



Governing Hen Welfare: Beyond Standards and Guidelines?

Final Project Report

**A report for the Australian Egg
Corporation Limited**

by Associate Professor Fred P. Gale

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Researcher/Author Contact Details

Name: Associate Professor Fred P. Gale
Address: School of Social Sciences, University of Tasmania,
Newnham Campus, Launceston, Tasmania, Australia 7250
Phone: 03 6324 3376
Fax: 03 6324 3652
Email: Fred.Gale@utas.edu.au

In submitting this report, the researcher has agreed to AECL publishing this material in its edited form.

AECL Contact Details:

Australian Egg Corporation Limited
A.B.N: 6610 2859 585
Suite 4.02, Level 4, 107 Mount St
North Sydney NSW 2060

Phone: 02 9409 6999
Fax: 02 9954 3133
Email: research@aecl.org
Website: <http://aecl.org/r-and-d/>

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Foreword

This project was conducted to better understand the role of science in hen welfare governance, especially in the context of a move from a general statement of jurisdictionally variable requirements in a model codes of practice approach to one based on nationally specific and verifiable standards informed by clear, detailed guidelines. The motivation for undertaking the research is that animal welfare is emerging as a critical issue within society to which the egg industry, along with other livestock industries, needs to respond. The research builds on the extensive literature on animal welfare ethics, hen welfare science, consumer studies, and politics and governance, supplemented by in-depth interviews of eight Australian animal and hen welfare experts.

This project was funded from industry revenue, which is matched by funds provided by the Australian Government.

This report is an addition to AECL's range of peer-reviewed research publications and an output of our R&D program, which aims to support improved efficiency, sustainability, product quality, education and technology transfer in the Australian egg industry.

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Program Manager – RD&E
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About the Author

Fred Gale (BA, MA, PhD) is Associate Professor in the School of Social Sciences, University of Tasmania. His research focuses on global and national sustainability governance. Past projects include investigations into certification and labelling in the forestry, fisheries and egg industries. Recent publications include 'Australian forest governance: a comparison of two certification schemes' (*Australasian Journal of Environmental Management*, 2014), 'Four models of interest mediation in global environmental governance' (*Global Policy*, 2014), 'Whose norms prevail?' (*Society & Natural Resources*, 2014), and 'Certification and Labelling in the Australian Egg Industry' (AECL Report 1UT111A, August 2013).

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Abbreviations

AAWS	Australian Animal Welfare Strategy
ABM	Animal Based Measure
ACCC	Australian Competition and Consumer Commission
ACO	Australian Certified Organic
AECL	Australian Egg Corporation Limited
AFI	Australian Farm Institute
AGMIN	Agricultural Ministers' Forum
AGSOC	Agricultural Senior Officials' Committee
AHA	Animals Health Australia
AQIS	Australian Quarantine and Inspection Service
AUSAWAC	Australian Animal Welfare Advisory Committee
AVA	Australian Veterinary Association
AVN	Australian Vaccination-skeptics Network
AVPA	Australasian Veterinary Poultry Association
AWTG	Animal Welfare Task Group
CAANZ	Consumer Affairs Australia New Zealand
CPV	Commercial Poultry Veterinarians
CRC	Cooperative Research Centre
CSC	Civil Society Coalition
CSES	Coalition for Sustainable Egg Supply
CSO	Civil Society Organisation
DAFF	Commonwealth Department of Agriculture, Fisheries and Forestry
DEFRA	UK Department of Environment, Food and Rural Affairs
ECA	Egg Corp Assured
EPC	Extensive Producers Coalition
EC	European Commission
EU	European Union
FAWC	UK Farm Animal Welfare Committee
FRFA	Free Range Farmers Association
HACCP	Hazard Analysis and Critical Control Point
HSI	Humane Society International Australia
IPC	Intensive Producers Coalition
ISB	Industry Services Body
NASAA	National Association for Sustainable Agriculture, Australia
NGO	Non-Governmental Organisation
OIE	World Organisation for Animal Health
PwC	PricewaterhouseCoopers
QoL	Quality of Life
RDE	Research, Development and Extension
RIS	Regulation Impact Statement
RNZSPCA	Royal New Zealand Society for the Prevention of Cruelty to Animals
RSPCA	Royal Society for the Prevention of Cruelty to Animals Australia
SFA	Statutory Funding Agreement
SIG	Special Interest Group

Executive Summary

Animal welfare is a 'wicked problem' to which there are no simple governance solutions. Reasonable people may disagree about where bars should be set regarding acceptable practices and science alone cannot provide answers because ultimately these decisions are ethical not scientific decisions.

Science can make an important contribution, though, by providing high-quality information regarding the impact that different production systems have on different dimensions of animal welfare.

However, since scientists are enmeshed in the ethics of animal welfare and because there is evidence of generational shifts within the scientific community, there is a need for a comprehensive scientific approach with teams balanced across generations, ethical preferences and research methods.

Gradations in animal welfare (from 'a life not worth living' to 'a good life') identified by animal welfare scientists have their counterpoint in segmented consumer markets, where different groups of consumers desire to be able to distinguish between otherwise 'like' products based on the degree to which different aspects of hen welfare are taken into account in egg production.

Modern governance arrangements should promote 'political modernisation' or 'dynamic governance', which involves establishing independent processes whereby all interested parties engage in deep, science-informed deliberation over what standards to establish, and the criteria and weightings required to determine whether they are met.

Overall Conclusions

- Animal welfare is no longer a simple, dichotomous concept of unacceptable and acceptable levels of welfare.
- The governance of hen welfare needs to recognise this more complex reality.
- The egg market is segmented and now serves consumers with a range of different preferences.
- Science can contribute to hen welfare governance by conducting meta-analysis as well as original research to clarify the welfare implications of production systems.
- Because scientists employ different methodologies, belong to different generations, and have different ethical commitment, broadly based and balanced comprehensive science panels are required to conduct the meta-analyses.
- To effectively govern hen welfare, independent, inclusive, representative, accountable and deliberative governance processes are required that balance producer, retailer, animal welfare and consumer interests.

1 Project Background

1.1 Hen Welfare Governance

This project is a follow up to *Certification and Labelling the Australian Egg Industry* (Gale, 2013). It investigates the strengths and weaknesses of governing hen welfare using codes of conduct and standards and guidelines, how the natural and social sciences are integrated into their development, and whether there are alternatives to adopting a standards and guidelines approach.

In a recent report, PricewaterhouseCoopers (PwC, 2013, p.2) stated that ‘Development of nationally consistent standards, as opposed to codes of practice that vary across jurisdictions, was mentioned as one of the key strengths by stakeholders across industry, government and animal welfare groups’. The PwC report identified the strengths of the standards and guidelines approach adopted as: inclusiveness of process; effectiveness of consultative mechanisms; independent project management; a national approach; and inclusion of science. However, key weaknesses identified were inefficiency, conflict, ineffective implementation, and a lack of clarity around objectives.

Despite PwC recognising the inclusion of science in standards development as a strength, they also note that ‘there is still room for improvement’ (2013, p. i) and that the ‘gap in understanding community expectations’ could be filled by ‘focused social science research’ (2013, p. iii). More generally, the integration of the natural and social sciences into regulation, including animal welfare regulation, is emerging as an important focus of research and practice.

A number of issues are relevant to the current project. First, while science is often considered monolithic, there are in fact diverse forms of science and scientific practice within and between the natural and social sciences. Second, there is tendency for the natural and social sciences to be integrated into governance in an ad hoc way. Thus, even when science informs governance, it is often not based on a comprehensive analysis of the issue. Finally, there are issues related to the contestability of science and the truth of claims made.

