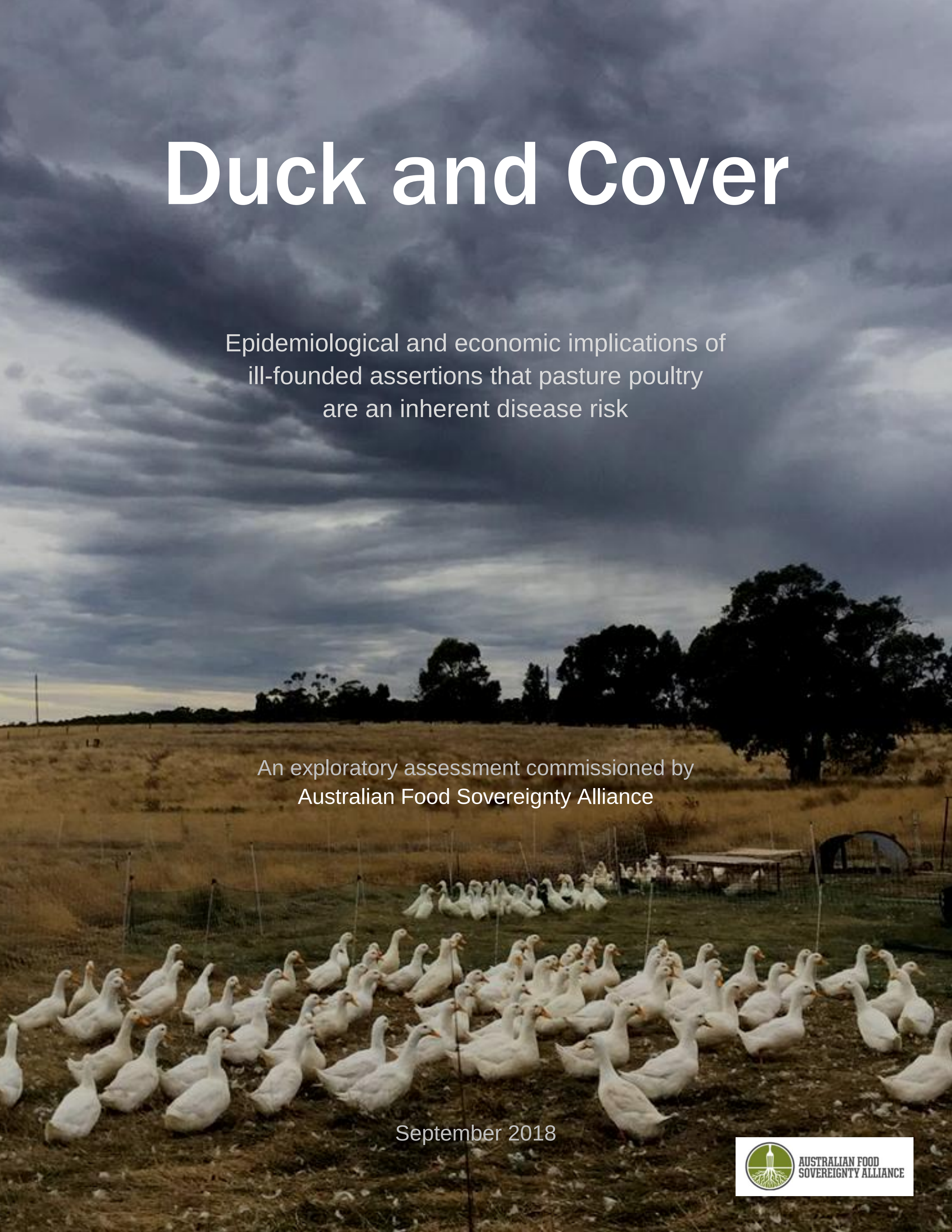
Duck and Cover

Epidemiological and economic implications of ill-founded assertions that pasture poultry are an inherent disease risk

An exploratory assessment commissioned by Australian Food Sovereignty Alliance



September 2018

AUSTRALIAN FOOD SOVEREIGNTY ALLIANCE

Cover

Pastured duck, Vue du Volcan Farm, Denver, VIC.

