

Australian agricultural restructuring and disadvantaged farmers

Abstract

The neoliberal turn of Australian economy since the 1970s has triggered profound restructuring in agricultural industries. With economic gain being viewed as the only major criterion in resource allocation, agriculture, which accounts for an insignificant share of the national economy, has been experiencing a considerable loss of arable land, human resources, and social capital. Under adverse economic conditions, farmers have been experiencing declining terms of trade, long working hours, low profitability, increasing indebtedness, the decline of agriculture-based rural towns, the loss of farm autonomy to financial capital, the abuse of market power by major supermarkets, disadvantaged competition with foreign products, and high psychological and physical pressure. When farmers are pressured to increase productivity, natural resources will be stressed. Environmental degradation is widespread on farms and is a billion-dollar problem. The future of Australian agriculture is uncertain. Problems have usually been attributed to the neoliberal policy agenda. Neoliberalism does not come naturally, but comes from the internal dilemma of capitalist economic development. From the agricultural boom in the 1950s, to the depressed neoliberal age since the 1970s, and to the unfolding of a rural debt issue 肉 roughly since 2008, we have witnessed a coherent trajectory that brings us to today's situation. Besides the economic development, we also discuss cultural and structural reasons why farmers are disadvantaged compared with people in other occupations. For the future, the capitalist economic path of Australian society and agriculture will be increasingly disturbed by the two by-products of capitalism, technological unemployment and environmental degradation.

1. Introduction

The starting point of this paper is the restructuring of Australian agriculture over the last four decades, and the economic and social change of Australia's rural communities, especially farmers. The course of change, usually referenced as neoliberalisation, increasingly puts Australian agriculture or farmers to a disadvantaged economic position, compared with other sectors.

Neoliberalisation is a global progress that originates in the late 1960s and early 1970s, and still continues today. During the neoliberal age, the status of the working class has been weakened, social inequality has been widened, and national welfare has been diminishing. Farmers are even more disadvantaged. The formation of the exploitative state has its internal inevitability, as the capitalist economy proceeds. Capitalist economic development is usually characterised by a cyclic pattern of boom and depression. Australian agriculture is part of the capitalist system. Over the boom stage in the 1950s and 60s, Australia's rural communities enjoyed prosperity and egalitarianism, and farmers earned more than city dwellers. This agricultural boom

was soon replaced by rural decline, community disintegration and many-faceted industry crises since the neoliberal turn in Australian agriculture. Although increasing global population and growing Asian food demand render people hope that there will be another agricultural boom in Australia, rising input costs, declining human capital, high rural indebtedness and increasing degradation of natural resources make the future of Australian agriculture uncertain.

Based on the various features of decline in agriculture-based rural communities, this paper aims to explore the economic process of the neoliberal turn, and structural and cultural reasons why farmers are disadvantaged in this process. Facing an uncertain future, it is questionable whether the current trend can be reversed. Instead of giving specific suggestions for policy makers, the authors would rather emphasise several worrying phenomena which should not be underrated further by the market-oriented policy agenda.

2. Restructuring

The restructuring is usually traced back to 1973 when the First Oil Crisis plunged the advanced capitalist states into two decades of crisis and triggered an era of neoliberalism (Hobsbawm, 1994). Even farmers in the most remote hinterland of Australia cannot escape the impact of neoliberalisation that derives from the core of the world stage (Harvey, 2005).

The path to neoliberalism in Australia is marked by several events or periods. For example: in 1975, the Whitlam government was dismissed, and neoliberals gained ascendancy in the ideological war with Keynesians in Australian politics (Hobsbawm, 1994, p. 409); in 1983, with the election of the Hawke government, the neoliberal regime implemented a Thatcherite economic program devoted to ‘the deregulation of the economy, the privatisation of the common wealth and the commodification of everything’ (Paul, 2012, p. 1) with full-fledged attack on protectionism (Conley, 2010); in the Uruguay Round 1986, the Australia-led ‘Cairns Group’, mainly formed by small and medium-sized exporting countries of agricultural products, strived for agricultural trade liberalisation (although the resulted agricultural agreement did not achieve a significant increase in access to protected markets, what matters is the trend) (Martin & Winters, 1995; Pritchard & McManus, 2000); in 1991, the advocacy for free trade reached a climax in the Australian government (Pritchard & McManus, 2000). Western et al. (2007) stated that Australian public policy has undergone the most profound changes since Federation in 1901. Compared with other developed countries, Australia has undergone the most radical level of liberalisation and exposure to foreign competition (Woods, 2014).

The national policy change is immediately reflected in agricultural industries, for example, statutory marketing authorities being dismantled in rice and sugar industries, the reserve price scheme being suspended in wool industry, gradual withdrawal of

government support for dairy industry, and the National Competition Policy (a microeconomic reform for trade liberalisation) being conducted in 1995 which finally leads to the deregulation of Australian dairy industry in 2000 (Sinclair et al., 2015). Principles of the new agricultural policies include prioritising market forces, removing tariffs from agricultural produce, reducing government intervention and support, minimising subsidies to farmers, reducing investment in agricultural research and development (R&D), placing agricultural R&D on a more commercial base, stimulating foreign investment, dismantling statutory marketing arrangements, marginalising concern for the victims of agricultural restructuring, attributing farm failure to individual, urging farmers to be more efficient, entrepreneurial and self-reliant, providing farmers with market information and training programs to make them competitive (Alston, 2004; Halpin & Guilfoyle, 2004; Pritchard & McManus, 2000; Moir, 2011; Millar & Roots, 2012).