Based on the above considerations, AECL decided to inquire into current hen welfare governance approaches, how the natural and social sciences are currently being integrated into hen welfare regulation, and whether there is a better overall approach to integrating the diversity of scientific knowledge into governance arrangements that would also be more efficient, effective and equitable.

1.2 Research Objectives

This study investigates how the natural and social sciences are integrated into animal welfare governance in the Australian egg industry. Its research objectives are to:

- Examine the strengths and weaknesses of current codes, and proposed standards and guidelines approaches, to hen welfare governance.
- Investigate whether an approach grounded in the integration of the natural and social sciences could achieve the same objectives in a more timely, effective, efficient and equitable way.

1.3 Methods

The major methods used in this study are literature review and conceptual analysis. However, these are supplemented by interviews with eight experts in the field of animal and hen welfare. The experts were identified from a review of the literature and by asking existing interviewees who else they would recommend as experts in the field (the 'snowball approach'). While each expert agreed to be 'on the record', I have reported the results here in a de-identified form as I believe that to be the approach that is best in line with Australia's approach to research ethics. The names and backgrounds of the experts are listed in the Acknowledgements section above, but the order in which they are listed there is not the order they are referenced in the remainder of this report (e.g. as Interviewee 1, Interviewee 2, and so forth).

2 The Ethics of Animal Welfare

2.1 Evolution of Animal Welfare Policy

A review of the literature highlights significant advances in animal welfare research over the past 60 years with a spike in publications in the past two decades (Walker et al., 2014). Identified drivers include evolving social values, media exposés of animal cruelty, civil society activism, regulatory competition as a result of increased agricultural trade, and the development of governmental, intergovernmental regulations and public and private codes (Dalla Villa et al., 2014). The expanded interest has revealed that the notion of 'animal welfare' is an 'essentially contested concept', which takes on different meanings when embedded in different animal welfare frameworks. Such frameworks can differ in terms of whether importance is granted to 'negative' over 'positive' animal freedoms, whether the unit of analysis is the individual animal or groups of animals, and the degree to which some aspects of animal welfare are permitted to be traded off against others such as environmental impact, economic cost and workers' health (e.g. see Green and Mellor, 2011, p. 263).

Accounts of the evolution of thinking on animal welfare highlight the importance of the publication in 1964 of Ruth Harrison's book *Animal Machines*, which awakened the British public to the more intensive systems of agriculture, labelled 'factory farming', being undertaken in England, Scotland and Wales (Maciel and Bock, 2013). Immediately after the publication of Harrison's book, the British government established the Brambell Committee, which subsequently published a hard-hitting report criticising the treatment of animals on British farms. The report recommended the establishment of what is now known as the Farm Animal Welfare Committee (FAWC) and this body has subsequently played an important role in the development of regulations and guidelines for the treatment of farm animals in the UK (Conklin, 2015).

FAWC outlined the now well known 'five freedoms' of animal welfare, and confirmed their ongoing relevance in a recent report (FAWC, 2009, pp. 1-2). The five freedoms are:

- *Freedom from hunger and thirst*, by ready access to water and a diet to maintain health and vigour.
- *Freedom from discomfort*, by providing an appropriate environment.
- *Freedom from pain, injury and disease*, by prevention or rapid diagnosis and treatment.
- *Freedom to express normal behaviour*, by providing sufficient space, proper facilities and appropriate company of the animal's own kind.

- *Freedom from fear and distress*, by ensuring conditions and treatment, which avoid mental suffering.

When the UK joined the European Union in 1973, its influence over animal welfare issues extended to a larger area, and the EU adopted a range of animal welfare policy measures in the decades that followed. Whether due to influence or evolving social norms within Europe, it is notable that in the 2009 Treaty of Lisbon, animals are formally recognised as 'sentient beings' with welfare issues becoming a matter of EU competence. Article 13 of the Treaty of Lisbon states:

In formulating and implementing the Union's agriculture, fisheries, transport, internal market, research and technological development and space policies, the Union and the Member States shall, since animals are sentient beings, pay full regard to the welfare requirements of animals, while respecting the legislative or administrative provisions and customs of the Member States relating in particular to religious rites, cultural traditions and regional heritage' (European Commission 2015).

According to the European Commission's website, 'This puts animal welfare on equal footing with other key principles mentioned in the same title i.e. promote gender equality, guarantee social protection, protect human health, combat discrimination, promote sustainable development, ensure consumer protection, protect personal data' (European Commission 2015).

In Australia, the first animal welfare laws date back to the pre-federation era when Tasmania (then Van Diemen's Land) passed animal cruelty laws in 1837 (White, 2007, p. 349). New South Wales adopted legislation in the 1850s and the other states and territories after 1860 (White, 2007, p. 349). A theoretical milestone in the Australian debate on animal welfare occurred in 1975 with the publication of Peter Singer's book, *Animal Liberation* (White, 2007, p. 347). Offering a utilitarian defence for extending consideration of suffering to animals, his work was widely quoted by animal rights theorists but appears to have had minimal impact on Australia's regulatory and legal practice. The only major change in animal welfare law during the 20th century was the increasing inclusion of a 'duty of care' provision in animal welfare acts (White, 2007, p. 349).

No provisions for animal welfare were included in the 1901 Federal Constitution, and animal health and welfare has remained mostly the responsibility of individual states. The only exceptions are that the Commonwealth is directly responsible for governing the live export trade and export slaughtering facilities. In the 1990s, the Commonwealth increasingly sought to harmonise animal welfare practices across the country by encouraging the development of model codes of practice for the welfare of animals in key industries including poultry. In the early 2000s, it became further engaged with the establishment of the Australian Animal Welfare Strategy (AAWS) and the upgrading of model codes of practice to standards and guidelines. At this time, significant capacity in animal welfare matters was established within the Department of Agriculture, Fisheries and Forestry (DAFF). However, following the 2013 Commonwealth budget, funding for AAWS was discontinued and DAFF animal welfare staff redeployed.

In summary, national approaches to animal welfare have evolved at different speeds in different countries led by developments in the UK and Europe. Australia's approach to animal welfare has been fragmented across states and territories and the willingness of the Commonwealth Government to play a leadership role has varied over time. The long-standing governance gap on animal welfare issues in Australia, exacerbated by the decision to defund AAWS and redeploy DAFF's animal welfare capacity, risks seeing the

country fall further behind its Organisation for Economic Co-operation and Development (OECD) peers on a rapidly evolving policy matter with high public importance.¹

2.2 Ethical Frameworks and Animal Welfare

The evolution of animal welfare governance has both influenced and been influenced by the development of competing ethical frameworks. At a very broad level, ethicists distinguish between two rather different justifications for action: utilitarian and deontological (rights-based) approaches (e.g. Millman et al., 2010). Utilitarianism, deriving from the moral philosophy of Jeremy Bentham, adopts a consequentialist ethic that argues that the rightness of an action is to be judged by its consequences according to the maxim 'the greatest good for the greatest number.' In contrast, a deontological ethic ignores consequences and seeks to ground the rightness of an action in some broadly accepted moral principle such as 'do unto others as you would have them do unto you'. Difficulties have been identified with both approaches, with critics concerned that utilitarian ethics can justify individual and group oppression providing only that the overall outcome benefits the majority. Meanwhile, deontological approaches have difficulty in justifying why a particular moral principle takes precedence over a range of other, potentially compelling alternatives.

