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Thirst in the Golden West:

Suburban and agricultural expansion (1901 to 1945)

In 1900, the *Western Mail* declared, 'With their colony stronger, sturdier, and more vigorous in its septuagenary than ever it was, the colonists can well look forward to the close of the century exhibiting indications of local development and progress that will place Western Australia in even a more important position than she now holds in the Australasian group'.[1] During the first half of the new century, Western Australians witnessed massive suburban and agricultural expansion that was sustained by political vision, but that was founded on the provision of water supplies. The Western Australian population more than doubled, Perth swelled, and the number of rural holdings increased more than three-fold. But this expansion was not without its costs, as the southwest's vulnerability to climate variability and water scarcity was further entrenched.

These vulnerabilities, arising from permanent settlement, a lack of local knowledge and an economic reliance on water, were exacerbated by an unprecedented passion for development. Writing in the early 1980s, historian Lenore Layman observed, 'From the earliest days of colonial self-government to the present

decade, from Sir John Forrest to Sir Charles Court, an ideology of development has been a major characteristic of Western Australia's political culture'.[2] The enduring features of Western Australian developmentalism have included state intervention to initiate, promote and implement development; an anti-Canberra refrain; and, according to Layman, an 'inflated rhetoric which has claimed for Western Australia a "greatness" to match its geographical area'.

The government focus on development was by no means unique: the state has played a particularly central role in economic development in Australian history, as it has in other settler capitalist societies. Moreover, the very notion that development required instigation, as opposed to being something that occurs spontaneously, was first advocated in Wakefieldian tracts from the Australian colonial context in the 1830s and 1840s. Imperial occupation and exploitation provided the ideal environment for scientific experts to flourish. Their role in development had emerged in the context of social unrest in Victorian Britain where liberal thinkers both possessed the means to portray progress as a rational and desirable goal to the populace, and believed they could direct and manage the path to its achievement.[3] Despite the incipience of Western Australia's scientific bureaucracy until after World War I, successive State governments relied upon an emerging faith and credibility invested in science and technology. These governments nonetheless shared an almost reckless optimism about the prospects for managing and achieving economic development. These elements of Western Australian developmentalism and their deployment to engineer the state's wheatbelt, to irrigate the southwest, and to beautify Perth's suburbs in the early twentieth century served to render people in the southwest particularly vulnerable to variations in climate and water supplies – to running out.

Making the last great wheatbelt

Following Western Australia's achievement of self-government in 1890, the state's first Premier, Sir John Forrest, had endeavoured to realise his vision of agricultural expansion throughout the southwest region. The recommendations of the 1887 Venn Commission, appointed to inquire into the stagnant state of colonial agriculture, led the Forrest government to legislate to provide assistance to farmers. This included making more land available to settlers, bank loans to facilitate improvements to their lands, and agricultural advice on farming methods.[4] Forrest envisaged agriculture as the stable foundation for economic development and self-sufficiency that the more volatile mining industry could not provide. The focus of this rural expansion would be the development of a wheat industry between the Darling Ranges and the semi-arid interior of the state. Although this region would be later described as 'hydraulically difficult country', its relatively flat landscape made it ideal for cropping and it became the last of the wheatbelts to spread across the Anglo-world.[5]

Although the colonial government attempted to promote the expansion of farming into new areas through a land grant system, the scale of the endeavour and the difficulties of attracting overseas investment to Western Australia led the government to assume a central role in the development of the wheatbelt region. Its role was not confined only to financing farmers, but also extended to establishing vital infrastructure in the region. The vast distances of the state's emerging agricultural areas from the capital, Perth, and its port, Fremantle, demanded an efficient means to transport goods and people throughout the southwest. Private efforts to establish land grant railways in the 1880s and 1890s had been beset with problems, which had delayed the completion of the arteries vital to 'opening' up new lands and slowed the progress of closer settlement. To spur land settlement after 1901, the government undertook to ensure that all agricultural lands and townships had access to rail services within a radius of fifteen miles (24 km). The

emerging pattern of agricultural settlement then aligned closely with the networks of timber and steel snaking across the region. Between Federation and the outbreak of World War I, over 4,000 km of rail were laid in the wheatbelt, which helped to treble the amount of alienated land from nearly 3 million hectares to nearly 9 million hectares.[6] In the age of the steam locomotive, both farmers and their main mode of transport depended on permanent, reliable supplies of fresh water, and were therefore vulnerable to water scarcity in the dry lands of the emerging Western Australian wheatbelt.

Some farming areas and railways benefitted from their proximity to the Kalgoorlie Pipeline. As Premier Sir John Forrest had long envisioned the agricultural development of the state's inland, he and his Chief Engineer, O'Connor, had also seen a role for the 'Golden Pipeline' in supplying water to the state's drier eastern districts. Indeed, Forrest alluded to such intentions in his speech at the official opening of the Eastern Goldfields Water Scheme at Kalgoorlie on 25 January 1903: 'The completion of this beneficent work must have an immense influence in promoting the advancement of these goldfields and *in assisting the settlement of the country through which the pipeline passes*'.[7] The Goldfields Water Supply Scheme became an important source of water for many parts of the wheatbelt in its early development, not least because this expansion of services could help to offset the maintenance costs of the pipeline.[8]

With most wheatbelt farmers undertaking both wheat cropping and sheep rearing, those without access to reticulated water supplies had to find alternative sources to meet their domestic needs and to water their livestock. The government's rail engineers had already encountered the difficulties of sourcing reliable water supplies in the streamless areas of the wheatbelt.[9] They had overcome the lack of surface water by exploiting and excavating the gnamma holes and soaks that had long sustained the region's Nyoongar and Kalamaia Aboriginal peoples. Many farmers developed their own supplies, such as natural reservoirs, wells, and 'earth tanks' or dams,

as well as collecting water from their roofs.[10] In his memoir *A Fortunate Life*, Albert Facey recounts digging a soak near Narrogin and later, sinking a dam on a property in Jitarning. Others carted water from government dams that the government had excavated at eight-mile (13 km) intervals.[11]