Although neoliberal policies in agriculture are usually conducted in the name of economic growth, national interest or a more productive agriculture (Pritchard & McManus, 2000; Sinclair et al., 2015), the overall impact on agricultural industries, rural producers and the natural environment is hardly benign or sustainable. The profitability of agriculture has become increasingly subject to the world price, foreign capital, and European and North American trade policies (Halpin & Guilfoyle, 2004). In Australia, we have seen more volatile food prices (NSWDPI, 2014), a constantly declining trend in farmers' terms of trade since 1973 (ANGA, 2013), continuously increasing food imports since 1990, unstable food exports in the last decade (Department of Agriculture, 2014), and a sharply declining trend in agriculture's share of national economy since early 1960s (Productivity Commission, 2005). Austin (1991) stated that 'the pressures ... [pushed] rural Australia into its worst depression since either the 1930s or 1890s'.

2.1 Capital loss

With the retreat of agriculture, the leverage of the housing industries and the neoliberal principle that land-use change should be directed by market force result in urban encroachment and rural residential development into agricultural land around major Australian cities (Cook & Ruming, 2008). It is reported that in Australia over 1 million ha of rural land has been encroached by urbanisation since 1945 (Millar & Roots, 2012). Compared with the total loss of farmland in 2001-2009 (47 million ha) (ABS, 2010), the threat of urbanisation seems to be insignificant. However, peri-urban areas usually contain highly productive land that faces irreversible conversion. Nearly 25% of Australia's agricultural production can be attributed to peri-urban areas that account for less than 3% of agricultural land in the mainland Australia (Houston, 2005).

Urbanisation leads to speculation in real estate values, and fragmentation of rural landscapes for residential use. The rising land values make it harder for peri-urban

farmers to enlarge their business through land purchase, and make the choice of selling or subdividing their land more favourable (Merson et al., 2010). In 2001-2005 Sydney, more than half of all approved projects of residential construction are for buildings to be constructed in the outer ring of Sydney (Trewin, 2006). In 2003-2004 Australia, 57% of new separate houses that are sold contain four or more bedrooms, and 77% of all Australian households have one or more spare bedrooms (Linacre, 2007). Arable land seems not to be valued from a productive perspective, while 'really good growing land with adequate rainfall makes up a very small percentage of the total [Australian territory]' (Winston, 1957, pp. 7-8). A large part of this arable land is under degradation (PMSEIC, 2010). Sinclair (2001) identified that the positive impacts of rural residential development are mainly commercial, economic or related to lifestyle, and they are dwarfed by the negative impacts that are ecological, agricultural, and social.

Australia's arable land is also threatened by mining industries. In 2010, 60% of Queensland's agricultural land purchased by foreign capital is for mining, including coal and coal-seam gas production (Moir, 2011). The projected annual value of Queensland's mining industries in 2020 is AUD\$16 billion, while that of agriculture is AUD\$2.2 billion (Fraser, 2011). In 2010, Minister for Environment Protection, Heritage and the Arts Tony Burke approved two coal-seam gas projects in Queensland regardless of environmental and agricultural concerns (Lawrence et al., 2013). The projects were claimed to create 18000 jobs, thus essential for national economy, and deemed unstoppable (AAP, 2015). The Expansion of mining leads many rural producers to selling their farm. For example: in Hunter Valley, New South Wales, dust diffused by coal and coal-seam gas production might taint newly produced milk, and compels dairy farmers to move out; purchase offers provided by mining companies lead farmers to handing over their land (Millar & Roots, 2012). As the mining industries generally provide better-paid jobs and more promising career developments than agriculture does (Carrington et al., 2013; NSW DPI, 2014), skilled labourers are drained away from farms (PMSEIC, 2010). Many farms face a labour shortage, both skilled and unskilled (Millar & Roots, 2012; Australian Dairy Industry Council Inc. & Dairy Australia, 2014).

In Australia, most lost agricultural land has been converted to conservation use, but these reserves are usually infertile or of low productive potential. Forestry also competes land with agriculture, but in the last decade its impact is limited (Millar & Roots, 2012).

Besides losing farmland, Australian agriculture also loses farmers or human capital. Under harsh economic conditions, many farmers have been forced out of agriculture, and have left for regional centres or capital cities for better job opportunities (PMSEIC, 2010; Kuehne, 2013). From 1975 to 2008/2009, the number of farmers decreases from 260,000 to 136,000, a fall of nearly 50% (Commonwealth of Australia, 2004; ABS, 2010). From 2006 to 2011, 19,700 farmers left agriculture, which is a

drop of 11%. From 1996 to 2006, the population in remote and very remote areas respectively declines by 0.4% and 0.3% annually, while the population in major cities and inner regional areas both increases. Major droughts could accelerate this process. Over the 12 months amid the 2002-2003 drought, the number of farmers drops by 15% (ABS, 2012). The loss of farmland and farmers is concomitant with the decrease of farm numbers. Compared with 1960, there are 60,000 fewer farms in Australia (ABS, 2010). The impact of deregulation on farm number is significant. For example, since 1999-2000 (the Australian dairy industry was deregulated in July 2000), the number of dairy farms in New South Wales declines by about 58% (NSWDPI, 2014).