In addition to situating behaviour within a utilitarian or rights-based framework, a key ethical question that requires answering is: 'Which beings are entitled to moral consideration?' Through history, some human groups have considered some people as less-than-human and thus worthy of less or no moral consideration. The consequence in practice is that these groups enjoy fewer rights. In Ancient Greece, for example, slavery was widely practised and it was only the 'citizens' of Athens – adult males who had been born there and completed military training – who were entitled to vote. In 19th century England, women were considered to be mentally and morally inferior to men and enjoyed fewer rights in consequence including, notably, the right to vote. It is in the 19th century, too, that claims begin to be taken seriously that animals are able to suffer, prompting the development of animal cruelty laws. And, as just noted above, only in the early 21st century have some countries officially declared some animals sentient and thus worthy of additional moral consideration.

The importance of these ethical considerations for investigating animal welfare is that there is necessarily going to be a high level of disagreement between those embracing a consequentialist, utilitarian view of animal welfare and those embracing a deontological perspective. The former will mount a defence of animal welfare in terms of the greatest good for the greatest number, with a focus on human utility. The latter, in turn, will set out compelling arguments for either the complete non-exploitation of animals, the special treatment of some animals (e.g. whales and dolphins), or the requirement that animals lead 'a good life'.

Efforts to bridge the divide between utilitarian and deontological approaches to animal welfare have been attempted. In one early effort, Hurnik and Lehman (1988) distinguished between utilitarian and animal rights approaches noting that both agreed on some aspects of welfare while disagreeing on others (Table 2-1). Notably, both approaches agree that there are circumstances in which animals may be killed (self-defence), harmed (self-defence), and used. These authors may, in fact, overstate the degree of difference between utilitarian and animal rights perspectives, since not all animal rights theorists agree that it is

¹ The OECD was formed in 1960 and now consists of 34 mostly advanced economy country members. Its mission is to 'is to promote policies that will improve the economic and social well-being of people around the world' (see <http://www.oecd.org/about/>).

wrong in itself to kill animals for food. Instead, they would argue that any killing should be humane, with the life of the animal up to the point of death being a 'life worth living'. Equally well, not all utilitarians would accept an implication that humans have no duty of care towards animals, and the variety of farming practices taking place is evidence that some otherwise very utilitarian minded farmers are concerned to provide their animals 'a life worth living'.

In short, the classification of ethical positions on animal welfare into a dichotomous 'utilitarian' and 'deontological' ethical perspectives may hide as much as it reveals. While there are undoubtedly individuals and groups who promote views at the far end of the animal welfare spectrum – either that humans have no duty of care whatsoever towards animals or that animals are fully deserving of the rights allocated to humans – most occupy positions in between and wrestle with what are often undoubtedly difficult compromises.

Table 2-1 Assessment of Human Actions by Utilitarian and Animal Rights Theorists

Type of human action directed toward farm animals	Utilitarian theory	Animal rights theory
Killing in self-defense	Acceptable	Acceptable
Killing for other purposes	Acceptable ^b	Unacceptable ^c
Harming ^a but not killing in self-defense	Acceptable	Acceptable
Harming ^a but not killing for other purposes	Acceptable ^b	Unacceptable ^c
Using but not killing or harming	Acceptable ^b	Acceptable ^d
^a Includes deprivation, aversive stimulation, overstimulation, or any other situation which causes suffering; ^b Conditional acceptability--only if positive consequences of given action for humans and animals outweigh, as much as possible, the overall negative consequences; ^c It would violate the basic animal rights demand that animals which are able to control their own lives have the right to do so; ^d Conditional acceptability--only if such a use would not encroach on animals' rights to control their own lives--for example, observation of animals which does not disturb them.		

Source: Hurnik and Lehman, 1988, p. 309.

2.3 Ethics, Norms and Political Contestation

FAWC (2009, p. 56) argues that the best approach is to seek consensus on the minimum criteria to apply while recognising the existence of a demand for both lower and higher levels of animal welfare in the community. This approach attempts to bridge the utilitarian and deontological divide by suggesting that both approaches can be validated, one providing animals with 'a life worth living' and the other providing animals with 'a good life'. Both stand in contrast to approaches to caring for animals that result in a 'life not worth living'. Figure 2-1 sets out FAWC's threefold conception of animal welfare.

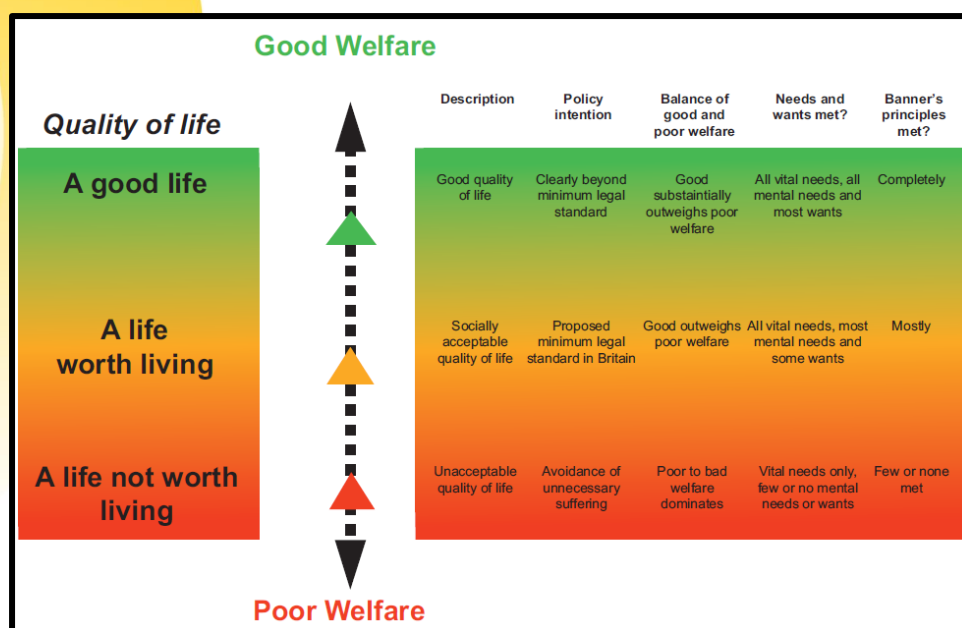


Figure 2-1 Levels of Animal Welfare

Source: FAWC, 2009.

FAWC's approach can be contrasted with the one developed by Thornber et al. (2012, p. 20), which explains Australia's animal welfare system as underpinned by an ethical matrix that clarifies what is at stake for different types of stakeholders.

The ethical matrix creates a formal structure for identifying the parties (agents) that need to be considered in decisions affecting farm animals, farmers, consumers and the livestock production environment. It formally identifies the complexity of ethical decisions relating to life forms, and the importance of considering an issue from multiple perspectives... The aim of the matrix is to assist rational decision making during development of public policy by articulating the ethical dimensions of any issue in a transparent and broadly comprehensible manner...' (Thornber et al., 2012, pp. 19-20).

Thornber et al.'s ethical matrix is reproduced in Table 2-2 and links the agents with a stake in animal welfare (the animal itself as well as producers, consumers, citizens and the environment) to the different dimensions of animal welfare (biophysical, behavioural and moral). According to the table, producers treat animals as property on the biophysical dimension, as desiring freedom in the use of animals with regard to the behavioural dimension, and as seeking fair treatment of animals with regard to trade and law. In contrast, consumers focus on the safety of food on the biophysical dimension, choice and labelling on the behavioural dimension, and food affordability on the fairness dimension. According to Thornber et al. (2012, p. 20), 'The aim of the matrix is to assist rational decision making during development of public policy by articulating the ethical dimensions of any issue in a transparent and broadly comprehensible manner.'

