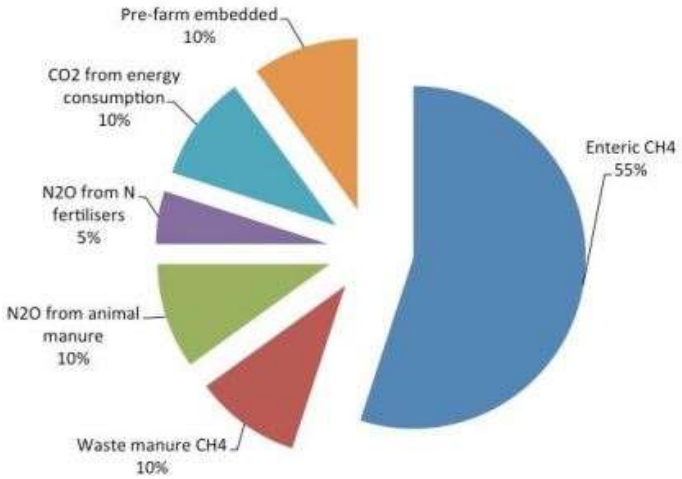
Along with land fertility issues, there has been a significant decrease in water availability due to large scale water-intensive operations on farms. Dairy farms use approximately 25% of the total surface water for irrigation in Australia (CSIRO Water for a Healthy Country National Research Flagship, 2010). Water is used for a variety of procedures which include hydration of cows, sanitation and maintenance of farms, as well as for feedstock. This brings the average amount of water required to produce one liter of milk to 800 liters, as per National Audit (2010). Yes, reports vary, but lets think about that for a moment. Does 1 liter of milk really justify using between 120 - 800 liters of precious water?

Although Australia has witnessed record low rainfall in the past decade and the prolonged drought has pushed several dairy farmers out of business, it would not be wrong to conclude that the aforementioned practices, employed by milk producers themselves, have been instrumental in significantly reducing water table levels in surrounding regions.



Usage of fertilisers in Australian dairy industry. Source: Sustainable Table

Milk production is also infamous for the exorbitant amounts of Greenhouse Gas emitted by farms into the atmosphere. Of the total GHG emissions in Australia, 12% is emitted solely by the dairy industry. A mix of harmful gases are produced from different processes on the farm. Electricity and transportation produce CO2, while burping cows and manure-effluent systems produce Methane (CH4) gas which is 25% more toxic than CO2. Nitrous dioxide is also released in large amounts on farms due to cow dung, fertilisers etc. (Dairy Australia, 2015). A carbon footprint this big must be curbed as urgently as possible, with the adverse effects of climate change being felt so closely and directly by the people of Australia. Alternatives like oat milk have been studied and shown to emit 3 times lesser amounts of GHG emissions than are emitted during production of a single glass of dairy milk (Poore et al 2018).



Composition of emissions from dairy farms. Source: Dairy Australia Ltd.

Apart from methane emissions, the problem of waste disposal and manure run-off is also common on Australian dairy farms. US reports suggest that dairies with over 2000 cows produce around 240,000 pounds of manure daily; given the scale of Australian dairy industry, the estimates for manure production are expected to be similar here. Proper management of this slurry is a daunting

task – which is easily overlooked by several farmers. This takes a toll on the local ecosystem as toxic materials flow into wild areas.

International studies have shown that climate change affects the weather conditions of each single day now (Sippel et al., 2020), but a large section of the population still fails to grapple the true impact of the climate *crisis*. However, the bush-fires in 2019-20 which affected almost 57% of the Australian population, as per surveys, acted as a massive reminder that we have already reached peak levels of unsustainability and environmental degradation can effectively disrupt millions of lives. Dairy production had also come to an uncertain halt and some farms faced destruction due to the fires, but the complicity of the dairy industry in aggravating a disaster of this scale cannot be overlooked entirely. Such wildfires are triggered by extreme heat and drought – factors which are the consequences of ever-increasing GHG levels in the atmosphere. Political attempts to cover-up the links between industrial development and climate change should not divert us from the glaring facts about such 'lethal' industries.
Another point of concern is the recent report which mentions the likelihood of more massive bushfires in 2020-21 like we experienced earlier this year; simply put – we have no time but *now* to change.

The role of government
Despite the deregulation policy in 2000, the dairy industry has continued to have a close partnership with the government over the years. The government's support to sustain this industry extends from research and development to expansion and commercialisation. However, the positive impact of this collaboration is felt disproportionately by different stakeholders, as processors have seem to have been advantaged over milk producers. Moreover, the government has failed to facilitate the transition of the industry towards a more holistically sustainable model. This has made conventional milk production not only disadvantageous to the farmer but to the environment as well.