As young people in rural areas generally show little interest in farming and tend to migrate to cities, the median age of farmers rises continuously from less than 44 years in 1981 to 53 years in 2011 (Barr et al., 2005). The median age of people in other occupations rises from 34 years in 1981 to 40 years in 2011. The departure of young people in rural areas is reflected by the decreasing proportion of farmers younger than 35 years from 28% in 1981 to 13% in 2011, and the correspondent increasing proportion of farmers older than 55 years from 26% in 1981 to 47% in 2011 (ABS, 2012). For those who will leave, selling their farmland can be inevitable. For example, in the Corangamite watershed to the west of Melbourne, half of rural properties would change ownership from 2006 to 2016, and new property owners are less likely to be farmers (Mendham & Curtis, 2010). Some of the sold farms are taken over by other farmers, leading to the increasing share of large farms in agriculture (ABS, 2012). The departure of young people also exacerbates the problem of labour shortage.

Rural producers show more interest in leaving, and people from the outside show less interest in coming in. In Australia, there is a decreasing public interest in food production (PMSEIC, 2010) and food security (Lockie & Pietsch, 2012). In Australian universities, courses on agricultural sciences are unpopular. The number of graduates in agricultural sciences declines from 520 in 2001 to 370 in 2006 (PMSEIC, 2010). In 2006, the number of new jobs generated by agricultural industries is estimated to be 86 times as many as the number of those graduates (Productivity Commission, 2005). Reasons for that include unfavourable work patterns and low salaries offered by agricultural industries. In 2011, half of farmers spend 49 hours or more per week on working. In other occupations, only 17% of workers work this long hours. Farmers also usually work on weekend and are required to be on call or standby (ABS, 2009). Though working longer, farmers' weekly disposable income is 38% lower than that of other workers in 2009-2010 (ABS, 2012). It is understandable that tertiary students are largely attracted to courses on business and management, teacher education, nursing, accounting, and law (ABS, 2013). When student number declines, university staff of agricultural sciences is squeezed, as in Australia student number is an important criterion for universities to get funded. Considering that more than 50% of agricultural scientists are going to retire soon (PMSEIC, 2010), Australian agriculture is losing its research capacity.

Besides the loss of arable land and human capital, agriculture-based rural communities have been losing government and non-government public services, such as government agencies, taxation offices, welfare services, courthouses, health and medicare services, schools, post offices, transport and communication companies, and banking branches (Pritchard & McManus, 2000; Alston, 2004). With the outmigration of young people, recreational facilities and organisations, such as sporting clubs, have also been eroded (Alston, 2004). The decline is attributed to less funding and privatisation of the public sector. Compared with governments in the 1960s and 1970s, Australian governments as a whole in the new millennium spend about AUD\$25 billion less annually on the public sector (Cleary, 2011). Privatisation of the commonwealth in financial, communication and transport sectors promotes economic rationalism in the arrangement of public services, and concentrates previously scattered public facilities in regional centres or major cities (Paul, 2012). Rural residents are usually forced to travel a long distance to get access to entertainment and public services.

With the closure of branches for various services, job opportunities, which are essential for young people's career development and on-farm women's access to off-farm employment, are also depleted. In rural communities, unemployment is more widespread and prolonged, and employees usually do not have secure working conditions (Cheers, 1998). Due to unemployment and low farm income, the majority of rural areas are characterised by poverty (Alston, 2004). Lawrence (1995) indicated that rural areas contain 89% of Australia's poorest electorates. Poverty results in financial constraints for farm families to send their children to education. Rural young people have lower completion rates in high school, and are less likely to receive tertiary education (HREOC, 2000).

2.2 Subordination

If losing farmland, human capital and social capital are superficial phenomena, what lies underneath are the entrenched problems of low return and lack of market power. Although with high productivity, Australian agriculture is characterised by low profitability and high indebtedness (McGovern, 2014). The average cash income of dairy farms in 2011-2012 is AUD\$143,000, and the average debt per dairy farm in 2012 is AUD\$701,500 (NSWDPI, 2014). The average debt per farm in 2012 (for farms over 4,000 square metres, excluding dairy farms) is AUD\$476,000. In 2010-2011, 31.6% of all agricultural businesses seek debt financing, while the average figure for Australian industries is 16.6% (DPS, 2013). From 1969 to 2013, rural debt has been soaring from less than AUD\$5 billion to nearly AUD\$70 billion, which far outpaces the nearly stagnant net value of farm production (Rees, 2013). Faced with declining terms of trade and an uninterrupted process of deregulation, farmers who intend to remain competitive are compelled to increase farm size and take advantage of economies of scale, but increased operational size and investment in machinery and agro-chemicals require considerable financial inputs. With minimal

government support, the top 20% of Australia's agricultural producers, which contribute to about 80% of Australia's farm output, carry untenable debt (McGovern, 2014).

Farmers with an increasing debt usually have to depend on financial advisors for on-farm decision making (Pritchard & McManus, 2000; Weller et al., 2013). Farm autonomy becomes more nominal and even obsolete. Indebtedness is a means for banks to seek control of and subordinate farmers (Merson et al., 2010; Richards et al., 2012). Unlike workers in manufacturing sector, farmers are under an indirect subordination to external capital that encroach agricultural industries (Mooney, 1982).