Table 2-2 The Ethical Matrix

Agent deserving respect	Impacts of respect on wellbeing (health and welfare)	Impacts of respect on autonomy and dignity (freedom and choice)	Impacts of respect on justice (fairness)
Treated organism	Animal welfare	Behavioural freedom	Intrinsic value, entitlement to care
Producer	Property interest	Freedom to use animals, respect for farming culture	Fair treatment in trade and law, duty of care
Consumer	Availability of safe food	Choice and labelling	Affordability of food
Non-consumer (citizen)	Value of opinion	Protection of interest	Exercise of democratic responsibility
Living environment	Conservation	Biodiversity	Sustainability of populations

Source: Terry L. Whiting, cited in Thornber et al., 2012, p. 20.

2.4 Ethics and Interests

The work of FAWC and Thornber et al. makes clear that different ethical understandings of what animals are, and what rights and duties are owed to them, both construct and are constructed by a diversity of interests located along a supply chain. A key analytical challenge therefore in animal welfare science broadly conceived, is to appropriately identify the relationship between ethical position, supply chain location and interests with a view to identifying the relative power that groups have to affect the policy, legislation and regulation. However, approaches to understand the link between animal welfare ethics and interest groups vary, with potentially important consequences for ways in which the political debate over animal welfare matters is specified.

For example, in Thornber et al.'s Ethical Matrix, the 'agent deserving respect' takes quite different forms, varying from those that cannot speak for themselves (organisms and the environment) to those that can (producers, consumers and citizens). The inability of organisms to speak on their own behalf means that advocates are required to speak for them, constituting a powerful justification for the emergence of animal welfare and animal rights organisations such as the RSPCA Australia, the Humane Society International and Animals Australia. However, the legitimacy of these groups to advocate on behalf of animals is often challenged by producer, distributor and retailer groups along the production chain.

Thornber et al.'s matrix also fails to recognise the diversity of interests that characterise the identified agents. For example, consumers are treated as a single group, collectively interested in food safety, choice via labelling, and affordability. While segments of consumers fit this profile, consumer segmentation studies indicate that some consumers are also interested in product content, country of origin, chemical additives, environmental impact and animal welfare (see Section 5.1). Consumers may speak on their own behalf when they purchase products, but they also have vicarious spokespeople, notably in Australia, the consumer organisation CHOICE and the two large supermarket chains, Coles and Woolworths. It is also important to note that producers are not a homogenous group either, with some promoting organics and others, different types of free range products.

Differences in ethical position are reflected in group organisation and interests, creating a politics of animal welfare. In a study of animal welfare policy in New Zealand, Morris (2009) identifies two groups engaged in contesting the content and application of the *Animal Welfare Act 1999*. One coalition of 'animal welfare and liberation groups' included the Royal New Zealand Society for the Prevention of Cruelty to Animals (RNZSPCA) and Save Animals From Exploitation (SAFE), which sought significant changes to the current law and its application. This group argued in favour of higher welfare standards for animals to enable them to engage in a degree of normal behaviour, and included the banning of sow stalls for pigs and of cage systems of egg production. The second, opposing, group consisted of producers in different farm sectors that resisted major changes to animal welfare regulations (Morris 2009, pp.33, 18).²

2.5 Summary

The literature on animal welfare indicates that a range of different equally legitimate ethical positions exist in relation to judgements regarding animal welfare. Judgements can be utilitarian and consequentialist, or they can be deontological and rights based with a range of intermediate positions. Further, ethical positions on animal welfare are reflected in organisational structures and a defence of interests. Those adopting a more consequentialist perspective will seek to have that perspective reflected in public legislation and private codes, as will those adopting a more rights based perspectives. It is in this complex political context of ethical conflict and contestation that science is called upon – by all sides – to intervene and resolve matters. To understand what science may and may not contribute, some appreciation of how science operates is required, which is the subject of the next section.

² The politics of animal welfare is addressed in another study by Elzen et al. (2011) of pig husbandry in The Netherlands, where two actor coalitions are also identified as contesting the welfare norms governing pig production. Animal rights groups promoting the banning of sow stalls included the Foundation for Nature and Environment, the Animal Protection Society and Lekker Dier (Sweet Animal), which were supported by the small organic pork producers who employed alternative production methods. These groups were opposed by pig producers headed by the sector association Land-en Tuinbouw Organisatie (LTO, the Dutch Federation of Agriculture and Horticulture), which opposed practices beyond the industry standard.

3 Science and Animal Welfare

3.1 What is Science?

The following account of 'science' is extracted from an introductory book on biology and appears to typify what many scientists understand by the term (Raven and Johnson, 1996, pp. 5-11). In the first chapter of the book, there is a brief discussion of the nature of science that draws on standard ideas regarding induction, deduction and falsification. Deduction is illustrated by the story of Eratosthenes, who employed Euclidian geometry to correctly calculate (i.e. deduce) the earth's circumference (Raven and Johnson, 1996, p. 5); induction is illustrated with reference to Francis Bacon and Isaac Newton who inferred general principles from close observation of specific instances. Finally, by building and testing models and doing experiments that contain hypotheses, it is shown how some answers can be ruled out and others retained via the scientific method. As Raven and Johnson (1996, p. 7) state: 'The scientific process involves the rejection of hypotheses that are inconsistent with experimental results or observations. Hypotheses that are consistent with available data are conditionally accepted'.

Having presented a diagram of the scientific method as consisting of observation followed by hypotheses formulation, experiment, prediction, further experiment and confirmation, Raven and Johnson state that some hypotheses that are continuously evaluated 'may eventually be considered a theory', that is 'that of which we are the most certain' (1996, p. 8). Yet Raven and Johnson are also aware of the serendipitous nature of science stating the 'as British philosopher Karl Popper has pointed out, successful scientists without exception design their experiments with a pretty fair idea of how the results are going to come out' and have 'what Popper calls an "imaginative preconception" of what the truth might be' (1996, p. 8). They undertake rigorous experiments to test the validity of these imaginative preconceptions. This approach leads to the elimination of false ideas but creates difficulties for determining the veracity of others. As Raven and Johnson note: 'there is no absolute truth in science only varying degrees of uncertainty. The possibility remains that future evidence will cause a theory to be revised. Therefore, a scientist's acceptance of a theory is always provisional' (1996, p. 8).

Despite the warnings of Raven and Johnson, many scientists speak and write about their research as though it was in some fundamental sense true. From a philosophy of science perspective, such strong claims about science are highly problematic given the rather shaky philosophical foundations on which they rest. Alan Chalmers highlights in his book *What Is This Thing Called Science?* (2013) the range of philosophical efforts that have been made to distinguish 'science' from 'non-science' and to justify the truth claims of the former. In doing so, he highlights the serious difficulties in grounding science in observation, induction, deduction, falsification and experimentation. While science has powerful knowledge claims to make in comparison to pseudo-science and religion, clearly specifying the basis on which science differs from other approaches to knowledge is very difficult and arguably a compelling answer has yet to be given.