Australia's role in meeting the UN Sustainable Development Goals is considered to be extremely crucial. However, its current approach of supporting exploitative practices in major industries like beef, milk, mining etc. is counterproductive to its ultimate goal of reducing the overall carbon footprint of the nation.

Support of dairy farmers
As DairyAustralia puts it – 'Downgraded milk prices, ongoing market volatility and dry conditions mean challenging times for many dairy farmers'. The deteriorating situation of dairy production should be seen as an opportunity to invest in alternative markets and open up fresh avenues for farmers to work in more efficient and environment-friendly industries. The transition, although complex, should not be seen as a major leap.

Unfortunately, the past few years have been spent formulating policies to protect farmers and support their activities in order to preserve the dairy industry in its conventional form. The government provides special allowances to farmers facing financial crises. Concessional loans are provided to producers who are located in drought-affected areas. Moreover, the government also disburses grants up to $1500 for community development activities. By the nature of these policies, one can gauge the vast gap between the ground realities of the industry and the short-term benefits offered by the government.

In the current scenario, the most genuine form of support for farmers will be, to not only encourage them to shift to cultivation of plant-based milk or other sustainable forms of agriculture, but to actively facilitate a smooth transition – with financial incentives, stable market for eco-friendly industries and increasing public awareness about the plethora of benefits of switching to plant-based milk alternatives. Many farmers have already made the switch, like Harjap Singh Dosanjh from New South Wales who shifted from cattle farming to blueberry cultivation – yielding positive results for producers, consumers and the environment. However, these isolated incidents of sustainable farming will not be enough to structurally change the general outlook towards industries like dairy.

Health

Across the globe, dairy has always been touted to be the one solution to a variety of health problems. While milk consumption is affected greatly by cultural factors, it is important to note that a large amount of information about the benefits of dairy, in the public domain, has been provided by scientists, economists and producers who have had personal stakes in the growth of the dairy industry. In 2014, Industrialists in the USA spent more than $3.5 million to lobby for the dairy market (OpenSecrets, 2014). Such a biased form of information dissemination has led to the normalization of several, otherwise, unverified details about milk and dairy products.

Milk has been assumed to be a vital source of Vitamin-D or Calcium to the point where it is expected to prevent breakage of bones in humans. Recently several studies have recorded how increased milk intake does not benefit bone health, to a large extent. Moreover, consumption of milk does not guarantee protection from stress fractures (Bolland et al., 2015). A study conducted in 2014 had also concluded that men who consumed milk more, were at a 9% *greater* risk of hip fracture (Feskanich et al., 2014).

Dairy products are known to be a major source of saturated fat and cholesterol which contribute to a variety of diseases like cardiovascular diseases, Alzheimer's as well as Type-2 Diabetes. These fats present in dairy products facilitate artery-clogging – making products like cheese (70% fat) extremely harmful to human health. Hyper-focus on the dairy industry has also pushed a vast section of the public, which experiences lactose intolerance, to the sideline. Lactose intolerance is the reduced ability to digest lactose sugar found in dairy products. Around 65% of the human

population is known to develop lactose intolerance to some extent, after infancy. Despite these numbers, this syndrome is treated as an anomaly and not a norm, in most parts of the world. Studies have shown that lactose-intolerant people, due to their reduced milk consumption, have lower chances of being diagnosed with lung cancer, breast cancer, and ovarian cancer (Ji et al., 2015).

IGF-1 is a form of peptide hormone – traces of which have been found in milk and dairy products – has positively been linked to increased risk of prostate cancer in humans. Non-dairy milk alternatives on the contrary, contain relatively low levels of these essential amino acid content which decreases blood-levels of IGF-1.

To understand the full picture of dairy's impact on human health, one must also understand the properties of the 'modern' milk which is widely circulated today. Achieving optimum production levels have forced dairy farmers to employ techniques which alter the quality of milk. A study conducted in 2011 highlights how traces of antibiotics used to treat commonly-occurring udder infections in cows are found in milk and dairy products (Azzouz et al., 2011).

Evaluating these health risks associated with dairy consumption draws our attention to the annual expenditure of tackling these widespread problems. As per the Australian Disease Expenditure report released in 2019, the total health expenditure was estimated to be $117 billion. Of the total disease groups analysed, the diseases linked to dairy consumption namely – Cardiovascular diseases, Cancer, Musculoskeletal diseases, Gastrointestinal disorders – contributed 8.93%, 7.17%, 10.72% and 5.86% respectively, to the total burden of expenditure.

In the face of such concerning numbers, we must shift our focus towards non-dairy milk alternatives which not only provide proven health benefits, they put less financial burden on the consumer, and avoid putting further strain on our already suffering eco-systems. The following table (Sethi et al., 2016) details the health benefits of different types (Legume-based, Cereal-based, Nut-based etc) of plant-based milk.