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Epidemiological and economic implications of ill-founded assertions that pasture poultry are an inherent disease risk

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Introduction

Farming is hard. Competence matters, of course, something in which many a farmer takes great pride. Bad management in any sector of agricultural production, under any model of ownership, can drive bad outcomes, among them the emergence and spread of infectious disease that are dangerous, in the case of poultry and livestock, to both the animals and the humans who tend or eat them. But the success of even the best of operations fundamentally depends on community support and infrastructure. No farm can succeed on its own, especially as the differences in the spatial extent of outbreaks are routinely attributable to the structure of production before a farmer stocks their first flock or herd (Graham et al. 2008, Leibler et al. 2009, Schembri et al. 2010, Leibler et al. 2017).

It is for this reason that State regulation and attendant support—subsidies, county agents, access to markets, and related services and protocol—are an important part of preempting such outbreaks (*e.g.,* Black 2012, Tobin et al. 2015, Hayes et al. 2018). On the other hand, ill-conceived State policy and arbitrary evidentiary standards may represent unsubstantiated presumptions about the nature of food production to a region's social and economic detriment (Scott 1998, Tadras 2010, Wallace et al. 2015). Such policy can also act as a scientifically unsupported, non-market means by which a dominant mode of production can attack its smaller competition (Lockie 1999, Davis 2005, Richards et al. 2013, Lawrence et al. 2013, Wallace 2016a).

The Victorian government and the State's small-scale regenerative farmers recently negotiated a streamline application process for pig and poultry pasture production (State of Victoria 2016, Tammi Jonas, President, AFSA, personal communication). Under the Planning for Sustainable Animal Industries, such production is to be held to species-specific stocking densities, as well as to herd and flock mobilities and ground cover standards necessary for maintaining soil health and mitigating pest and pathogen emergence. However, during the final stages in planning and negotiation, State administrators suddenly removed non-chicken poultry—ducks, quail, turkey, squab, emu, and ostriches—from the proposed streamline application process on the basis of "biosecurity" concerns. Upon farmer objections, the State announced it would revisit the matter, with an eye on folding the non-chicken poultry back into the streamlined process (Jonas 2018).

With similar negotiations underway in other Australian states, we will unpack the presumptions underlying removing non-chicken poultry.

Glossary

biosecurity- procedures intended to protect humans or animals against disease or harmful biological agents.

pathogen- a bacterium, virus, or other microorganism that can cause disease.

regenerative farming- a system of farming principles and practices that increases biodiversity, enriches soils, improves watersheds, and enhances ecosystem services.

What are the reasons? Are they legitimate? Do such decision trees represent something other than scientific criteria? Are alternate policy positions possible?

Double standards and false equivalences

An immediate objection to this last-minute maneuver in Victoria centers on an ostensible double standard. While the State appeared on the precipice of delivering extensive non-chicken poultry producers to regulatory practices beyond the scale of both their production and their fiscal margins, at the same time it held the scale of damage caused by industrially sourced disease outbreaks; odor flux rates from intensive livestock and poultry's waste lagoons; and the steroidal hormones, antibiotics, ectoparasiticides, mycotoxins, heavy metals, and dioxins in industrial feedlot waste constitute acceptable environmental risk (Casey et al. 2006, Khan et al. 2008, Moffatt et al. 2016, State of Victoria 2016).

A series of related questions follow. Does such a discrepancy depend on a path dependency—first come, first serve—by which industrial production preceded the latecomer movement toward smaller, regenerative practices? Given the sweep of Victoria's agricultural history out of such practices as far back as its Aboriginal predecessors, as well as intensive agriculture's relatively recent impact on regional agroecological resilience, precedence is clearly not the matter at hand (Pratley and Rowell 2003, Anderies et al. 2006, Dorrough et al. 2007, Walker et al. 2009, Walker et al. 2010, Pascoe 2014).