In the philosophy of science literature, three figures stand out as having attempted to identify the foundations of scientific knowledge: Karl Popper, Thomas Kuhn and Imre Lakatos. While each has put forward detailed and powerful explanations for what science is and how it progresses, each explanation also contains some significant difficulties for traditional views that rely on observation, deduction and induction. Moreover, no agreement exists within the philosophy of science community on the relative merits of the three approaches. There is no philosophical consensus that favours Popper, Kuhn or Lakatos

such that anyone inquiring into the field needs to weigh up the various approaches and come to their own determination.

Natural scientists often find Popper's approach to science, known as falsificationism, compelling, notwithstanding its many difficulties. Chalmers outlines these difficulties in an extended discussion (2013, pp. 55-96). For example, while Popper argues that science progresses by making bold conjectures, which are tested against reality via experiment, with false hypotheses rejected outright and those not shown to be false accepted as contingently true, Chalmers contends that matters are not so simple.

For instance, suppose an astronomical theory is to be tested by observing the position of some planet through a telescope. The theory must predict the orientation of the telescope necessary for a sighting of the planet at some specified time. The premises from which the prediction is derived will include the interconnected statements that constitute the theory under test, initial conditions such as previous positions of the planet and sun, auxiliary assumptions such as those enabling corrections to be made for refraction of light from the planet of the earth, and so on. Now if the prediction that follows from this maze of premises turns out to be false (in our example the planet does not appear at the predicted location), then all that the logic of the situation permits us to conclude is that at least one of the premises must be false. It does not enable us to identify the faulty premise. It may be the theory under test that is at fault, but alternatively it may be an auxiliary assumption or some part of the description of the initial conditions that is responsible for the incorrect prediction. A theory cannot be conclusively falsified, because the possibility cannot be ruled out that some part of the complex test situation, other than the theory under test, is responsible for an erroneous prediction... (Chalmers, 2013, pp. 82-83).

Moreover, Chalmers argues that falsificationism does not explain how science has, in fact, evolved. Many foundational theories in science were initially falsified on being tested and were not abandoned but pursued by those demonstrating a commitment to them. Persuaded in part by this argument, Imre Lakatos developed an alternative falsificationist account of scientific progress based on the concept of a 'research program'. According to Lakatos, scientists operate within a research program, which consists of a 'hard core' of fundamental principles that are unquestioned by those operating within the program. Beyond the hard core, the research program contains a 'protective belt' of auxiliary hypotheses that are modifiable in the light of experimental data. Scientists are guided by both positive and negative heuristics as to what to do and not do. The negative heuristic informs scientists as to what they should not try to modify within a research program if they are to maintain the integrity of its hard core. The positive heuristic, on the other hand, establishes the set of experiments and investigations that scientists should engage in and that are likely to produce fruitful results. According to Lakatos, 'the positive heuristic consists of a partially articulated set of suggestions or hints on how to change, develop, the "refutable variants" of the research program, how to modify, sophisticate, the "refutable" protective belt' (Lakatos quoted in Chalmers 2013, p. 124).

If Popper's falsificationism and Lakatos' research program approaches are problematic as a basis for justifying strong claims concerning scientific knowledge, then this criticism applies *a fortiori* to Thomas Kuhn's 'paradigms' approach. According to Kuhn, science progresses through a set of stages. At the pre-paradigmatic stage, a diversity of alternative approaches vie with each other and little progress is made in a field because of the absence of a single, shared understanding. Eventually, however, a 'paradigm' emerges which is embraced by the majority of scholars and consists of a shared set of fundamental ideas and techniques. Scholars working within the paradigm apply its ideas and techniques – which Kuhn refers to as 'normal science' – leading to significant advances in the field.

Eventually, however, 'anomalies' emerge as new discoveries begin to challenge the paradigm's fundamental principles and ideas. Eventually, a full-blown crisis emerges that is resolved by a 'scientific revolution' and the replacement of the old paradigm with a new one. According to Kuhn, paradigms are 'incommensurable', which means that they differ so significantly from one another that a scientist working in one of them cannot accurately assess the work of a scientist working in another. Scholars operating in different paradigms are operating in different worlds and have difficulty communicating with each other as they do not share each other's principles, experimental techniques, or even standards of evidence.

The point of this section is neither to defend nor promote a particular philosophy of science, nor to undermine science as a very valuable social enterprise. Rather it is simply to point out that: (a) there is no unproblematic philosophical defence of the truth claims that science makes; and that (b) science is a social enterprise and while scientists can strive to be objective and impartial, they will only ever partially succeed in being so, which underscores the importance of peer review and critical self-reflection.

Given that it is Popper's falsificationist approach that is often referenced in textbook accounts of the scientific method, it is perhaps pertinent to leave the last words in this section to him:

There is no more rational procedure than the method of trial and error – of conjecture and refutation: of boldly proposing theories; of trying our best to show that these are erroneous; and of accepting them tentatively if our critical efforts are unsuccessful. From the point of view here developed, all laws, all theories, remain essentially tentative, or conjectural, or hypothetical, even when we feel unable to doubt them any longer (Popper, 1966).

Science does not rest upon solid bedrock. The bold structure of its theories rises, as it were, above a swamp. It is like a building erected on piles. The piles are driven down from above into the swamp, but not down to any natural or 'given' base; and if we stop driving the piles deeper, it is not because we have reached firm ground. We simply stop when we are satisfied that the piles are firm enough to carry the structure, at least for the time being (Popper, 1992, p. 94).

3.2 The Natural and Social Sciences

Philosophers of science like Popper, Kuhn and Lakatos have not devoted much attention to theorising the social sciences. Indeed, in part their work has been to distinguish between the 'real' knowledge that is revealed by natural science and 'pseudo knowledge' generated not only by 'bad science' and magical thinking but also, they believe, by much social and psychological inquiry. Popper, in particular, was motivated in part by a desire to demonstrate why physics was a science and could progress, while Marxism and Freudian psychoanalysis were pseudo-sciences that could not. Kuhn argued that most social sciences remained in the 'pre-paradigmatic' stage of scientific development meaning that 'normal science' could not occur. Even today quite a few natural scientists look askance at the social sciences as failing to deliver foundational knowledge.

One of the major differences between the natural and social sciences, however, is the nature of the 'reality' they confront. In the natural world, the atoms, molecules, quarks, genes, and diseases exist independently of human intention and behave independently of what humans think about them.³ It makes sense when examining the natural world to consider reality as obeying underlying 'laws' that, once discovered, enable a range of new phenomena to be understood and manipulated. In the social world, in contrast, what is 'real' is a product of the inter-subjective beliefs of groups in societies that construct it, and thus reality itself changes in subtle or dramatic ways as inter-subjective beliefs alter.

As a simple example of how social theory can affect social behaviour, consider the behavioural economics literature on the effects of teaching economics. This literature (e.g. Haucap and Just, 2010) shows that there are both nature and nurture effects influencing economics students into being less likely to cooperate and more likely to endorse market systems as fair than non-economic students. When asked to assess whether raising the price of a bottle of water to reflect increased demand is fair in comparison to other distributive mechanisms, trained economists are more likely to respond in the positive than those trained in other disciplines. As Haucap and Just (2010, p. 10) conclude:

Overall, our study would reject the hypothesis that training in economics does not affect students' judgement about what is fair and unfair, i.e. that we as academic economists are "not guilty". However, since there are also selection effects, indicating that economics students already hold different views than others when beginning their studies, we can claim that our students' views are not entirely "our fault" as economics teachers either.