Although these supplies were sufficient when the seasons were favourable, the slim margin for error in the wheatbelt was exposed when rains fell short of expectation. The winter of 1911, for example, put these supplies to the test, when the wheat-growing districts registered an average of 12.54 inches (318.5 mm) of rain, at least four inches fewer than the preceding four years. These dry conditions resulted in a significant reduction of the average yield of wheat per acre and many farmers in the central and eastern agricultural areas had to cart water over significant distances for their stock.[12] Dependent on run-off from rainfall, dams had proven ineffectual when they were most needed.

The Scaddan government's (1911–16) response to the drought conditions displayed the hallmarks of a technocratic approach to the management of climate variability and water scarcity. Rather than question the historical and social dimensions of natural hazards such as climate variability, a technocratic approach advocates the application of scientific prediction and centralised management of hazards to mitigate disasters. Historical geographer J. M. Powell suggests that the most visible official response to the 1911 drought was a shift away from the reliance on earth tanks to well-boring.[13] The newly established state-wide Water Supply, Sewerage and Drainage Department despatched teams to drill for water in the dry districts and their success was largely dependent on the accessibility and quality of the groundwater. These wells were located near roads at regular intervals for watering travelling stock. The department also improved soaks and rock holes; cleared dam catchments to improve run-off; erected corrugated iron tanks at railway sidings; and ensured these supplies were more accessible to farmers. These were technocratic solutions designed to stave off the abandonment of the agricultural areas and to insure the

wheatbelt against future shortages. Although many desperate farmers no doubt welcomed these measures, this hasty provision of water supplies arguably gave farmers and the government the confidence to go on, and to ultimately extend into the most agriculturally marginal areas of the southwest.

These solutions also had ramifications for the resilience of the local Aboriginal people to dry seasons. In early September 1913, Commissioner of the Wheatbelt George L. Sutton presented a lecture to an audience at the Western Australian Museum. Using lantern slides he showed his audience the state's agricultural progress and explained, 'Yesterday our wheat lands were a blacks' camp. To-day they are being broken up with the most suitable implements modern engineering can devise'.[14] Sutton's speech deployed the rhetoric of white development: that agricultural cultivation was a moral act of civilisation, which rendered white Australians superior to Aboriginal peoples, who seemed to lack the ability to till the soil. Yet many Aboriginal people remained in the emerging agricultural areas: historian Anna Haebich estimates that about three-quarters of the southwest's Aboriginal population (possibly 1,500 people) lived in the wheatbelt region at the turn of the twentieth century.[15] The development of Western Australia's wheat industry dramatically transformed Nyoongar and Kalamaia lands and limited the ability of many Aborigines to access country. In turn, these restrictions on Aboriginal mobility constrained their capacities to cope during periods of water scarcity. Consequently, many Aboriginal people were compelled into dependence on white settlements from which they were comprehensively marginalised, and therefore, rendered especially vulnerable to climate variability.

Prior to agricultural development, much of the land that would become the wheatbelt had been held under pastoral lease. The pastoralists had used the waterholes and moved their stock according to the seasons. Many of the region's Aboriginal people had been able to gain employment from the pastoral stations, and the station owners permitted them to hunt and camp on the land. Although the Aborigines had been paid a pittance, this

employment had at least allowed them to continue to live on country, to maintain some elements of traditional life, and to access important soaks and waterholes, although many of these had been damaged by stock.

As the wheatbelt slowly began to take shape, however, these opportunities for the region's Aborigines to remain on country were greatly diminished. As the large pastoral properties were broken up, fenced, and cultivated, many farmers prohibited Aboriginal access to their landholdings. Furthermore, employment opportunities for Aboriginies were reduced as their labour was only required for clearing bush and seasonal labour.[16] The extensive land clearing required for agricultural development also affected the water quality of the region's few streams, which became brackish and unsuitable for drinking. The Aborigines who had been granted farms found their efforts subject to stringent conditions. Although they were denied the land titles for their farms, the Lands Department still expected them to carry out a host of improvements to their blocks, such as building a farmhouse and fences, as well as clearing and cultivating portions of the land. If these requirements were not met, the department could reduce the size of their land or resume their properties. But many of these farmers lacked the capital to make these improvements and could not use their properties as security for bank loans.

Such were the constraints on their endeavours that it was nearly impossible for them to survive and with the onset of dry conditions in 1911, many Aborigines were forced to move into camps on the outskirts of the wheatbelt towns. In one town, Katanning, the Aboriginal population increased fivefold in three years, from forty to over 200.[17] Accompanying this shift was a threefold increase in the reliance of Aborigines on government rations, from about 1,000 in 1907 to over 3,000 by the outbreak of World War I. As Haebich explains, the state of the camps quickly degenerated: 'There were no proper shelters, no sanitary or rubbish services, no fresh water, no work and only meagre rations of flour, tea and sugar for the elderly and dependent mothers, issued by the

police on behalf of the Aborigines Department'.[18] Many perished as a result of these conditions. The development of the wheatbelt, therefore, forced many Aborigines into a condition of dependency on the state and onto the fringes of the white settlements in the southwest, where their hydroresilience continued to be eroded.