Table 1

Functional components of plant-based milk alternatives and their health benefits

Type of milk	Functional or bioactive component	Health benefits	References
Soy milk	Isoflavones	Protective effect against cancer, cardiovascular disease, and osteoporosis	Omoni and Aluko (2005)
	Phytosterols	Cholesterol lowering properties	Fukui et al. (2002)
Peanut milk	Phenolic compounds	Protective role against oxidative damage and diseases like coronary heart disease, stroke, and various cancers	Wien et al. (2014), Settaluri et al. (2012)
Rice milk	Phytosterols, especially β-sitosterol and γ-oryzanol	Lowers cholesterol, hypertension, anti-diabetic, anti-inflammatory, anti-oxidative effects	Biswas et al. (2011), Faccin et al. (2009)
Oat milk	β-Glucan	Increases solution viscosity and can delay gastric emptying time, increases gastrointestinal transit time which are associated with their reduced blood glucose level, hypocholesterolemic effect by reducing total and LDL cholesterol	Welch (1995), Truswell (2002), Deswal et al. (2014)
Sesame milk	lignans such as sesamin, sesamolin, sesaminol	Neutraceutical properties such as antioxidative, hypocholesterolemic, anticarcinogenic, antitumor, and antiviral activities	Namiki (2007)
Almond milk	Alpha-tocopherol	Powerful antioxidant which plays a critical role in protecting against free-radical reactions	Burton and Ingold (1989), Niki et al. (1989)
	Arabinose	Prebiotic properties	Mandalari et al. (2008)
Coconut milk	Lauric acid	Promotes brain development, boosts immune system and maintains the elasticity of the blood vessels	Seow and Gwee (1997)
	Vitamin E	Fights against ageing, nourishes skin	

Functional components of plant-based milk alternatives and their health benefits.
Source Sethi et al., 2016

Animal Cruelty

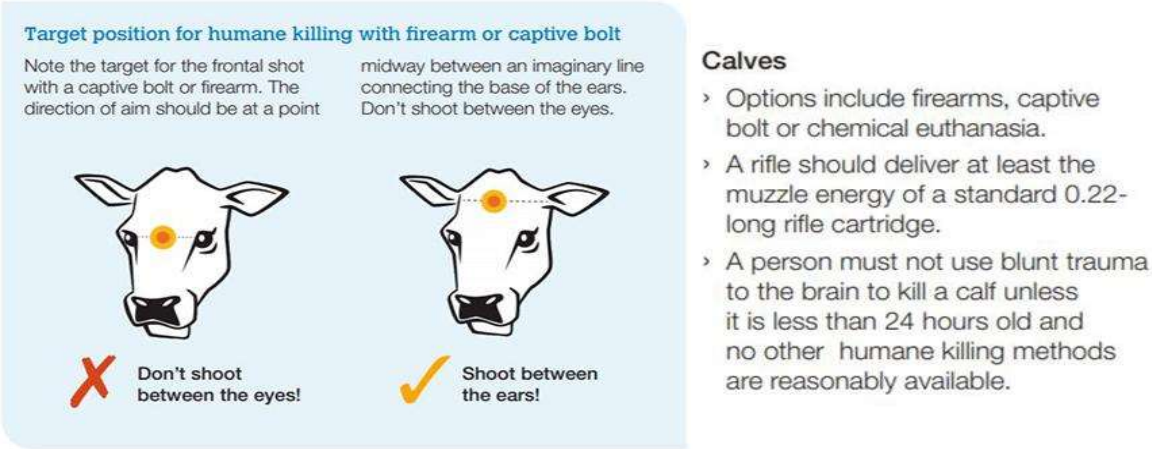
Inhumane treatment of animals in a wide range of industries (cosmetics, clothing etc.) has been a point of contention for decades. Continuous advocacy to decrease animal cruelty in several such industries has brought about positive results to the point where 'Cruelty-free' products are prioritised over other products. However, the dairy industry has evaded stringent action for exploiting animals to an extent where they are treated more as commodities than as animals.

The torment of cows, bulls and calves occurs at all levels of milk production and processing. The efficient herd management techniques that the dairy industry is famous for actually begins with a rigorous process of breeding. Semen is collected from a specific type of bulls using electro-ejaculation which requires an anal probe of all the bulls to offset involuntary ejaculation. The semen collected from these bulls is then forced into the anus of cows using a gun-like straw. In the name of 'better genetics' and consequential 'better results', artificial insemination is not only considered a viable form of reproduction by farmers but has also been deemed to be a legal procedure by the court of law.