Does the discrepancy between how industrial and regenerative farmers are regulated depend on the political power by which agribusiness is able to impose the worst social costs of production upon Australian states and its citizens with little consequence (Halpin and Martin 1999, Dibden and Cocklin 2007)? Does that power include a kind of gaslighting out of a moral economy of agribusiness's control, forcing smallholders to carry the load (and blame) for biosecurity problems little of their making and emerging at scales far greater in industrial production (East 2007, Bryant and Garnham 2014, Moyle et al. 2016)? It increasingly appears that the largely unfounded notion wild waterfowl and pasture poultry in Australia represent inherent gateways through which industrial poultry production is placed at risk is presently a global go-to fallacy, deployed across multiple countries internationally, and aimed at redirecting attention away from intensive production's role in driving the evolution and spread of newly emergent disease (Engering et al. 2013, Wallace 2016b, 2017).

Highly pathogenic avian influenza (HPAI) offers a definitive example. No

Glossary

agroecology- study of ecological processes applied to agricultural production systems.

ecological resilience- the capacity of an ecosystem to respond to a perturbation or disturbance by resisting damage and recovering quickly.

ecological service- any beneficial natural process arising from healthy ecosystems, such as purification of water and air, pollination of plants and decomposition of waste.

epizootic- relating to or denoting a disease that is temporarily prevalent and widespread in an animal population.

natural selection- the process whereby organisms better adapted to their environment tend to survive and produce more offspring.

cases of HPAI in passerine birds were recorded anywhere before 2005 (Capua and Alexander 2006). Deadly flu in waterfowl has since been discovered only as collateral blowback from outbreaks on farms, largely originating out of industrial sheds (Atkins et al. 2010, Wallace 2009, 2016b, 2017). The clinical sterility of animal housing environments, combined with high doses of pre-emptive antibiotics and genetically homogenous livestock breeds, limits the development of immune responses and beneficial microflora, increasing the possibility of large-scale disease outbreak (Mulder et al. 2009). Monoculture homogenization at the barn, farm, and regional landscape levels; increases in rates of cohort turnover; increases in live trade in volume and geographic extent; and declines in the diversity of breeding stock contribute to the emergence of multiple deadly infections. Mosaic immune resistance is reduced and the rate of transmission and the access to susceptible populations that models show select for virulence is increased (Wallace 2009, Messinger and Ostling 2009, Atkins et al. 2010, Atkins et al. 2013, Fuller et al. 2013, Mena et al. 2016).

The dangers in such a model of production were long present before the re-emergence of regenerative practices. Highly pathogenic strains of what Bulach et al. (2010) reported are monophyletic H7N3, H7N4, and H7N7 were documented on large broiler and layer poultry operations in Victoria and Queensland as far back as the 1970s (Cross 1986/2003, Westbury 1998). An on-site increase in the virulence of an avian influenza H7N4 strain from low to high pathogenicity in 1997 was documented on a large commercial broiler-breeder operation of 128,000 birds (Selleck et al. 2003).

There is an additional audacity in foisting the health of industrial poultry on smallholders. Broilers and layers are bred by a consolidating class of corporate breeders offshore, typically at the level of grandparent stock before being shipped to clientele around the world (Bugos 1992, Koehler-Rollefson 2006, Gura 2007). Scott et al. (2009) report great grandparent hatching eggs are shipped into Australia through the quarantine facility at Torrens Island or industry-owned facilities: “Imports at regular intervals of six months to two years allow these industries to obtain genetically improved livestock and to correct any disease or negative production traits.”