Irrigating the southwest

Other calls to the government to provide additional water supplies came from an unlikely source: the farmers in the coastal districts of the southwest. In the late 1890s when O'Connor's pipeline was under construction, the *Western Mail* had observed, 'Surely it is one of the satires loved of nature, that, while an elaborate scheme is necessary to supply the goldfields with water, a whole district in the South-West is piteously demanding help to get rid of a superabundance of it'.[19] Farmers in the Harvey area had found that they could withstand the dry summer months by irrigating from the drains that had been excavated in the district to alleviate frequent flooding. This water was mostly used for the irrigation of pastures to ensure that cows were in milk throughout the year. In addition to dairy pastures, farmers irrigated orchards, vines, vegetables and lucerne on the productive alluvial soils of the Pinjarra Plain.

Hoping to replicate the perceived successes of the Mildura and Renmark irrigation settlements in Victoria and South Australia, many farmers in the Harvey area were demanding in 1911 that the government provide irrigated water supplies.[20] A government irrigation scheme, these farmers believed, would provide a more efficient and equitable system than using the drains.[21] After government engineer Hugh Oldham surveyed the rivers from the Serpentine to the Collie to gauge their suitability for impounding water, Harvey Dam was constructed on the Harvey River in 1916 and its waters distributed through open, unlined channels. Only time would tell whether it would be the panacea that irrigators had hoped for.

Battling on the home front

'Grim drought stalks almost the length and breadth of the land', reported the *West Australian* on New Year's Day, 1915.[22] Many farmers had had little opportunity to recover from the dry conditions of 1911 and now, the entire agricultural area was affected, with some areas receiving less than half their 'average' rainfall.[23] These conditions caused the state's wheat yield to plummet by 80 per cent in a single year.[24] For many older farmers, it was the worst season they had ever known. John Payne of Perenjori remembered the emotional toll of this drought on his father, who 'put his head in his hands and he cried there for a long time'.[25] The region's Aboriginal farmers were especially affected as they generally lacked the financial resources to persevere and many were forced to leave their properties.[26] The coincidence of the drought with the commencement of World War I saw many young rural men enter the armed services in order to escape economic hardship.[27]

The overwhelming effects of drought and World War I on Western Australian farmers led to grave doubts about the southwest's suitability for agricultural development, particularly regarding wheat farming in the eastern wheatbelt. These were environmental anxieties that questioned the state's economic future. As most of the wheatbelt had only been settled after 1908, many farmers had struggled to establish themselves under difficult climatic and financial conditions. Compared to the longer-established farmers, the more recently established farmers lacked the capital and experience to cope with the dry conditions. In 1916, the State government established a Royal Commission to inquire into the state's agricultural industries; its findings for the wheatbelt and the southwest coastal areas were published the following year. Echoing assessments of the struggling Swan River Colony, the commissioners concluded that, 'The settlers, in brief, have up to the present, conducted a vast experimental farm for the benefit of the State and posterity'.[28]

Evidence to the Royal Commission revealed just how vulnerable some wheatbelt farmers were to climate variability and water scarcity. Witnesses reported that farmers were 'inclined to lose heart' as their debts mounted. In the Victoria district, noted a witness, 'Half of them do not get a decent feed a week'. He wondered, 'It puzzles me to know where the records of rainfalls come from and how it is that people were rushed out into these dry areas'. Of great concern to the commissioners was the amount of rain that the wheatbelt farmers could expect to receive. Farmers at Ajana and Carnamah considered the government had deliberately misled them with promises of 14 and 16 inches of average annual rainfall respectively. The government, argued these farmers, had not only overlooked the drought of 1911 but also assured them that it would be 'absolutely droughtless'.[29] The government had estimated that 12 inches of winter rainfall was sufficient for cropping and rainfall data suggests that, on average, most of the agricultural areas received this amount. But averages can be misleading. Until the end of World War I, this wheatbelt area was 'critically marginal' because of the rudimentary nature of the farming techniques employed at that time.[30]

For the government and the farmers on the wheatbelt's eastern fringe, the drought of 1914 had exposed a mismatch between their ambitions and their knowledge. The testimonies above suggest that at least some farmers blamed the government for the consequences of the drought. This position reflects the prevalence of a technocratic approach to disaster prevention at this time. As this approach fosters the concentration of scientific expertise in government bureaucracy, concern about the preparedness, prediction and control of natural hazards is abrogated to specialists. This process, according to geographer Kenneth Hewitt, 'quarantines disaster in thought as well as in practice', which in turn, places the responsibility to ameliorate disaster squarely on the government.[31] After all, the Western Australian government had promoted farming in the areas that were affected by drought and the state's farmers were vital to its

plans for agricultural development. If farming on the margins was to continue, the government would have to do more to improve the hydroresilience of wheatbelt farmers.

Although the commissioners acknowledged the limited climatic knowledge of the outer limits of the wheatbelt, they attempted to impose a 'safe' limit for cultivation. Upon the request of the commissioners, Surveyor-General Frederick Slade Brockman charted a line of 'reliable rainfall' across the western third, recalling Goyder's Line in South Australia. In creating this lesser-known Brockman Line, the Surveyor-General constructed a region in which farmers could safely expect climatic conditions that were suitable for wheat-growing. But it would do little to help farmers avoid or ameliorate droughts in the future; instead, the rainfall limit had 'merely reinforced the prevailing definition of wheat-growing areas'.[32] It served then to support the continued development of these districts that were vulnerable to running out.

After all, drought in the southwest was believed to be an abnormal phenomenon. As the commissioners reported, 'Our rainfall…is more regular than in any of the other States, and we should be able to look forward to regular yields as our methods of cultivation improve'.[33] Failure on the land, therefore, was not seen to be due so much to the land or climate but to the lack of effort and determination of the farmer.[34] The 'land is usually good to those who use it well', observed the commissioners, 'While it rejects infallibly the unfit and the ineffective'.[35] Good farmers were those who applied the latest innovations in wheat growing, such as the new wheat varieties and superphosphate that were helping to support the agricultural expansion into the drier wheatbelt region.