'Anal probe and semen being collected from bull.' Source: FarmTransparency

The majority of the time, after a 9-month gestation period, the calves birthed by these cows are immediately separated from their mothers. This is followed by rigorous rearing of the calves to make them useful components of the milking herd, as soon as possible. Typically, these calves are also involved in the reproduction procedure 2 years after their birth. These calves are known to become distressed and anxious since their birth due to separation and are put under undue pressure to reproduce at a young age.

Some farm animals, however, arguably have it even worse. Not performing activities to the liking of their farm owners (i.e. not profitable) leads to the indiscriminate slaughter of farm animals. Bulls with sub-par quality of semen, cows with stunted growth or calves with undesirable qualities, are all slaughtered. As per estimations made from Dairy Australia, around 400,000 bobby calves are slaughtered every year – before they even reach the age of 30 days. Majority of these calves are killed in their first week of birth itself. The methods used to kill these animals such as blunt-force trauma, firearms, chemical euthanasia etc., are also grave points of concern.



Outline for the destruction of cattle. Source: FarmTransparency

After the selective breeding of cows, the treatment of dairy cows is shocking, to say the least. These cows have been genetically modified to produce an unnatural amount of 20-40L of milk per day. Just like all mammals, a cow must be pregnant or have recently given birth to be lactating. The procedure of milking of these mothers has been mechanised, where they are hooked to industrial machines, and the breastmilk which was meant for their babies is extracted from their bodies. The increased level of udder infections like Mastitis, as well as other disorders in dairy cows are closely linked with the mechanisation of the entire process of milk production (Benedict et al., 2009).

Even these cows – considered to be productive (profitable) by their owners at one point – are culled (selectively slaughtered) after a decline in their level of milk production is observed. Apart from the export of dairy products, Australia is also involved in the 'Live export' of dairy heifers to other countries like Qatar, Sri Lanka etc. Around 90,000 cows are exported live each year in Australia. A vast section of these cows are pregnant and are forced to travel in extremely harsh conditions, with many not surviving the journey.

Other animal-based milks obtained from goats, camels etc. are also forced to face the dangers of the dairy industry. Similar procedures of artificial breeding and selective slaughtering are employed in such farms. Male goats are considered 'waste' products, and apart from a small percentage which are preserved for breeding, most of them are slaughtered at birth (Animal Health Australia 2019**)**. Infections are common and the antibiotics and other drugs used to treat infections and illnesses find their way into the cups of milk consumed by the public.

The gross violation of bodies of farm animals are hidden under the carpet to prevent any major changes to the way this industry works – and to the way it acts as a money-making machine for many. Unlike the conventional dairy industry, plant-based milk industries are intentionally cruelty free and do not put any animals at the risk of being treated as commodities – with a singular purpose to serve humans. The US has seen a 15% fall in dairy sales since 2012, with increasing awareness about animal-cruelty, environmental implications, bovine-infections etc. It has become increasingly important for the consumers in New South Wales to actively opt for non-dairy alternatives which are guaranteed to provide holistic benefits.

Human Rights

Advocating against the growth of the dairy industry in Australia does not entail a call to demonise the farmers who work in this industry. Farm and herd management practices have become accepted as tradition and a "normal, natural, and necessary" evil for the majority of these farmers. Handling of animals in deteriorating conditions and working tirelessly in slaughterhouses takes a physical, mental and emotional toll on workers. There are a total of 25,000 slaughterhouse employees in Australia (as of 2017) who slaughter approximately 10,000 animals every *hour*. They are forced to sustain deadly injuries at the workplace, with limited resources for treatment. Repetitive strain

injuries, lacerations etc are common injuries at the slaughterhouse. A majority of these workers take to drugs to deal with the demands of their industry (Richards et al., 2013). The psychological impact of being employed on at slaughterhouses for years are startling; slaughterhouse workers have been reported to have higher incidences of involvement in several forms of crimes including murder, assault and rape. Suicide is also a problem, with farm manager and laborer suicide rates up to 2.19 times the comparative national rate, with the trend only rising over the years (Page et al., 2002).

Potential for sustainable growth

The sheer nature of the dairy industry in its present form is such that animals, farmers and consumers find themselves stuck in a vicious cycle of exploitation and limited benefits. Such conditions must not be forced upon the citizenry when vastly better alternatives exist. A dedicated plan to shift to a plant-based milk industry is bound to positively affect the overall health of citizens, living conditions of animals and the environment.

Moreover, the dairy industry should strive to become a model for other age-old industries who are running out of fuel to their dependency on unsustainable industrial practices. The only future Australia should envision is one where no industrial supply chain is riddled with exploitative practices but one which promises a healthy and ‘eco-positive’ lifestyle to all.

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