The practice in effect removes natural selection as a self-correcting (and free) ecological service (Wallace 2016c,d). Any culling upon an outbreak or by farmers in reaction to an outbreak has no bearing on the development of immune resistance to the pathogens identified, as these birds—broilers and layers alike—are unable to evolve in response. In other words, the failure to accumulate natural resistance to circulating pathogens is built into the industrial model before a single outbreak occurs. With no reproduction on-site, there exists no room for a real-time, ecologically responsive, and self-organized immune resistance. It

Documented cases of high pathogenicity in avian influenza, Australia

- Victoria, 1976, H7N7, combined broiler and egg layer farm, Westbury (1998)
- Victoria,1985, H7N7, multi-aged chicken farm (120k) (broiler-breeders, broilers, layers & pullets), Westbury (1998)
- Victoria, 1992, H7N3, broiler-breeders (>13k), Westbury (1998)
- Queensland, 1994, H7N3, egg layers (22k) (multi-age)
- New South Wales, 1997, H7N4, commercial broiler-breeder (128k birds) , Sellek et al (2003)

Atkins et al. (2010)

isn't clear why pasture producers must cover for what is an epidemiological vulnerability *built directly* into industrial production.

Ecological and economic complications

The impacts are ecological as well (McFarlane et al. 2013). As agricultural production turns wetlands into farmland worldwide, including through the Murray-Darling Basin in the heart of Victoria, migrating waterfowl that have traditionally visited wetlands along their flyways have switched to feeding on grain on industrial farms (Lawrence and Vanclay 1994, Bomford and Sinclair 2002, Jeffries et al. 2004, Van Erden et al. 2005, Australian Human Rights Commission 2009, Hansen et al. 2015). That is, the expanding interface, and potential epizootic pathway, between waterfowl and intensive poultry arises from the industrial sector itself. As McFarlane et al. (2013) summarize the matter:

> The systematic assessment of [land-use/native vegetation change and emerging infectious disease (LUCC-EID)] relationships has demonstrated associations for 22% of human and animal EIDs in Australia. EIDs with LUCC associations most frequently occur with the REPLACEMENT and REMOVAL of natural vegetation (i.e., agriculture, plantations and intensive livestock production; settlements and infrastructure). These two categories are the most advanced stages of LUCC and represent an ecological state shift.

In the context of the present debate about excluding non-chicken poultry, placing causality upon essentialist notions of species misses the point that agroeconomic context is as much a source of causality. Ducks, for instance, may be typically little affected by highly pathogenic avian influenza, permitting the pathogen to continue to circulate among their flocks between acute outbreaks (Nestorowicz et al. 1987), but the same can be said about vaccinated chickens, from which new strains of HPAI have been documented in industrial flocks (Smith et al. 2006, Pasquato and Seidah 2008).

The dichotomy between extensive and intensive production upon which industry arguments are depending is itself problematic. The superficial distinction that has been made between industrial farms exercising "biosecurity" on the one hand and small farmers whose flocks are exposed to the epidemiological elements belies the complexities in ownership and contractual obligations (Wallace 2009, Atkins et al. 2010). In many industrial countries, agribusiness ship day-old chicks to be raised piecework by contracted farmers. Once grown (and exposed to migratory birds), the birds are shipped back to the factory for processing. The violation of biosecurity appears to be built directly into the industrial model (and the costs of outbreaks off-loaded onto contractors and local governments) (Leonard 2014, Wallace 2016e).

As a leader in the Cairns Group of Nations, Australia has been advancing deregulation in agri-food trade. Successive governments have assumed that Australia would benefit from a greater deregulation of international trade because this would allow increased access to world markets for primary agricultural commodities. But regulation exists, at least in Europe, to protect the social value of the rural landscape. **Australian governments, strongly influenced by economic rationalist ideology, have given insufficient consideration to the rural social landscape. Little critical reflection has taken place about whether Australia, and its farmers, would actually benefit from deregulation, or what the social impacts of this trend might be.** Deregulation inevitably invokes structural adjustment, forces farmers out of agriculture, depopulates rural areas, and creates social hardship. There are also environmental ramifications. The exit of farmers from agriculture has not been as fast as was expected by economists and policy-makers, with many farmers adapting to new situations.