To assist farmers in their endeavours, the Commission demanded better services from the state's Department of Agriculture. To foster the productivity of the inland areas, the Forrest government had established a Bureau of Agriculture in 1894, which later became the Department of Agriculture. The purpose of the Bureau was to regulate the farming industries and their produce, and to communicate scientific developments that could help

farmers. Its establishment of experimental farms in the inland areas reflected the pattern of agricultural expansion at this time, with the intention of demonstrating that farming could be successful in these areas if they followed the department's directives.[36]

One of the methods that the department advocated to wheatbelt farmers was dry farming. These techniques had first emerged in the 1870s and 1880s on the Great Plains of the United States.[37] The dry farming concept was based on the idea that cultivating bare fallow left behind a layer of fine dust, which would prevent evaporation and conserve soil moisture. The concept was enthusiastically adopted in eastern Australia at the turn of the century, and later brought to Western Australia by George L. Sutton, the first Commissioner for the Wheatbelt.[38] The fervour for fallow captured the imagination of the agricultural technocracy throughout the nation's cereal regions because it was supposed to make the most of the limited rainfall in these districts. Through technical advice, competitions and Agricultural Bank lending policies, technocrats urged farmers to frequently cultivate bare fallow to increase their yields and improve their ability to withstand dry conditions.[39]

Although the commissioners had found fault with some of the government's more reckless policies, the vital importance of agricultural development remained unquestioned. The definition of a 'safe' rainfall limit counted for little when overseas markets beckoned and allowed farmers to roll the dice when it came to the seasons after the war. Sooner or later, their luck would run out.

The orchardists in the Harvey district, meanwhile, faced the problem of too much water. The predictions of large water losses; the uneven distribution of water through ungraded, established citrus groves; and waterlogging problems were all borne out. Despite their much shorter examination of the challenges facing the Harvey district compared to their study of the wheatbelt, the commissioners were scathing of the state's first large-scale irrigation scheme. 'The application of water to land', they surmised, 'is not an open sesame to profitable production'. The main grievance

for the commissioners was the scientific and technical advice, or lack thereof, that had guided the scheme's development: 'There is perhaps no more regrettable feature of the Harvey question than the fact that no attempt was made to show the settlers how to use the water'.[40] The government had deployed inexperienced engineers on the project and failed to address the significant drainage issues affecting the region. Likewise, Oldham's decision to use unlined channels, rather than the piped network that the farmers had wanted, proved a failure. Water could easily escape the channels, causing considerable damage to the poorly drained orchards. Irrigators and their governments continued to face the problems of 'too much' and 'too little' in their ongoing efforts to overcome the summer 'drought' in these districts.

Watering the suburbs

After Federation, Australians across the new nation continued to gravitate toward cities along the coastline. In Western Australia, Perth and its expanding suburbs grew nearly threefold between 1911 and 1941, from 87,000 to 229,700.[41] By the end of World War II, more Western Australians lived in Perth than in the state's agricultural areas, eclipsing the metropolitan dominance in the other states.[42] The expansion of the suburbs transformed the environment of the Swan Coastal Plain as land was cleared to make way for new homes. The water use of suburban householders also underwent a dramatic change, with each Perth resident in 1941 consuming nearly twice as much water per day as they had in 1911. Before World War I Perth residents on average consumed nearly 164 L each per day; by the beginning of World War II, they were consuming nearly 306 L.[43] How did the people of Perth become so thirsty?

Some of this increase in water use can be attributed to the increased domestic availability and accessibility of water, which resulted from the growing reticulation of the suburbs. The

opening of the Kalgoorlie Pipeline in 1903 had created a disparity in comfort between those on the eastern goldfields and those in the suburbs of Perth, who remained largely reliant on artesian bores.[44] Even in the early 1920s, the *Daily News* would opine, 'There is no sound reason why the people of the metropolitan area should be treated differently from the rest of the population'.[45] This would later become a complaint from regional residents about the special treatment given to the people of Perth. Reticulation was frequently used as an enticement to prospective residents of the new suburbs and the Metropolitan Water Supply, Sewerage and Drainage Board (MWSSDB) increased its water storages to ensure these supplies would be available. By 1913, all areas serviceable by gravity had been reticulated. Yet nearly a quarter of Perth's homes remained without piped water and they depended on wells and neighbours' taps for their supplies. Many more continued to rely on galvanised iron tanks to supplement the expensive and unreliable reticulated supplies.

In the summer of 1919–20, the State government introduced water restrictions on suburban water use. These restrictions forbade the use of mechanical sprinklers as the tendency of Perth residents to consume more water during the hot summer months threatened to exhaust the city's water supplies. This move was met with a backlash, evident in the local press. The *Daily News* raged:

> The Water Supply Department's order issued to-day is a humiliating confession of incapacity and short-sightedness, and the citizens whose gardens are doomed, and whose pride will very soon be humbled in the hot sand, will be altogether justified if they demand either that the Government…shall either straightway take steps to ensure that no future summer will find us in such evil straits, or will get out of office and give the reins to another set of Ministers who will be…more given to exercise of initiative in big things and capable of administration in the departments which count so largely in our everyday life.[46]

The editor of the *Sunday Times* argued that the government had failed to keep pace with the growing metropolitan population.[47] Although per capita consumption had remained steady, total consumption had doubled since 1911, from about 5,000 ML to over 10,000 ML in 1921.[48]

The press argued that as the 'people [paid] for water, and [paid] dearly', they should be able to use their scheme water when, where, and how they wished.[49] Such an argument suggested a growing consumer activism among Perth water users. In their study of water shortages in London in the 1890s, historians Vanessa Taylor and Frank Trentmann consider that such activism represented a 'politics of entitlement and provision in times of scarcity', which arose from the growing connections between the private and public spheres that reticulated water supplies had helped forge.[50] In both London and Perth, these connections were technical as well as political. The linkage of households to pumping stations and dams, which allowed changes in private routines, became the basis for political mobilisation regarding water services. In Perth, such protests not only reflected public dissatisfaction with the state of the city's water supplies, but also the sense of vulnerability among householders to running out of water. This vulnerability arose from anxieties about the nature of Perth's urban and domestic spaces.