This indirect subordination also exists in farmers' relation with major supermarket chains through means of contractual relations and market duopoly. The market domination of major supermarket chains has been increasing since the 1990s, concomitant with the proceeding of globalisation (Richards et al., 2012). Recently in Australia, over 70% of grocery sales are controlled by two supermarkets (Woolworths and Coles) and one wholesaler (Metcash) (ACCC, 2008). Their abuse of market power is not seriously regulated by the government. If farmers do not come to terms with the supermarket chains, they may be unable to find an unoccupied market, and may lose their livelihood. Farmers' profits can be squeezed by the supermarket chains through several ways. For example: major supermarket chains can source the cheapest products with acceptable quality across the whole country, which brings more competitive pressure to each farmer (Merson et al., 2010); the supermarkets tend to impose stringent private standards, which are used to guarantee product quality and can be financially demanding, on farmers (Lawrence et al., 2013); the supermarkets can directly require their suppliers to reduce product prices, as shown by the milk price war between Coles and Woolworths where unsustainable milk price is imposed on dairy farmers to increase the supermarkets' competitive advantage (Richards et al., 2012). These disciplinary measures squeeze inefficient farmers out of agriculture and force those who stay to increase productivity (Lawrence et al., 2013).

Supermarkets' power does not come naturally, but is given by deregulation. In the case of subtropical dairy region (from Kempsey in NSW to the Atherton Tablelands in Queensland), before the deregulation of dairy industry, producer cooperatives controlled milk-processing plants that were obliged to process all of the offered milk (Sinclair et al., 2015). After deregulation, with price control being removed and external competition being introduced, dairy farmers' advantaged position along supply chain was eroded. Supermarkets started to determine whether farmers' milk could get access to major markets. The milk processing industry was now dominated by two multinational corporations (Parmalat and National Foods). The new supply chain relation becomes that the two supermarkets (Woolworths and Coles) impose terms on the two milk processors (Parmalat and National Foods), and the two processors shift their pressure to dairy farmers through contractual relations. Interestingly, the pressure on farmers is further shifted downwards onto cows which

have to be fed over a longer time and produce more (Sinclair et al., 2015).

2.3 Farm asset

With income being squeezed, farm asset value growth is usually the only reassurance for many farmers whose retirement needs to be funded somehow (Williams et al., 2014). In 2009-2010, although farmers' average income is 62% that of people in other occupations, farmer households' average equivalised net worth (both assets and liabilities) is 3.3 times the average of other households. When one fifth of other households are deemed having low economic resources, only 5% of farmer households are classified within this group (ABS, 2012). However, the high value of farm asset can be illusive. Farm values are constantly inflated by external investments, either domestic or international (Tegene & Kuchler, 1991). From 1985 to 2007, domestic investment was channelled to valuable farmland by the managed investment schemes that provided tax concessions for domestic investors to take on high-risk investment (Malcolm, 2011). After domestic tax concessions were removed in 2007, high-risk investment in agriculture was no longer attractive for domestic investors. Foreign investment was channelled to fill in this gap, as evidenced by the sudden increase of foreign investment in Australian agriculture from AUD\$7.9 million in 2005-2006 to AUD\$104 million one year later (FIRB, 2013). Without this foreign capital, farm value might not be sustained (Williams et al., 2014).

In 2012, total non-mining investment in Australia is around the lowest level in the past 50 years (Lowe, 2013). Foreign capital has a strong existence in food processing industries. Around half of milk production, 60% of raw sugar production and 40% of red meat production in Australia are processed by foreign-owned firms (Moir, 2011). However, investment in farms comes to a halt. A debacle of farm asset value in certain areas has been unfolding since 2012 (McGovern, 2014). With low income and declining farmland value, some farmers could not fulfil their debt repayment conditions, and have to go broke. As farm foreclosures spread further, external investors retrieve their money to avoid risk. Occasionally, foreclosed farms have to be sold at fire-sale prices. McGovern (2014, p. 1) identified that Australian agriculture has dropped into 'a debt-deflation spiral and subprime mortgage crisis'. McGovern (2014, p. 4) also quoted one Western Australian to show the miserable situation of some farmers: 'I now know there is something worse than losing the farm. That's being stuck there for over two years with no one wanting it...'

2.4 Farmer

For Australian farmers, being forced to sell their farm usually means losing their home probably inherited from their parents or ancestors, the farm as the record of their family history, opportunity to use their skills and experience, approaches to earn a living, their masculine identity as a farmer, their self-worth, and the farming tradition of patriarchal succession and family ownership (Riley & Harvey, 2007;

Carrington et al., 2013; Kuehne, 2013; Bryant & Garnham, 2014). Faced with an adverse restructuring force and the danger of losing their farm, a common response of farmers is working harder or more self-sacrifice without asking for help under a tradition of stoicism. Needing help is usually viewed as a sign of failure, especially in rural context where one person's financial difficulty can be easily exposed to all others (Alston, 2012). Direct results of this kind of action include long working hours, social isolation and higher risk of injury.

There are other factors that exacerbate rural men's social isolation. For example: rural women are increasingly involved in off-farm work, and leave their spouse or partner on farm probably with more workloads (Alston, 2004); with more families moving out, the farming communities left behind become more hollowed (Pritchard & McManus, 2000); with an increasing number of young people moving out, traditional recreational activities, such as those organised by sporting clubs, gradually disappear, and rural men's chance of social interaction is minimised (Carrington et al., 2013); there is a lack of services in rural areas to help handle mental health problems, and male farmers are either reluctant or unaffordable to take mental health services (Alston, 2011); the process of neoliberalisation destroys social solidarity, and replaces a rural culture of unity and cooperation with competition and secrecy (Sinclair et al., 2015). It is understandable that many male farmers are constantly under tremendous pressure (Berry et al., 2011), especially when they are going to fail and become overwhelmed by shame. Some farmers increasingly rely on drinking to handle depression. Agricultural communities are troubled with different types of hidden violence, such as domestic violence and sexual assault (Carrington et al., 2013). Male farmers and young people in rural areas are characterised by higher rates of suicide (Alston, 2004; Sankaranarayanan et al., 2010).