Vanclay (2003)

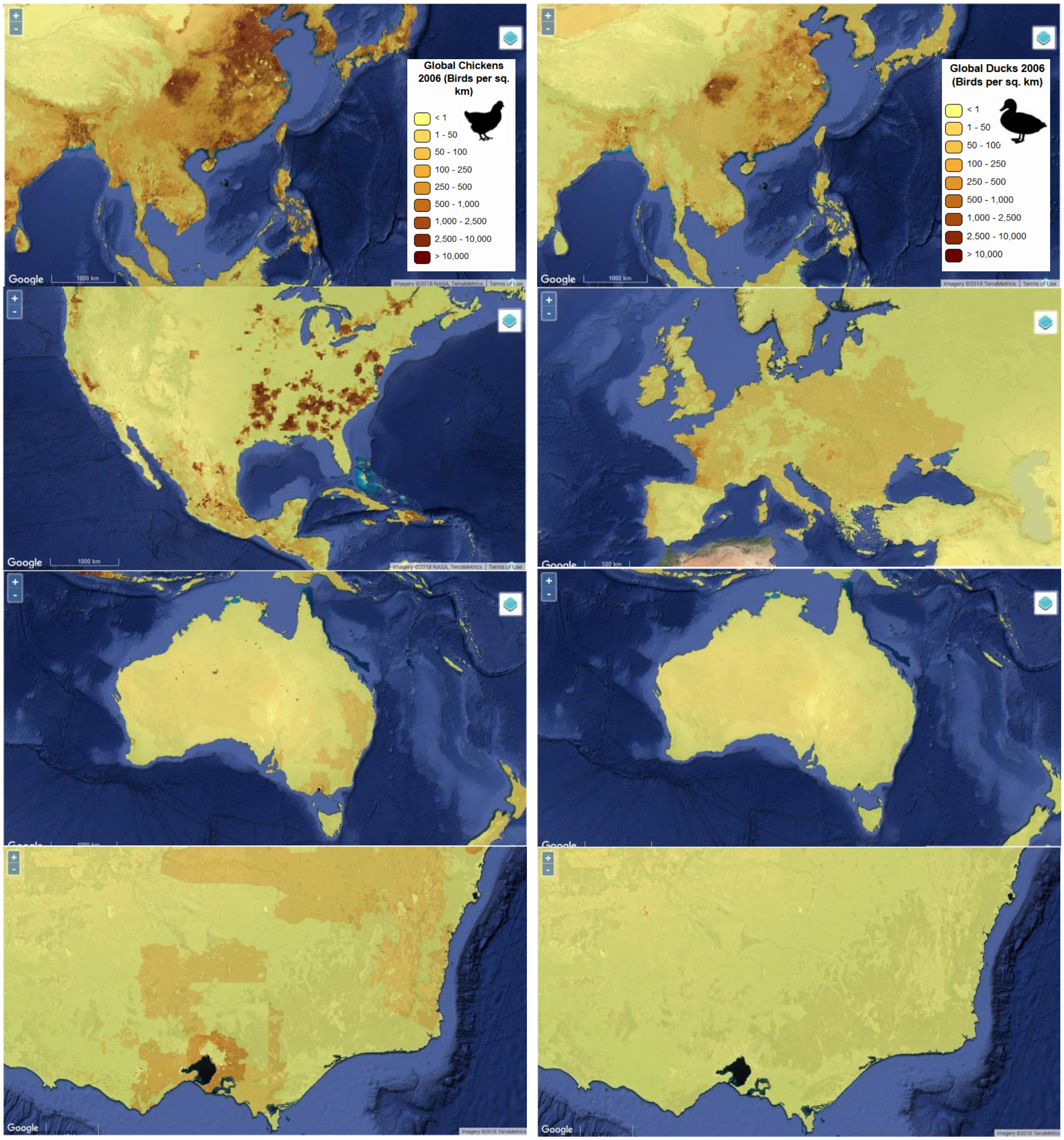

Figure 1. Projected chicken and duck densities, 2006. Gridded Livestock of the World updated to Livestock Geo-Wiki of 1 km resolution. Using FAOSTAT national data and subnational statistics, a series of spatially stratified regression models were repeatedly developed on training polygons. These were then applied to the entire 1-km set of predictor variables (vegetation, climate, topography, and demography) to estimate disaggregated livestock densities. Predictions from the best models per locale were used, producing an aggregate mosaic. Unsuitable areas, such as mountains, permanent ice, or protected areas, producing zero density, were conservatively masked, affecting associated projections of those areas deemed suitable for poultry production.