Anxieties about the health and progress of white Australians were important influences on the relationships that people in the growing suburbs of Perth had developed with water supplies and their (natural) surrounds by the first half of the twentieth century. Their anxieties led them to develop dependencies on abundant water supplies to overcome their fears, which in turn, weakened their hydroresilience. The application of the concept of environmental anxiety to the households and suburbs of Perth in the early twentieth century questions the security that Australians have long associated with suburban spaces.

After World War I, concerns were reignited among the British and Australian middle classes about racial degeneration and

the decline of the empire.[51] Roused by these worries, reformers from an emergent class of technocrats sought to overcome social ills through the application of principles of science and reason to domestic life. Stimulating this movement were widely held anxieties about the influence of the environmental conditions inside and outside the (middle class) home on the mental and physical health of Western Australians. Meanwhile, the body and its health had come to be seen as a closed system, distinct and separate from its environment. White Western Australians, for instance, no longer perceived the climate characteristics of the temperate southwest as potentially threatening to their health. Likewise, belief in the miasmic theory of disease transmission had been replaced with germ theory.

These ideas point to the paradox that historian Linda Nash has observed in modern public health: 'it insisted on the need for certain environmental changes while denying that the environment played an active role in the production of disease'.[52] In line with the modernist state, advocates of these environmental reforms were mostly male members of an emerging professional middle class seeking to reshape Australian suburbs, homes and families according to their vision of a modern society. Local advocates such as William Saw, Billie Bold, Harold Boas, and also Bessie Rischbeith, called for the improvement of parks and playgrounds to better the lives of Western Australians, particularly children.[53] Water was an important, yet often overlooked, tool to achieve such reform. By the end of the nineteenth century, a constant water supply had come to symbolise modern civilisation and these supplies provided the means to cultivate attractive open spaces. These suburban environmental anxieties, therefore, kindled an ever-growing thirst in many Perth householders and diminished their hydroresilience.

The State government had blamed Perth's avid gardening enthusiasts for the need to implement water restrictions. The Minister for Water Supply, William George, likened their water consumption to 'criminal practice', and considered their behaviour

mindless because 'in the sandy soils of Perth this flooding of water simply leached out the plant food'.[54] But without liberal amounts of water, cried one newspaper correspondent, 'the City Beautiful…must quickly become little better than an arid desert'.[55] The government's condemnation was an affront to the city's gardeners who had invested heavily in improving the appearance of their properties. It also revealed the cultural significance that suburban gardens had attained in Perth by the early decades of the twentieth century.

The expansion of Perth's reticulated water supplies had coincided with changing expectations about the appearance of the city and its suburbs. During World War I, Perth's town planning movement emerged and its influence on suburban development in Western Australia was almost immediate. The leaders of the local movement widely advocated the importance of orderly planning, open spaces and aesthetic appeal in town planning.[56] In an address to the Royal Society of Western Australia in 1918, William Saw, the President of the Town Planning Association of Western Australia, argued,

> We must do better than we have done in conserving our baby life by taking greater care of the mothers of the nation…by getting [them]…out…to zones…where the children, in their garden villages, will grow up taller, stronger, deeper in the chest, freer from physical defects, happier, more likely to be stalwart effectives in the wealth-creating forces of the State, and less likely to be a burden on the community.[57]

Attention to these details not only reflected the ideals of the international town planning movement, but was also evidence of the prevailing anxieties about the influence of the environment on the mental and physical health of suburban Western Australians.

Creating the ideal environment for the healthy moral and physical development of Western Australian children was the duty of the state's citizens. Citizenship, therefore, was closely

related to the upkeep of the home's outward appearance. The maintenance of the front garden in particular was, according to historian Robert Freestone, 'vital in order to attain the coherence of the garden suburb street picture, which secured a demonstrable sense of community'.[58] Garden fashions called for a large expanse of lawn, with flowering shrubs and annuals. The backyard, in contrast, was a utilitarian space for household tasks.[59] To allow the front garden to deteriorate would undermine the bonds of the community, reflecting imperial anxieties of racial and imperial decline during the interwar period.[60] These middle-class concerns about the appearance of the front garden led to the heavy use of water outside Perth homes, particularly during the long summer months. During the period of water restrictions, some local businesses appealed to these anxieties and encouraged gardeners to invest in windmills and engine pumps to 'be independent' and to ensure 'a free water supply, when you want it, and where you want it'.[61] It was only after this period of water restrictions that locally produced gardening publications for local conditions, such as the *Western Australian Gardening Guide*, advocated methods of water conservation.[62]

Although Perth's gardening enthusiasts were especially outraged at the restrictions on their water use, many householders found their reticulated water supplies had literally dried up. In March 1920, the *Daily News* declared, 'Last night practically the whole city was without water, and the sorry spectacle was witnessed, even in Hay-street West, of mothers taking their pitchers to those who possessed wells, to obtain water with which to wash their children before putting them to bed'.[63] Reminiscent of the Great Water Famine of the late 1890s, this account highlights the domestic relationship between women and water, and the ways in which gender relations shaped water use in suburban Perth in the early twentieth century. At the time of these shortages, nearly half the average household's water consumption took place inside the home.[64] These shortages exposed the dependence of many suburban households on relatively reliable scheme water supplies

to maintain the fragile veneer of civility, and in doing so, revealed the vulnerability of the middle class home to running out.