2.5 Environmental degradation

When farmers have to get more out of their land, crops, livestock or poultry, they usually pay less attention to conservation of natural resources. Conservation-based farm management may lead to reduced productivity and profitability. The impact of environmental degradation caused by farming may be beyond farm boundaries and take a long time to be discernable (RIRDC, 2007). Thus, farmers have little incentive to manage degradation. However, with the withdrawal of government support, farmers are expected to bear the burden of conservation (House et al., 2008). The result is ineffective policies and programs since the 1980s to make agricultural industries more environmentally sustainable (Hajkowicz, 2009; Hochman et al., 2013).

Under the neoliberal regime, farmers are urged to be more 'productivist'. Productivism means 'specialisation, intensification and economic concentration' of farm businesses (Lawrence et al., 2013, p. 4). It is expressed in practice as adopting fertilisers, herbicides, pesticides, livestock pharmacy, farm machinery, monoculture

farming of crops, factory farming of animals, extensive grazing, and irrigation system (Dibden et al., 2009; Lawrence et al., 2013). The new production modes are usually environmentally harmful. Marx (1959, pp. 505-507) stated that 'all progress in capitalistic agriculture is a progress in the art, not only of robbing the labourer, but of robbing the soil'. Around AUD\$1.7 billion is cost annually due to the environmental degradation in which farmers are viewed to be directly involved (Price, 1998). In 2001-2002, degradation is respectively reported on over half and 23% of broadacre and dairy farms in Australia (ABARE, 2003).

This degradation is gradually accumulated over the history of Australian agriculture. Since European settlement, about 13% of Australia's native vegetation, 50% of rainforests, and 30% of woodlands have been removed mainly for agricultural production (Aretino et al., 2001; Hochman et al., 2013). Many of the remaining ecosystems are in decline, disruption, modification, fragmentation and biodiversity loss (Hochman et al., 2013). As vegetation is removed or reduced, rainwater that used to be captured by plant bodies strengthens the drainage of soluble salts from land, and concentrates the salts in other places or waterbodies. Besides rainwash, salinisation of surface water can be caused by irrigation that uses over 70% of Australia's freshwater for food production, and carries salt into waterways (ABS, 2006). Across Australia, about 6 million ha of dryland (Lawrence et al., 2013) and 2 million ha of farmland (ABS, 2002) are affected by salinity. Salinity-affected dryland is anticipated to spread and triple its area around 2050 (Poldy & Foran, 2002). Furthermore, salinisation of surface water is estimated to affect at least two million ha of remnant vegetation. In Western Australia, salinity affects about 80% of river systems (Goldie et al., 2005). Overall, salinisation has been claimed to be the biggest human-induced calamity that Australia has ever suffered (Pritchard & McManus, 2000).

If vegetation is in decline, land surface is also vulnerable to soil erosion mainly caused by wind and local storm events (PMSEIC, 2010). Compared with conditions before European settlement in Australia, the recent rate of soil loss is twofold greater in inland rangelands, increases fivefold in pastures where there is a higher rainfall and exotic pasture species, and increases fifty times on hill slopes for cereal production (NLWRA, 2001). Overall, the amount of annual soil loss by erosion in Australia reaches 14 million tons which is 19% of the global figure (SEAC, 1996).

Another soil ecological problem is acidification. With more plant and animal products being taken from the land, fertiliser use being increased sevenfold since 1970 (Lawrence et al., 2013), and the widespread use of legumes in pastures, about 50 million ha of land in Australia has been recorded for a surface soil pH below the optimal range for most plants and soil organisms (Hochman et al., 2013), which has induced an annual loss of over AUD\$134 million (Millar & Roots, 2012). Acidified area is anticipated to double for each decade. There is little prospect to alleviate soil acidification (PMSEIC, 2010).

As mentioned earlier, food production has been taking most of Australia's freshwater. This has devastated natural resources, especially in the Murray Darling Basin, the most iconic river system in Australia. From 1920 to 1990, annual water extraction from the Murray Darling Basin has increased more than fivefold (MDBA, 2010). As a result, over half of ecosystems in that basin are undergoing severe degradation (Beeton et al., 2006). Irrigation is the most serious threat to groundwater and water bodies through direct water loss, and drainage from chemical-based agricultural land that leads to N and P contamination and eutrophication (Hochman et al., 2013). Overall, aquatic ecosystems pressured by irrigation can undergo toxic algae outbreak, salinisation, loss of species, and closing of river mouth (Millar & Roots, 2012). Some case studies show that substituting centre pivot irrigation for border check irrigation will remove surface runoff (Hochman et al., 2013). However, the establishment of centre pivot systems can lead to a significant reduction of paddock trees or components of matrix habitat, which threatens remnant ecosystems of that landscape (Maron & Fitzsimons, 2007). As agricultural industries use water at an unsustainable level, water reform processes have been triggered since the 1990s with more water being allocated to the environment or higher-value production (Lawrence et al., 2013). Water will increasingly become a restricting factor for agricultural production.