The instability of the nature of social reality presents a problem for social scientists that natural scientists can largely ignore. The fact that social reality can and does alter over time requires theorising that is responsive to that fact. Social science also needs to recognise that the 'objects' of its analysis, human individuals and groups, themselves construe the context in which science occurs. That is, unlike studying molecules, atoms or genes, or even autonomic nervous system responses, humans seek to interpret the situation they are in and undertake hard-to-predict action based on that interpretation. Thus the 'subjects' of a social experiment may not behave the same way the next time the 'same' experiment is run because, having reflected on and learned from that experience, they may now decide to behave differently. This is a rather different reality than that confronting the natural scientist in the laboratory who expects atoms, molecules and genes – and even laboratory rats – to behave the same way when subjected to the same experiment under the same conditions.

It is because social reality differs significantly from natural reality that social scientists have evolved a range of qualitative as well as quantitative methodologies to grasp its nature. It is also why social scientists disagree so significantly about starting points for the interpretation of the nature of social reality. Social scientists recognise that the theory they employ to study social reality significantly affects, even generates, that reality. While it is not simply a case of 'what you theorise is what you get', it is clearly evident that 'theory matters', as illustrated in the economics example. In the social world, individuals and groups are motivated to act on theories of human nature and the nature of the social system. In the past, 'subjects' were predisposed to view the laws of kings and queens as legitimate and obey them; today, 'citizens' respond similarly to competitively elected party-political governments. Thus, to investigate what people and groups believe, and why, requires sociological, psychological and interpretative methods of inquiry usually conducted

³ I recognise that there are issues regarding the impact that observation has at the level of quantum physics where the act of observation appears to alter the behaviour of electrons. While this approximates the world of social scientists, electrons are considered to be reacting to the physical act of observation and not to evidencing a mental awareness that they are being observed.

via surveys, interviews, focus groups and participant observation among other social science methods.

3.3 The Politicisation of Science

Science, both natural and social, has frequently challenged status quo understandings of 'reality', constituting a perceived threat to religious and secular rule. In the early modern era, Copernicus challenged the conventional, Ptolemaic, conception that the earth was at the centre of the solar system with a heliocentric model of the earth moving around the sun. While not challenged during his lifetime, the Copernican view was subsequently disputed by the Catholic Church, which found the heliocentric view set out in Copernicus' book *De Revolutionibus Orbium Coelestium* (On the Revolution of Celestial Bodies) heretical. When Galileo Galilei subsequently advocated a heliocentric approach to the solar system, he was placed on trial by members of the Inquisition, found guilty and sentenced to house arrest.

Today, science continues to encounter scepticism from a range of religious and state authorities when it advocates positions that challenge existing world views. The theory of evolution, for example, articulated by Charles Darwin, and for which there is a mass of confirmatory observations, still fails to persuade many. In some jurisdictions, this leads to the teaching of 'equivalent' perspectives on the emergence of life such as 'intelligent design'. Beyond the conflict between science and religion lies conflict between science and some social movements, such as those questioning automatic childhood vaccination. The Australian Vaccination-skeptics Network Inc, which advocates individual choice regarding vaccinations, states on its website that: 'The government and the medical community provide you with one side of the story – the AVN gives you the other side. Taken together, this data will allow you to make the best possible decision for the health of your child' (AVN, 2015).

Scepticism regarding the claims of the natural and social sciences is not confined to religious groups and marginal movements. It is endemic within our society and manifests itself at the highest levels of media and government. In a series of articles in *The Australian* in 2014, the claim was made that the Australian Bureau of Meteorology was fudging the data. Yet according to researchers at the ARC Centre of Excellence for Climate System Science at the University of New South Wales, there was no validity to this claim whatsoever (Alexander and Pitman, 2014). *The Australian's* allegations against the Bureau appear part of a concerted campaign by that newspaper to undermine climate science (Ashley, 2011).

Such anti-science is also evident in our current political system. For example, while there is a great deal of social science evidence to indicate that there are better ways of dealing with criminal behaviour than incarceration, popular public policy responses often advocate precisely the opposite. 'Tough on crime' policy slogans coupled with mandatory sentencing laws have led to a rapidly increasing prison population in Australia despite the fact that 'It does not reduce the rate of serious crime, discourage potential offenders or reduce re-offending rates' (Bagaric, 2015). The same is true with the 'tough on drugs' policy, which produces perverse results by criminalising what is usually a social and psychological problem, certainly at the level of the individual addict. As the nation prepares itself for a new 'war on ice', it is important to note just how badly the past 'war on drugs' is perceived to have gone (Fitzgerald, 2015).

The conclusion is that science has a history of being contested and politicised when it comes into conflict with received wisdom, whether that be religious, social or political. In the modern era, non-experts have many more avenues to express their opinions regardless of whether those opinions have any foundation or not. While society might expect its major

institutions to distinguish between informed and uninformed opinion, this often does not occur either because of the threat to vested interests or of some misguided application of the journalistic principle of 'balance' (see, e.g. Stokes, 2012). As might be anticipated, therefore, when it comes to animal welfare studies, the temptation to ignore, distort and spin science to specific sectoral advantages is real and a clear account needs to be taken of this possibility.

3.4 Science and Animal Welfare

The scientific approach to animal welfare has evolved over time, becoming more interdisciplinary in the process. According to Green and Mellor (2011, p. 264):

...current animal welfare thinking recognises three major orientations: biological function, affective state and natural living. As these orientations have developed from different roots, the predominant one adopted by each person will reflect their particular worldview and convictions, i.e. their values. Moreover, each orientation has been and is informed by scientific knowledge. Hence, there is interplay of values and science, and different conclusions about animal welfare status may be reached because of the different values frameworks adopted.

If Green and Mellor are right, then bringing the three separate strands of animal welfare research together constitutes a major advance over single-disciplinary approaches that focus exclusively on the biological, the affective state, or the natural. While the evolution of animal welfare science in this direction is discussed in later sections, the three approaches are separately analysed in this section to indicate what is at stake in terms of ethics, science and welfare.

The biological function approach to animal welfare is grounded in the natural sciences and has tended to accept a negative conception of animal welfare. Green and Mellor (2011, p. 264) describe the biological function perspective as follows:

According to the biological function orientation an animal has good welfare when, among other attributes, it grows well, is in good health, reproduces successfully, and is relatively stress free. This orientation arose during the early 1980s when physiological and behavioural indices of these forms of biological performance were well established and at a time when scientists were still strongly discouraged from inferring that animals could experience mental subjective states or feelings.

In contrast, the affective state perspective focuses on the mental state of animals and animal sentience. Again, according to Green and Mellor (2011, p. 264):

Although the idea that welfare includes both the mental and physical wellbeing of an animal was articulated at least 55 years ago, it took until the mid-1990s for this notion to begin to be accepted scientifically. By the early 2000s the concept of affective state or feelings had become well accepted and today is the basis of much animal welfare science thinking...According to the affective state orientation, therefore, an animal's welfare will be good when it adapts with positive emotional experiences and/or without negative experiences during its interactions with other animals, people and the environment.

Finally, for Green and Mellor (2011, pp. 264-65), there is the natural living orientation:

...which developed in parallel with the other two orientations, incorporates the view that the closer an animal is to its natural, wild state, especially with regard to its ability to express natural behaviours, the better its welfare may be. While this view can provide a useful perspective when, for example, farming systems restrict behavioural expression in barren environments, it must also be noted that the welfare of the wild ancestors of current domesticated species was not necessarily good in other respects. Thus, although animals in the wild live naturally, without human intervention they may be in poor physical condition as a result of nutritional inadequacies, climatic challenge, disease states and predation, to give only a few examples of factors that would have negative impacts on their welfare.