As the account suggests, such episodes of water scarcity interrupted the domestic routines of Perth's housewives and domestic servants, adding to their heavy household burden.[65] After all, argued the local magazine *Western Homes*, they were responsible for making the ideal home: 'The parents of the West must strive to make a home of their house, and create that "Home Influence" which does not distort but beautifies; which makes *good citizens*, and not bad parasites or dangerous criminals'.[66] Despite the improvements in household plumbing and the availability of piped scheme water, the domestic duties of most housewives remained arduous. Even homes that were connected to scheme water supplies did not necessarily have a kitchen sink and its associated drainage system. For instance, on the eve of World War I, a visitor to a comfortable home in suburban Claremont would have found the kitchen tap near to the floor, dishes washed in a bowl, and the dirty water tipped out daily.[67] Although indoor plumbing had become commonplace around World War I, some homes still remained without these conveniences in the 1940s. Nevertheless, these rudimentary technologies helped Perth housewives to conform to middle-class expectations of the domestic sphere. As sociologist Kerreen Reiger notes, their daily chores had become transformed into 'scientific work of national importance' – of creating good citizens.[68] Water scarcity, however, rendered these technologies impotent and exacerbated suburban anxieties of running out.

When restrictions were re-imposed in the following years, newspapers called for lunch-hour demonstrations, warning the government that 'the people [would] not tolerate further fooling. Water must come, or, on the first opportunity, the Government must go'.[69] In 1923, over 2,000 Perth residents attended a meeting at the Rosemount Theatre in North Perth chaired by Premier James Mitchell – a sizable crowd for a city of just under 155,000 people. Their concerns were with both the quality and the quantity of the reticulated water supplies. The disgruntled assembly brought

with them specimens of the unpalatable water supply, which they said resembled 'liquid sausage meat' and 'tomato sauce'.[70] Premier Mitchell told the audience, 'It is not the desire of the Government in any way to hamper the laudable desire of the people to beautify their surroundings'.[71] He then announced his government's plan to extend the reticulation system to meet the needs of the city, which would include new service reservoirs on Mt Eliza, Mt Hawthorn and Melville Park in the late 1920s; new catchment dams at Wungong and Churchman's Brooks in 1925 and 1929, respectively; and lastly the Canning River Scheme, which was finally completed in 1940. Until the completion of Canning Dam, however, restrictions were intermittently imposed on garden water use to reduce the draw on the city's limited supplies.

By the end of World War II, nearly all the houses in Perth had running water. In the southwest's agricultural areas, however, fewer than half of the homes had a coldwater tap inside the house.[72] Raising the living standards of the state's farming families became an important project after the war. This post-war project reflected the enduring strength of the environmental reform movement that had shaped the development of Perth's suburbs and homes in the first half of the twentieth century. The movement's emphasis on the role of the suburban and domestic environment in improving the moral and physical health of (white) Western Australians played a significant part in entrenching the thirsty lifestyle that would characterise Perth after the war. It was a lifestyle that would leave the suburbs vulnerable to running out.

Development and depression between the wars

Following the Armistice, James Mitchell's National Party government (1919–24; 1930–33) renewed its support for expanding agricultural settlement throughout the heavily timbered southwest and into the increasingly marginal lands of the eastern wheatbelt. Its policies of group, soldier and unemployed workers' settlement schemes in

Western Australia reflected efforts throughout the British Empire to colonise the dominions with British emigrants, to aid economic recovery, and to reward soldiers for performing their wartime duties. In Western Australia, it was anticipated that the agricultural production of these settlers would offset the decline of the gold industry and overcome the shortage of dairy supplies and associated products in the state. Furthermore, the schemes would relieve post-war unemployment and the influx of migrants would boost the state's prospects for economic development.[73] But the difficulties that the group settlers faced as they attempted to establish a dairy industry in the coastal southwest made success in the wheatbelt vital, for both the state's economy and the government's reputation.

There were doubts within the scientific community regarding the wisdom of Western Australia's agricultural expansion into the eastern districts. Among them was the outspoken physiographer Griffith Taylor, who had worked for the Bureau of Meteorology and participated in Scott's *Terra Nova* expedition to Antarctica prior to his appointment as foundation head of the geography department at the University of Sydney in 1920. In contrast to the resounding call for 'Australia Unlimited' after the war, Taylor counselled caution. He considered that large areas of Australia remained uninhabited by Europeans because these lands were suitable for neither agriculture nor pastoralism. In his 1911 book *Australia* (and its subsequent editions), Taylor had denoted a large portion of inland Western Australia as 'useless'. This description was clearly at odds with the expansionist agenda of the Mitchell government. Perceived then as a poisonous influence, Taylor's textbook was banned from the state's school and university curriculums in 1921.[74] The rejection of Taylor's cautionary message was symptomatic of the revival of long-held anxieties regarding the progress of a White Australia. Moreover, it was representative of the widespread disregard for scientific advice when it conflicted with a political agenda of development and land settlement – a trend that only deepened the vulnerabilities of the southwest to variations in climate and water supplies.[75]

Taylor's former employer, the Bureau of Meteorology, was far more supportive of the Western Australian government's development agenda. In 1929, for instance, the Bureau published the *Results of Rainfall Observations in Western Australia*, the fifth in a six-volume series in which the rainfall statistics of each state were compiled. The Bureau's representation of Western Australian climates complemented the expansionist agenda of the recently elected Collier government (1933–36), which pursued policies similar to its predecessor. In the preface to report, the Commonwealth Meteorologist, Henry A. Hunt, explained:

> The records of past seasons…are…indispensable to the success of most of the young inexperienced men on the land. By a study of his districts' [sic] seasons in the past, a young settler is able to avoid under or over expenditure in increasing his stock or in improvements. The records will show him how many good, bad, or indifferent years he is entitled to expect; and he will not be over optimistic after a good season nor over pessimistic after a bad one. The records, too, are made available for the guidance of the majority of established farmers and graziers, for memory of past seasons can rarely be relied upon.[76]

This passage suggests that the Bureau's system of data collection and recording was closely aligned to agricultural interests. Furthermore, this system could provide more accurate knowledge of the local weather than experience on the land itself and, in time, offer the Bureau the means to 'tame chance' in the state's agricultural areas.

Reflecting its alliance with the development project of the State government, the Bureau of Meteorology directed its advice towards the Western Australian 'Primary Producer'. One of the volume's articles extensively detailed the relationship between rainfall, wheat yield and geographic location. The authors argued that dry fallow practices had the 'virtual effect of increasing total available rainfall for each harvest season'.[77] The eastern limits of

the wheatbelt, therefore, could be expanded beyond the existing 10-inch wheat-growing line to the 7.5-inch line. This would embrace towns such as Norseman and Southern Cross.[78] They also assured readers that improvements in agricultural science would provide the means for settlers to develop the eastern margins of the wheatbelt. Indeed, in 1929 after a year of light rainfall, the state's Department of Agriculture had boasted, 'Not many years ago a season such as the last one would have meant disaster to the majority of wheat growers'.[79] This shared belief in the possibilities for settling and indeed cultivating Western Australia's semi-arid inland saw the Bureau of Meteorology and the Department of Agriculture portray the climate of the region's marginal lands as safe and secure for European agriculture, bolstering the government's development aspirations.

Whatever reservations farmers might have had about these districts were easily overcome with the favourable market and climate conditions of the decade following the end of the First World War. With generous government subsidies and scientific advice, wheat farming edged eastwards beyond Brockman's line of reliable rainfall. The government was deaf to the possibility of insufficient rainfall in these increasingly marginal eastern lands, and fortunately for them, the seasons were wet.[80] Historian Geoffrey Bolton has suggested that Mitchell's farming successes in the long-established and better-watered Avon Valley during the 1890s when markets had been more favourable, 'had led him habitually to underestimate the hazards of pioneer farming'.[81] The wheat acreage trebled during the 1920s, as farmers were spared dry conditions like those experienced in 1911 and 1914. The total area under crop grew from nearly 650,000 to nearly 2 million hectares between 1920 and 1930, and in the wake of the Empire Marketing Board's 'Grow more wheat year' of 1929, wheat production reached a record of 53.5 million bushels in 1931.[82] By the 1930s, Bolton explains, the region had become 'the heartland of Western Australia; their creation, from a dry and uncultivated wilderness, was the State's proudest and most recent achievement'.[83]

Building a 'discriminatory sanitary order'[84]

Bringing this land into cultivation, however, came at great cost to the region's Aboriginal population. With few employment opportunities on the land after the war and fewer places to camp, more Aborigines had drifted into the outskirts of wheatbelt towns, particularly in the Midlands, Avon and Great Southern districts. But these towns were unprepared for this growth in the Aboriginal population and few white residents were willing to accommodate their presence. Already forced off country, many of the region's Aborigines were now forced out of the towns and onto local reserves or into native settlements like Carrolup (est. 1915) and Moore River (est. 1918). According to historian Anna Haebich, the number of gazetted town reserves in the area increased from six in 1920, to thirteen by 1925. Among the reasons for their expulsion was the view that Aborigines were carriers of disease, and needed to be kept separate from the otherwise healthy (white) population.[85] As historian Alison Bashford has observed, 'The discourse of public health was always an effective mode for the expression and practice of racism, since health, hygiene and cleanliness were one significant way in which the "whiteness" of white Australia was conceptualised'.[86]

Already considered filthy, Aborigines were forced onto small reserves that were often situated near town rubbish dumps and sanitary depots, where there were inadequate water supplies and sanitation facilities. Aboriginal elder Robert Bropho recalled that in the early 1940s at the Eden Hill camp on the eastern outskirts of Perth, the 'only water supply was from the local tip on the hill near the swamp' or from shallow wells they dug in the ground. In their tin billies they collected water with 'tadpoles and the slime on the top', 'with a bit of flavour in it from human piss and human shit'.[87] In the wheatbelt, future Governor-General Paul Hasluck observed:

> Clothing is seldom washed – how can it be when there are no facilities for doing so or even vessels in which to carry sufficient

> water into the dwelling? The human body goes unwashed because there are no baths and often little water, though a swim now and again, in some not too distant waterhole helps a little.[88]

Although Hasluck was sympathetic to their plight, more often than not, white Western Australians blamed the Aborigines themselves for their state of health and living conditions. As historian Linda Nash argues in the Californian context, 'The *habits* rather than the biology of non-white groups would be… frequently cited to explain higher rates of sickness and death'.[89] Confined to the margins of white settlements on reserves, camps and in settlements, Western Australia's Aborigines could be better regulated and controlled under what historian Gyan Prakash has described in nineteenth-century India as 'a discriminatory sanitary order'. Protecting the health of white Western Australians, as in colonial India, required the containment of the putative source of disease – the bodies, habits and homes of Aborigines.[90]

The apparent disregard among Aborigines for hygiene and cleanliness were grounds for their exclusion from the very institutions that could have helped to improve their living standards and employment prospects. After all, according to prevailing middle class ideas about citizenship and environment, unclean people were 'bad citizens'. Across the southwest in towns like Quairading, Katanning and Koogan, parents of white school children demanded the expulsion of Aboriginal children on the grounds that they were an unhealthy physical and moral influence.[91] These demands were finally answered on the eve of the hotly contested state elections of November 1914, when the 'offending' Aboriginal children were expelled from the schools under a provision in the *Education Act 1893*, which authorised the exclusion of children deemed to be 'injurious' to the health, welfare and morality of their classmates. As Haebich observes, the persistence of this practice into the late 1940s denied access to state education for generations of Aboriginal children.