In summary, the restructuring of Australian agriculture is like a chain reaction with economic pressure being gradually shifted downwards. When government support is withdrawn, and protectionist market conditions are dismantled, farmers are faced with an increasing competitive pressure from other regions or countries, and an increasing exploitative pressure from major supermarket chains and banks. Farmers are leaving continuously. Farmland is increasingly transformed to mining fields and residential development. This land use change is usually environmentally detrimental. Farmers who are holding on have to be more productive. In primary production, productivity is usually against the environment and animal welfare. Environment and other animals are nearly always the final takers of economic pressure. This process implies an end point, when environmental degradation renders most farmland uneconomic for production.

3. Discussion

Considering that in the 1950s agriculture stood for more than one fourth of the national economy, and farmers earned more than wage workers (Pritchard & McManus, 2000), today's situation is rather ironic. Recently, agriculture accounts for only about 2% of Australia's gross domestic product, and farmers' average income is only around two thirds that of people doing other jobs (ABS, 2012). The course of the economic development of Australian agriculture from the boom stage in the 1950s and 60s, to the depressed neoliberal age since the 1970s, and to the gradual unfolding of a rural debt crisis roughly after 2008 is discussed in this section. It shows that each stage of the course contains a trend that leads the system to the next stage. The economic, structural and cultural reasons why farmers are more disadvantaged than

other workers are also discussed. Since each stage of the system implies its future form, what will the current trend lead Australian agriculture to? Will the two by-products of capitalist economic development, namely environmental degradation and technological unemployment, negate the possibility of a future boom and finally overturn the equilibrium? These questions are briefly explored.

3.1 Toward neoliberalisation

Before the neoliberal turn of national economy, farmers were more subsidised, prices of agricultural products were supported, foreign imports and capital were limited, rural communities were united, and rural producers, processors and officials were coordinated. There is a compromise between capitalists and labour which is expressed as Australian egalitarianism. This egalitarianism is claimed to be based on protectionism (Conley, 2010). Protectionism is sound, when no strong external political forces pressure Australia to open its market, and Australia does not have a strong need for protected foreign markets to be liberalised. If global economy is static from that time, the two conditions would be kept. However, a static state is always unfavourable for capitalism.

As public funds are invested in research and development of agriculture, new agro-technologies and management systems will inevitably be adopted. That will drive up productivity. If the number of farmers does not decrease too fast, national agricultural throughput will increase. However, market will not increase infinitely, and will finally be unable to catch up with the pace of production. If the prices of agricultural products are still protected to make sure farmers' profitability will not be compromised, this distortion of market rule will create redundant commodities that cannot be digested by the market or build up pressure to drive down the prices. In the example of Australian dairy industry, after its deregulation, the dominant supermarket in Australia, Woolworths, immediately reduced the price of its home brand milk. Milk price in New South Wales, Queensland and Victoria immediately fell (Sinclair et al., 2015). Milk production in New South Wales dropped correspondingly (NSWDPI, 2014). The neoliberal turn in agriculture released the pressure built up in the system, but did not solve the problem. Right after 1975 when neoliberalism gained ascendancy in Australian politics, farmers' terms of trade dropped sharply (ANGA, 2013).

When there is no prospect for a proliferated market, the most usual approach for farmers to keep their profitability is to increase their productivity. For each individual farm, if the producer does not reduce the scale of production, a rising productivity means a higher throughput. If all farmers manage to increase their throughput hoping that it will cover their shrinking profitability and make them more competitive, the situation can only be worse, as the market potential of their products is further squeezed. It seems absurd that when market is squeezed or static, farmers strive to produce more. That implies a lack of rational arrangement, or collective human

behaviour renders rational planning impractical. A reasonable choice for a squeezed profitability is that some farmers have to leave agriculture. However, if rural communities have a strong social solidarity, the first choice for them may not be that 'we should ask some farmers to leave', but be 'we should ask the government to do something'. By the end of 1970s, Australia spent more than 60% of its public expenditure on social welfare (Hobsbawm, 1994), and it soon became unbearable. The situation is back to that 'some farmers have to leave'. Many are forced out by the market rule.

Another necessary change for Australian agriculture is to look for an extra market from both the domestic and the overseas. Farmers from one state in Australia may push for domestic trade liberalisation, so that their products can be sold in other states, or they can extend business in other states. Farmers may also push the federal government to open the Australian market of agricultural products to other countries, so that Australian government has a sound base to urge other protectionist countries to open their markets for Australian agricultural products. Some farmers did push toward these directions (Pritchard & McManus, 2000). Helping or persuading enough farmers to leave agriculture may not be very operable for the government and community. Then, trade liberalisation that may bring a promising market becomes a direction that seems worth a try.

From a logic sense, trade liberalisation cannot create a market out of nothing, and may lead domestic producers to the risk of being outcompeted by their foreign rivals. Moreover, trade liberalisation is not only related to economics, but matters to power distribution. Those who are most likely to benefit from trade liberalisation are those who are large, get most access to consumers, and have more leverage in national politics. Thus, trade liberalisation may not help most Australian farmers who have a small business. From this sense, the logic approach to keep the rural communities economically sound and socially harmonious is to channel some farmers out and help them to find a way of living in other industries which need work force, before the pressure built up within the system erupts. Although this approach is impractical from many angles (farmers may not want to leave; farmers who are leaving may not have skills to work elsewhere; the whole national economy may not need extra work force; the program of channelling farmers out may not be profitable or economically attractive for the government; farmers who move out and settle in urban areas may also cause the problem of urbanisation), that does not mean the government should let market force drive farmers out.