Broad declarations as to the nature of poultry are deployed against the daily realities of conditional context another way. China has been turned into an epidemiological catch-all, not without reason, as the country has served as a source for multiple strains of poultry and livestock diseases (Wallace et al. 2010, Yang et al. 2015). However, outbreaks of HPAI H5Nx in Europe and HPAI H5N2 and swine flu H1N1 (2009) in North America disprove the Sinophobic presumption that China (and Southeast Asia more generally) is the source of all poultry and livestock infections, avian influenza among them (Wallace 2016f, Wallace 2017). But China appears to represent another tool in the arsenal of an apparent campaign to impose margin-busting biosecurity overhead upon regenerative production. "China" serves as an all-encompassing alert, a shrill signifier, that a deadly epizootic is imminent, even as Australia has nowhere near its poultry densities (or that of chickens in the U.S. and ducks in the EU) (Figure 1) (Robinson et al. 2014).

Hamilton (2011) offers a different view, to the effect that "five Australian poultry production regions had poultry farm densities"—as opposed to poultry densities—"that were comparable to areas in Canada and Italy that have experienced extensive epidemics of HPAI." His spatial stochastic models of what is *in actuality* a HPAI-free Australia, projected a sustainable outbreak should an HPAI emerge, dependent upon a laundry list of farm and regional characteristics, and modalities of intervention: surveillance, size of disease control zones, pre-emptive ring culling, process slaughter, and emergency vaccination. But as we began this assessment, Hamilton also concluded HPAI incursion into intensive broiler areas such as the Central Coast of NSW and the Mornington Peninsula in Victoria, "tended to result in larger epidemics compared with epidemics seeded into turkey grower, duck grower, chicken meat parent breeder and combined chicken egg layer and pullet farms."

The distinction is sharpened when densities are differentiated by intensity of production (Figure 2) (Gilbert et al. 2015). Indeed, for extensive production, even as the Australian pasture sector has grown since these 2006 data, one must zoom in at a fine scale to even spot it.

The geographies give the impression that quashing non-chicken poultry before duck really even emerges as a sector—whatever the industry's ambitions, namely just about all of populated Australia (Figure 3)—is more a preemptive economic strike than an effort at mitigating disease risk. A more cynical interpretation is that as the sector is only now taking off, imposing stringent biosecurity standards upon producers—as if they were generic to species than specific to context—or shuttling non-chicken regenerative producers through the full application process under Planning for Sustainable Animal Industries are about aiding the industrial sector's efforts to corner both the domestic and Asian markets (Vanclay 2003, Grindlay 2015).

As well as environmental and health implications there may be important social consequences of production intensification, but these are much less well understood. Whilst there may be positive aspects such as a greater availability of affordable, safe protein, the quality of meat may be lower from intensive production systems in which animals are pumped with growth promoters and antibiotics. **Similarly, whilst intensive production and associated food systems may provide important employment opportunities, it may also squeeze less competitive, smaller producers out of markets.**

Gilbert et al. (2015)