Likewise, Aborigines were denied proper hospital care on the grounds that their lack of hygiene posed a danger to white

patients.[92] Finally in 1915, the government agreed to the demands of the wheatbelt towns to shut down the town camps and move Aborigines into segregated settlements.[93] This discriminatory system trapped the Aborigines of the southwest as surely as in a prison, where their abilities to uphold their traditional sources of resilience to climate variability and water scarcity were systematically eroded. Their lack of access to clean water not only excluded the southwest's Aborigines from education and health care, but also initiated a cascade of discriminatory effects that continued to be realised long after World War I.

High and dry

Despite the heady days of the 1920s, the prosperity of many Western Australian farmers was coming to an end. During this decade, wheat farmers in other parts of the world had begun to reduce their wheat acreages in response to an uncertain economic outlook. But in Western Australia, wheat remained king. The state's economy had become heavily reliant on the buoyant overseas wheat market and the State government was convinced that Western Australian wheat could continue to compete against exports from Canada and the United States on British and European markets.[94] Seduced by the prosperity of the 1920s, many farmers took on debts to expand their farms. On the eve of the new decade, however, commodity prices collapsed with disastrous consequences for the state's wheat farmers.

The severity of these economic conditions had left many farmers financially exposed to the onset of dry conditions in the mid-1930s, which lasted until the end of the decade. Aside from 1939, rains across the state's agricultural areas were below average and the drought of 1940 rivalled that of 1914 in its severity. Invasions of ravenous rabbits, grasshoppers, and emus decimated the surviving crops, exacerbating the farmers' plight. For the eastern wheatbelt, circumstances were especially dire – farmers

there were over-laden with debt and faced with poor seasons, poor soils and poor prices. Nearly 3,000 abandoned their properties in subsequent years.[95] As Premier Wilcock observed, 'All their labour has gone for nothing, all their hopes have been dashed, and the only result has been disaster'.[96]

In contrast to the Scaddan government's response to the dry conditions during World War I, the Wilcock government (1936–45) decided that it was no longer tenable to encourage wheat farming in the more marginal eastern districts. The human toll had become too great, and the State government lacked the funds to continue to subsidise their agrarian endeavours.[97] In 1940, the Commonwealth joined with the Wilcock government to initiate a 'reconstruction' program to support a shift from wheat to sheep in these 'marginal' areas. The main criteria for 'marginality' were the rainfall and cropping statistics of these areas: about 250 mm (1011 inches) of annual rainfall was classified 'marginal'. Five of these marginal areas were targeted for reconstruction: Ajana to Kalannie; Kalannie to Southern Cross; Dulyalbin; the Lakes/Ravensthorpe District; and Esperance/Salmon Gums. Over a period of four years, about 2,000 farms were reduced to fewer than 800 farms, which now relied on sheep as their main source of income. The Commonwealth assisted with purchasing stock as well as fencing material and water supplies, while the State government helped by reducing land prices, reclassifying soils, increasing acreages by linking abandoned properties, and writing off debts. The intention of these reconstruction efforts had been to reduce the vulnerability of farmers in these marginal areas to variations in climate and the market. Yet when better seasons and prices returned after World War II, along with improvements in soil science, wheat growing resumed in these marginal areas.

Meanwhile, the dire economic circumstances of the 1930s proved to be a windfall for the irrigators of the southwest. After World War I, soldier settlers had struggled to establish themselves in the poorly drained areas around Harvey and Waroona. The Public Works Department had to pump additional irrigation

water from the Brunswick and Serpentine Rivers, while irrigators in the Waroona district found that their reliance on drains was inequitable and inefficient.[98] With Commonwealth assistance, the Mitchell government embarked on a scheme to put over 6,000 unemployed men to work on public works around the state, which included irrigation and drainage works at Harvey. At last there was the cheap labour and political will to build the water supply and drainage infrastructure for which irrigators had pressed for a decade.

Construction began on raising the height of the Harvey Dam in late 1930, and the work was completed in 1932. This included expanding the size of the Harvey irrigation district and excavating additional channels. Drakesbrook Dam at Waroona commenced construction in 1930 and finished in 1931. That year, despite protestations from many farmers in the Collie district who were unconvinced of the benefits of irrigation, work began on the Wellington Dam, which was completed in 1933. Finally, the construction of a drain to divert the Harvey River ensured that by 1934, water from the river no longer spread across the plain but ran straight into the Indian Ocean. In the meantime, the irrigation channels were lined with concrete to reduce the loss of water from seepage, and the paddocks underwent grading, to ensure the more even and efficient distribution of water. So successful was irrigated dairy farming during this period that construction began on the damming of Samson Brook in 1939, and surveys commenced for the Stirling Dam on the Harvey River, which was completed after World War II.

For many people in the southwest, the end of the war signalled an end to the hardships of drought and depression, and that an exciting new chapter for the state was about to unfold. Many Western Australians were swept up in the developmentalist zeal of the post-war years. But in their prosperity lay the foundations for running out in the future.