The neoliberal turn in Australian economy is inevitable not only on grounds of the economic trend, but also for political reasons. When the problem of Australian economy became increasingly salient in the 1970s, other advanced capitalist countries were also faced with a full-blown economic dilemma. The historic trend favours neoliberalism, which emphasises free trade and free capital movement. Neoliberalisation has also been identified as the key element of the American imperial

project to concentrate political power and establish exploitation (Paul, 2014). As one member of the Anglosphere centred by the USA, Australia could not resist but followed the trend with its domestic market being gradually open to foreign products, and its common wealth, public services, and financial and resource sectors being gradually open for privatisation by multinational capital. The Anglo-American capital which has controlled the Australian mining industry certainly profited in the neoliberalisation with 40% of Australia's iron ore profits being extracted by foreigners (Edwards, 2011).

No matter how inevitable the neoliberal turn in Australian economy and agriculture seems to be, it is inevitable only when the majority of Australians allow or acquiesce to it. It is relatively easy for a historian of the modern era to realise that economic liberalism generally leads to depression and catastrophe, but for average citizens, who work in different occupations and can easily be misled or manipulated by mass media largely controlled by multinational corporations (Paul, 2012), learning the hard lesson from history is hard. From what happened to Australian agriculture since the 1970s, it is arguable that neoliberalisation is not the cure but the poison. It does not solve the problem of profitability, but threatens the future of Australian agriculture. Over the neoliberal era, about half of farmers left, and they were often referenced as being forced out. Currently, the best-performing part of Australian agriculture carries an untenable debt.

3.2 Disadvantaged farmers

When Australian agriculture is exposed to global market, farmers' economic predicament heightened by market saturation or competition is exacerbated by foreign imports. When these foreign products come from countries where farmers are more subsidised or more advantaged in other ways than Australian farmers, these imports intensify social and environmental pressure in rural Australia (Dibden et al., 2009). Compared with the average level of OECD countries, support for agriculture in Australia is much lower (OECD, 2014). Australian farmers need to rationalise their production in order to outcompete their rivals. This contributes to the situation that farmers need investors (capital) or retailers (access to market) more than they need farmers. It gives financial capital and supermarket chains convenience to exploit farmers. When some farmers' profit margin is squeezed too much, they have to consider leaving. These farmers should not be totally deemed as redundant or technologically unemployed, because their pressure is not from fair or level market competition. Without exploitation or foreign competition, Australian agriculture may prevent those many farmers from leaving.

If the agricultural boom before the 1970s is a stage when farmers produce to fulfil the market, the neoliberal age is a time when farmers struggle to stay. It is a course that market outpacing production gives way to market being outpaced. When protectionism becomes untenable, trade and capital liberalisation will be pushed to the

forefront. Liberalisation itself may not hurt farmers, but liberalisation is a natural tool of political and corporate power. It gives more space for capital to spread and enlarge its influence. No matter which source farmers attribute their hardship to, there is evidence that farmers do not seriously challenge the neoliberal policy agenda and the power of their retailers or investors (Richards et al., 2012; McGovern, 2014), but direct their spearhead against other farmers. Sinclair et al. (2015) reported that some dairy farmers see their community as being disintegrated and everyone is against each other, because everyone needs to be more competitive than others in order to survive.

It looks not very logical that social solidarity of some rural communities become eroded, because it seems that farmers should not tolerate their hardship, should not view other farmers as their enemies, but should unite and show their strength. There are protests, but small and uncoordinated (Dibden et al., 2009). In general rural context, farmers and agricultural labours are usually dispersed in space. It is relatively hard for them to gather a solid political force and bargain for better terms (Pepper, 1993). Even if collective political actions are organised, farmers are not the majority of the electorate, and do not have enough leverage to counteract the neoliberal political power (Pritchard & McManus, 2000). The inability to make a political change could be one reason for farmers to tolerate the status quo. There is evidence that many farmers view the source of their problem as global or beyond their control (Halpin & Guilfoyle, 2004). This attribution leads many farmers to dealing with their economic hardship by working harder and trying to outcompete their neighbours.

The question is why there are still so many farmers who choose to stay in agriculture rather than look for a better life elsewhere. We should first consider that in 2011 nearly half of Australian farmers are over 55 years. From 1981, farmers who leave are more likely to be younger than 55 years (ABS, 2012). It is relatively hard for old people to adapt to a new lifestyle. Another reason is the rural tradition of stoicism (believes that challenges can be overcome by working harder and longer), holding onto the farm, and handing down the farm to the next generation (Kuehne, 2013). There are also structural hurdles for farmers to leave. Changing job for farmers usually means selling their farm or home, moving out of their hometown, settling in a different place, living in a different lifestyle, and looking for jobs that may be too demanding for them (Pink, 2008; Sinclair et al., 2015).

In an employment sector where exploitation on the working people exists, when the working people cannot organise effective resistance, and a large enough number of them want to continue to work there, there will be little reason to roll back the exploitation. If the exploited people do not resist or escape, they actually advocate the system that exploits them. Compared with workers in other sectors where such conditions that encourage exploitation do not exist, the profits of people in the exploitative sector could be lower or unsustainable. This could be one explanation for the disadvantaged position of Australian farmers.