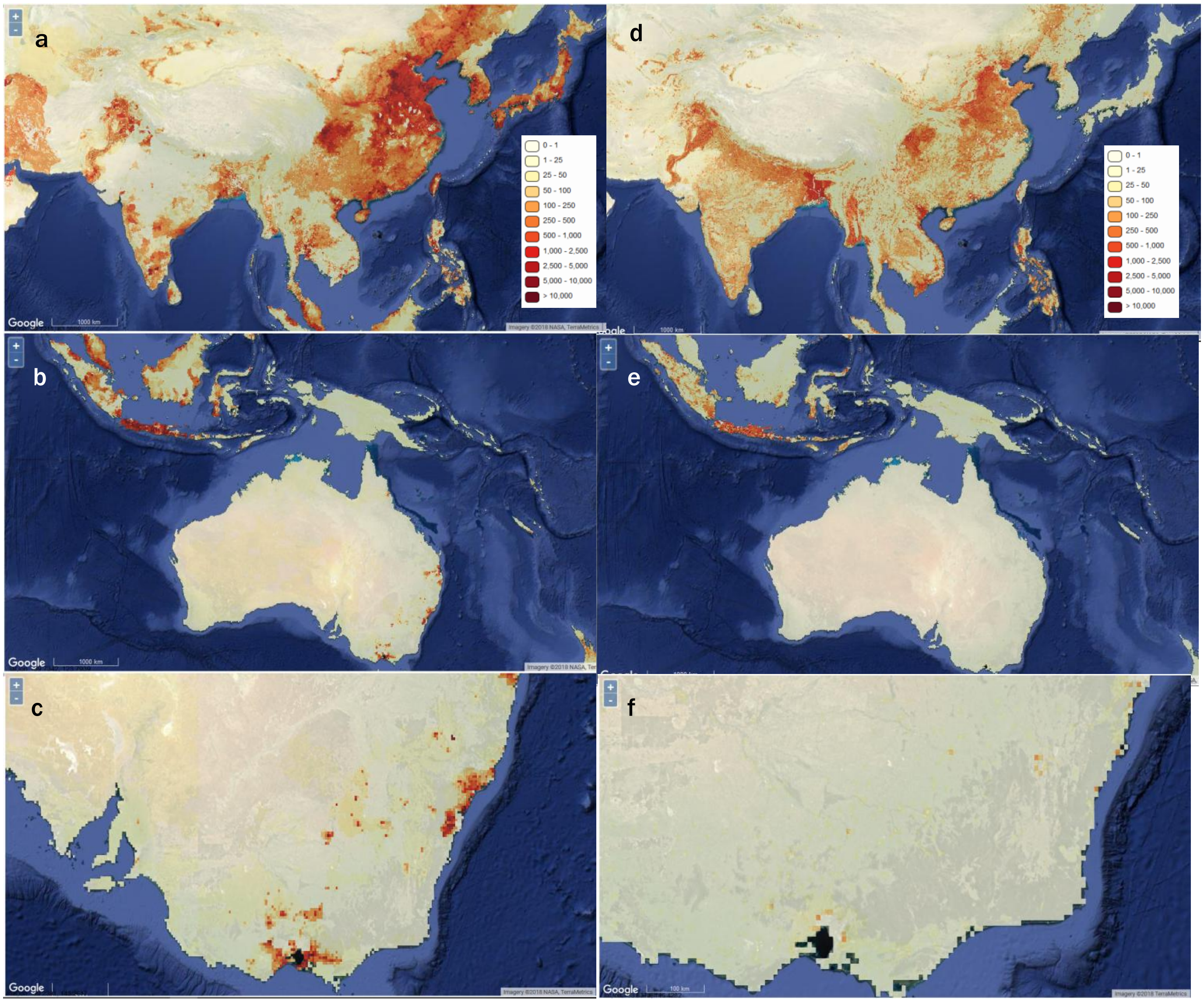

Figure 2. Projected chicken densities by ownership structure (Gilbert et al. 2015). Intensive production: (a) Asia, (b) Australia and Indonesia, and (c) Victoria. Extensive production: Asia (d), Australia and Indonesia (e) and Victoria (f). Meat production and stocking rates 2010 from FAOSTAT and China National Bureau of Statistics. Extensive production data (sector 4 under FAO system) for some countries were data-mined from the literature. Data on the proportion of chicken raised under different systems were found for 86 countries. Spatial projections at .083333 decimal degrees were produced out of a model that related extensive production to GDP, used the model to project extensive production for those countries without data, distributed extensive production equally over rural population, estimated commercial production as the total less extensive, and adjusted for rare pixels wherein extensive production exceeded total.