It needs to be noted, too, that animal welfare scientists are deeply conflicted, both theoretically and methodologically, over the issue of animal consciousness. Dawkins (2015, pp. 5-6) explains the issue as follows:

Consciousness has always been both central to and a stumbling block for animal welfare. On the one hand, the belief that nonhuman animals suffer and feel pain is what draws many people to want to study animal welfare in the first place. Animal welfare is seen as fundamentally different from plant “welfare” or the welfare of works of art precisely because of the widely held belief that animals have feelings and experience emotions in ways that plants or inanimate objects however valuable do not... On the other hand, consciousness is also the most elusive and difficult to study of any biological phenomenon... Even with our own human consciousness, we are still baffled as to how the wealth of subjective experience we all know from first-hand experience can actually arise from a lump of nervous tissue weighing less than 2 kg. Unable to understand our own consciousness, we are even more at a loss when it comes to its possible existence in other species.

In a thorough review of the issue, Dawkins identifies four different animal welfare science approaches to the paradox of animal consciousness. The first denies the existence of a paradox by building on Darwin’s view that nonhuman animals are sentient and that ‘the lower animals, like man manifestly feel pleasure and pain, happiness and misery’ (Darwin quoted in Dawkins, 2015, p. 21). The second, more ‘cautious’ approach views consciousness as such an illusive topic, even in humans, that it is best studied in animals via the use of physiological and behavioural correlates. A third approach sees the paradox as disappearing once better techniques are invented to study the relationship between physiological change and cognition. In particular, work correlating brain imaging with expressed and observed behaviour in humans may be transferable to animals more generally and thus ‘The implication would be that if the same ‘neural correlates of consciousness’ were found in nonhuman animals, this would indicate that they had similar conscious experiences’ (Dawkins 2015, p. 24). Finally, there is the view that scientific techniques to directly investigate consciousness are unlikely to emerge in the near future to resolve the paradox, but that this does not matter as practically focusing on animal health and animal behaviour delivers good outcomes regardless.

3.5 Animal Welfare Science: Interviewee Comments

Interviewees displayed a variety of views about the nature of science and the role it could play in resolving animal welfare ethical problems. Some recognised that science could be politicised as a result of the commitments of some scientists to specific ethical perspectives

or as a consequence of policy makers wanting manageable solutions to complex problems. Interviewees 6 and 8 observed respectively:

Scientists can always interpret data in different ways. Some of the debates get a little personal, I'm just thinking of bobby calf transport, where people had agendas and they interpreted data differently from other people and yet that can happen especially in animal welfare where you get things overlaid by ethical values as well and no matter if you do have the science you can still get the ethics overlaid over top (Interviewee 6).

One of the difficulties that occurs when you put a scientist and a policy maker in a room is that the scientist wants to have the exact condition and is ready to be quite prescriptive whereas the policy maker thinks this could get a bit complicated, and the policy maker likes simple rules...You know what scientists will put forward is not necessarily the easiest thing to regulate. It might be the most important thing but it might not be the easiest thing to regulate (Interviewee 8).

It was generally recognised that science's role in resolving ethical problems was limited. It was argued that while animal welfare science can measure physiological, behavioural and cognitive aspects of animal welfare, this did not enable scientists to adjudicate on how much suffering or welfare was acceptable. Interviewee 1 observed with regard to science and ethics:

Animal welfare science is very much just looking at the impacts. The way we treat animals, what impact is that having on the animal? Now the interface comes, if perhaps you start from the science, we can do the science, we can determine treating a laying hen like this is going to have this effect on it. We can then ask the ethical question, which is: 'Is that how we want to treat it?'... You can see scenarios where science could say, 'This is actually having quite a poor effect on the animal', but there might be all these other reasons that tell us that we need to carry on doing this because if we don't it's going to have all these other catastrophic effects (Interviewee 1).

Interviewee 8 noted:

I don't think there's that much disagreement about the science itself. I think the disagreement comes in as we were discussing earlier animal welfare science is also, a part of taking an interpretation of when we move from the welfare science to what we ought to do or the ethical implications. You have to take a specific decision about what is acceptable or not acceptable. So I think if you ask animal welfare scientists to look at a piece of data, even though they might have a different approach because we know there are difference concepts, and some people are more influenced by some particular concept like biological functioning, emotion or natural behaviour, I think most scientists will agree about the data – about what the data is saying, you know this is higher than that – I think the difficulty comes in when we actually have as scientists to take a decision about where to set the bar. So, what is acceptable and what is unacceptable in terms of animal welfare. And that is where there is a real difficulty and where disagreement occurs, which in my opinion is a bit beyond science (Interviewee 8).

3.6 Summary

While it has proved difficult to find a solid philosophical foundation on which to defend the claims of science against non-science, this does not mean ‘anything goes’. Scientists operating with disciplines, ‘paradigms’ or ‘research programs’ engage in high-level debate over the evidence for and against particular understandings of the way things are and as a community subject research findings to rigorous analysis via the peer review process. In contrast, the claims of non-scientists are not subject to rigorous logical analysis to determine degrees of inconsistency and are accepted rather than critiqued by the community to which the claims are made.

Because there is no completely satisfactory account for distinguishing science from non-science, scientists are encouraged by senior figures in the field (e.g. Popper) to be wary of over-reach and claiming they know more than their experiments and theories have demonstrated. While this makes sense from the perspective of science, it can create a vacuum within society for knowledge that is then filled by non-scientific discourse promulgated by specific sectoral interests. Thus, scientists need to speak out about the knowledge they have while also being aware of its limits.

The understanding of science and animal welfare has evolved significantly over the past 50 years. While initially there was a tendency to focus on ‘negative freedoms’ within regard to animal welfare (e.g. freedom from hunger), increasingly this focus is being supplemented by a focus on ‘positive freedoms’ (e.g. freedom to express normal behaviour, emotions). This has occurred as a consequence of the elaboration of animal welfare ethics, an evolution in social norms, and an increasing focus on animal sentience and ‘consciousness’, the latter proving especially problematic. In the process, the dominance of the physiological approach to animal welfare studies is being rebalanced by behavioural and cognitive studies of animal welfare, supplemented by social sciences studies of human behaviour, including consumption. According to leading animal welfare researchers, animal welfare science is increasingly an interdisciplinary field with aspirations towards the development of a transdisciplinary approach.

4 Issues in Hen Welfare

4.1 Key Issues in Hen Welfare: Literature Review

Given the complexity of each hen welfare issue, it is not possible to undertake a detailed review in each area. Thus, this literature review is based on one completed by AECL (2013) and supplemented by reviews of hen welfare as conducted by Scott et al. (2009), Ferrante (2009), Millman et al. (2010), Wright (2013), the Coalition for Sustainable Egg Supply (CSES) (2015) and especially Lay et al. (2011), as well as studies specific to a few areas. Readers are referred to those articles for further detailed technical information. To structure this section, the issues identified at a recent AECL workshop on the topic of hen welfare (AECL, 2013) were selected and reorganised to differentiate between generic hen welfare issues and those that apply to specific egg production systems. Thus, this section provides a brief overview of the following:

Generic issues

1. Osteoporosis/bone density/fracture
2. Chick hatching
3. Hygiene/biosecurity
4. Spent hens/euthanasia
5. Consumer/community values
6. Stockmanship/competencies
7. Feather pecking, cannibalism, new strains (beak trimming)