From a historic point of view, agriculture is different from other sectors in the way that it is on the frontline of technological unemployment, which means agricultural labourers are always at the risk of being laid off due to application of new technologies and management systems. Since the industrial revolution at the turn of the 19th century, the proportion of global rural population is always in a declining trend (Hobsbawm, 1962). Since 1975, the number of Australian farmer drops by nearly 50%, but the total value of agricultural production is not compromised (Millar & Roots, 2012). There would be little reason for farmers who are going to be laid off to have a higher profit than urban workers, except by receiving farm support from their government.

No matter whether farmers are driven out by new technologies and management systems, foreign competition, or indirect exploitation from the corporate power, the government should slow down the process by alleviating farmers' pressure to make this course less socially and environmentally devastating. During the early enclosure movement (1450-1640) in England, the Tudors and the early Stuarts managed to slow down the process of enclosure in order to make its social impacts bearable for England (Polanyi, 1944). If old farmers have difficulty in leaving agriculture, the government could at least alleviate their pressure and prepare for channelling their next generation out of agriculture. However, Australia's farm support is the second lowest among OECD countries (OECD, 2014). The difficulty for the federal government to do something for farmers derives from the fact that 'the state has been hijacked by a coalition of neoliberal and neoconservative elites to serve common but narrow interests' (Paul, 2014, p. 2). Any program without challenging or coming to terms with the corporate power cannot serve those economically insignificant farmers wholeheartedly (Dibden et al., 2009).

3.3 Prospect

Many farmers are struggling, and this cannot last. The stage of farmers struggling would lead to the next stage of farmers going broke (McGovern, 2014). Another factor is the anticipated increase of global demand for food and biofuel, which is supposed to digest Australia's agricultural produce. This prospect is founded on the increasing global population. Will this trend create an agricultural boom that enriches Australian farmers? The demand for food and biofuel will probably increase, but farmers' cost of production is also increasing due to the increasing interest payment and other costs induced by water shortage and environmental degradation. It is probably an irreversible trend that the cost of primary production is increasing, as the degradation of natural resources is nearly unstoppable. If food prices are too high, even if the demand is strong, consumers' limited purchasing power will pressure the prices downward.

That high demand does not necessarily translate into high prices or profitability can be better shown in the example of world oil price change. As the global economy

continuously grows, the demand for petroleum is naturally increasing. However, world oil price peaked in 1973 and 2008, rather than kept increasing (Tverberg, 2015). In 2014, major oil companies' profits are squeezed by the low oil price and the increasing capital expenditures on oil extraction (Tverberg, 2014). The cost of oil production will probably keep increasing, but the oil price is capped by consumers' affordability. Thus, a high demand can end up with squeezed profits.

It is uncertain whether there will be an agricultural boom in Australia. Even if there will be such a boom, how much arable land will be left at that time? If farmland loss does not slow down, more than half of the current land will be lost by 2050 (Millar & Roots, 2012). Besides the irreversible farmland loss, the reduced employment in agriculture due to multiple reasons may also be irreversible. The trend that farmers are driven out will last. With farmland being increasingly concentrated under large farming enterprises and multinational corporations, even if there will be a boom, it is questionable who will really benefit from that boom? In the example of Australia's mining boom, Anglo-American corporations took a large share of the profits.

Overall, Australian agriculture is on the path toward corporatisation and intensification. Small landholders will increasingly be phased out or rely on off-farm income. Environmental regulation and protection will probably be further compromised. It would be mistaken to anticipate an 'agricultural boom'.

4. Conclusion

A society is like an organism, and agriculture is like an organ. Under the neoliberal policy agenda with economic gain as the only chief criterion in resource allocation, agriculture is viewed as reducible, and farmers are left at the mercy of market rule. The rural hardship does not trigger sufficient action from the government. Farmers may be a small fraction of the national population, but their case gives a modern example of social change induced by economic progress and application of new technologies and management systems, and government responses to that.

In the experience of Australian agricultural restructuring, application of new technologies and management systems is accelerated by heightened market competition. When farmers' profit margin is threatened, they have to increase their productivity by updating their production mode. Modern technologies help farmers to get more out of their livestock, poultry, crops and land, but lead to reduced employment of agricultural industries (as shown by the significant drop in the number of farmers since the 1970s), and the degradation of natural resources. From this sense, the employment-depleting effect of new agro-technologies can only last until relevant natural resources cannot be economically extracted due to degradation. When this happens, farm operators have to invest more resources or labour in their impoverished land, or find a living elsewhere. Countries with diminished arable land would seek for land in other countries with stable politics and a sound legislative system, until all

such land is exhausted. This so-called 'spatial fix' is extending problems rather than solving problems. Environmental degradation and the induced food and water shortage will continue.

Before the environmental crisis renders those energy-intensive technologies obsolete or inefficient, technological unemployment will proceed and exert pressure on most people. The pressure from technology update is usually expressed as market competition or adverse economic conditions. The impact of market liberalisation on agriculture-based rural communities is profound. Farmers' situation may also be extended to the majority of the national population with more free trade arrangements being set up and competition for jobs and market being further introduced from other regions or countries. As technological unemployment gradually unfolds, it is possible that up to three fourths of the population in a society would live a low-gain life in the not-too-distant future (Hobsbawm, 1994). Technological unemployment itself is argued to be able to bring down the global capitalism (Wallerstein et al., 2013). If a large share of the national population is undergoing an economic hardship like today's farmers, how will the economic and political elites handle that?

Environmental degradation and technological unemployment are two problems that modern capitalist societies have to face at certain time. Sociologists can sketch the near future based on past experiences from history, but an outbreak of the two problems is probably beyond anyone's experience, and should be considered seriously.

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