Conclusion

In short, the objections to including non-chicken poultry under Victoria's proposed streamline application process on the grounds of disease biosecurity appeared inadequate and spurious. The argument, and its analogs elsewhere, read as dependent upon unfounded overgeneralizations as to the nature of free-range production as a class of husbandry and applies those overgeneralizations as an a priori and unsupported objection to all smallholder farms regardless of their individual management, which the Planning for Sustainable Animal Industries ostensibly aims to address in the first place.

The notion of an "inherent" risk appears a term of art deployed as an attempt at a coup de grace, an argument that ends all other discussion, but the criteria it implies are ill-supported by the scientific literature. Such a policy position also implies the failures of biosecurity in intensive shed production are caused by the *existence* of *other* models of production as opposed to the industrial model itself or the management practices of any specific operation on-site. That contention speaks more to the vulnerabilities of the intensive operations State governments and Canberra appear to be protecting or outright promoting than of any management practice on the part of pasture producers.

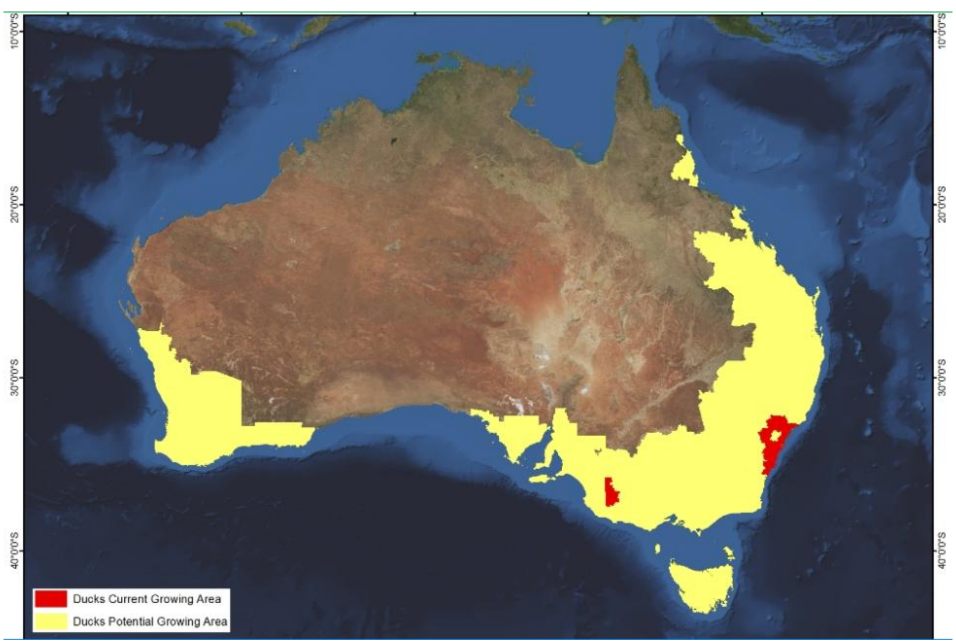

Figure 3. Duck growing areas, current and potential as mapped by AgriFutures Australia (2017).

In Australia, production is rapidly increasing, fuelled by a dramatic increase in the demand for duck meat. By global standards, Australia's commercial industry is still small with major expansions taking place only since the 1970s and 80s.

It has been estimated that the industry slaughters eight million birds annually and is worth approximately AU$100 million per annum. Two companies undertake 85% of this production.

Poultry consumption in Australia was estimated by ABARES to be 37.4 kgs per person during 2006–07. Duck meat consumption figures are a minor part of that, with ABARES estimating consumption as approximately 0.5 kg per person per annum. **While duck consumption figures are small, the growing demand for duck meat in Australia means the industry is expanding at around 10% per annum…**

Two companies are responsible for supplying 85% of the Australian duck market. One is based in the Wimmera region of Victoria and the other in the Sydney Basin.

AgriFutures Australia (2017)

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