System specific issues

8. Cage systems
 - Furnished cages
 - Minimum housing standards
 - Behavioural opportunities/enrichment
9. Free range system
 - Free range design
 - Free range stocking density
 - Registration of veterinary medicines for free range

Issue 1 – Osteoporosis, Bone Density and Fracture: Incidents of osteoporosis, bone density and fracture may have their origins at the outset of the hen welfare cycle in genetic selection. According to Millman et al. (2010, p. 294):

Breeding companies have a key role to play in improving poultry welfare, since some significant welfare problems have arisen due to genetic selection for high rates of production, or as related aspects of such selection. These include skeletal problems in broiler chickens and osteoporosis in laying hens. Selection programs for poultry have been driven almost solely by production considerations. Egg-laying lines have been selected for traits such as egg number, egg size, shell strength, shell colour and low mortality.⁴

Beyond genetics, osteoporosis, bone density and fracture are issues related to the activity of hens, with those kept in cages having few options to exercise resulting in osteoporosis and subsequently bone fractures when birds are removed from cages (Lay et al., 2011; CSES, 2015). In non-caged systems a higher incidence of old bone and keel bone

⁴ Internal references in this and subsequent extended quotes have been removed to facilitate reading. Interested readers should consult the original papers for the citations used in support of the claims made.

fractures occurs than in caged systems, likely as a result of bumping when moving (Lay et al., 2011). CSES (2015, p. 9) noted that 'Analysis of flights in the open litter area in the AV [aviary system] showed that 9-21 percent ended in failed landings, usually due to collisions with other hens.'

Issue 2 – Chick Hatching: Concern has been expressed over the hatchery practice of sexing and disposing of day-old male chicks via gassing or maceration (RSPCA, 2015a). The importance of the issue is recognised by the Poultry CRC, which noted in its recent Annual Report that:

Firstly, it is a welfare issue where over 6 billion cockerels are discarded as day-olds, and secondly, it would be a massive productivity gain for the global egg industry if all 6 billion eggs were not put through incubators and day-old chicks not manually sexed and discarded. If implemented, such a technology would completely change the way the egg industry has operated to date (Poultry CRC, 2014).

Recent research at Wageningen University (Woelders, 2014) outlines a range of options and their public acceptance that included sexing eggs before incubation (25%), breeding of dual-purpose chickens (24%), and acceptance of current euthanasia practices (14%).

Issue 3 – Hygiene and Biosecurity: Hygiene and biosecurity are animal welfare issues due to their implications for the health of large numbers of chickens within a flock. Disease not only can result in significant distress to individual animals, but also may involve increased handling, medical treatments and, *in extremis*, euthanasia. Given the complexity of modern egg production, biosecurity can be compromised in a number of ways. According to Grimes and Jackson (2001, p. vii), these include the following mechanisms:

- entry of chicks, litter, equipment, vehicles, people and feed into started pullet farms
- entry of litter, started pullets, adult fowls, equipment, vehicles, people and feed into egg production farms
- the presence of wild birds and rodents in sheds or where hens and pullets range
- water sanitation on farms using surface water for internal shed fogging or bird drinking water, and for disposal systems for dead birds, reject eggs and manure from the farm
- the presence of non-poultry bird species, other poultry and pigs on the farm.

These mechanisms create the risk of disease spreading to the flock with significant consequences not only for the egg farmer but, in some cases, for the wider industry. In particular, there is especial concern to avoid outbreaks of emergency diseases such as Virulent Newcastle Disease, Avian Influenza and Very Virulent Infectious Bursal Disease. To minimise the risk of such outbreaks and outbreaks of other diseases such as Infectious Laryngotracheitis Virus, Egg Drop Syndrome Virus, Mareks Disease Virus and Infectious Bronchitis Virus, egg farmers are advised to adopt a Hazard Analysis and Critical Control Point (HACCP) analysis to ensure that the entry of animals, equipment, vehicles, people and food onto the farm is controlled and the risk of contamination is limited.

Issue 4 – Spent Hens and Euthanasia: The issue of spent hens and euthanasia raises a range of animal welfare issues. These include fractures as a consequence of catching spent hens (which vary depending on housing system), transportation to slaughter houses and slaughter itself. According to a DEFRA study (2006), the skill of hen catchers plays a major role in limiting new fractures and thus in improving hen welfare during the depopulation process. The study found: 'New fractures were most prevalent in birds from conventional cages, particularly to the wing, and there seems to be a direct correlation with cage opening size. New cage designs tend to have more generous cage opening areas

(above 1000 cm²), which help reduce the incidence of new wing fractures, provided the catching crew is not tempted to then remove more than one bird through the increased aperture (which was shown from data collected in this study to negate the benefits of the wider opening)' (DEFRA, 2006, p. 21).

Issue 5 – Consumer and Community Values: Consumer and community values regarding hen welfare are a hen welfare issue to the extent that evolving consumer and community preferences lead to shifting expectations with regard to how eggs should be produced, with evident implications for the full range of activities through the egg production chain. The issue of consumer and community values and attitudes concerning egg production and hen welfare is discussed in detail in Section 5.1.

Issue 6 – Stockmanship: In the case of many of the above welfare issues, the quality of animal management practices or 'stockmanship' is revealed as a key element in animal treatment. Good stockmanship can result in superior welfare outcomes because diseases are avoided, necessary food and water is provided, temperature and air quality is controlled, and a range of stimulation provided. In addition, good stockmanship can ensure that any necessary husbandry practices are performed at the right time and in the right way to minimise feather pecking, cannibalism and injury from handling and transportation. Good stockmanship was highlighted in the recent AECL literature review of hen welfare (AECL, 2013, p. 3):

Good stockmanship, both in terms of management, knowledge and skills, is a major determinant of hen welfare for any type of housing systems. The management of hens in non-cage systems is more complex than cage systems due to the lesser degree of control over environmental conditions. Stockmanship includes different aspects: the stockperson attitudes, technical knowledge, and work motivation. Although technical training is in place, there is currently no training aimed at targeting stockperson attitudes or behaviours toward laying hens. Stockperson training programs of this type have achieved improvements in both productivity and welfare in other animal industries. The development and validation of practical welfare indicators for use on-farm may also be useful to manage welfare parameters, standardize the factors that make for good management and pro-actively identify situations where bird welfare may be or become at risk.

Issue 7 – Feather Pecking, Cannibalism and New Strains: Feather pecking and cannibalism receive a great deal of attention in the literature and are well-recognised hen welfare issues. AECL's recent Strategic Review of Key Topics for Hen Welfare (AECL, 2013) identified feather pecking as a key issue noting that:

Feather pecking and cannibalism occur in every type of housing system, but the consequences can be worse in non-cage systems where outbreaks can spread more easily through the flock. It is a behavioural problem that is multi-factorial, difficult to predict and difficult to control. Severe feather pecking is thought to be a redirected foraging behaviour. However, the behaviour can occur even when birds are reared and housed on litter throughout their lives. The etiology of feather pecking is complex and contributing factors include nutrition and feed form, rearing experience, availability of foraging material, light intensity, flock heterogeneity and genetic predisposition. Beak trimming is effective at reducing cannibalism when done properly at a young age. However, genetic selection for reduced feather pecking and increased survivability appears to be the most promising solution to tackle the cause of the problem. The prevalence of the practice of a second beak trimming on adult hens in Australia needs to be investigated as it can induce both acute and chronic pain.

Lay et al. note that surveys show that feather pecking and cannibalism are a major cause of mortality in commercial layer hens (2011, p. 2), which can occur in both caged and free range systems and which can be ameliorated by beak trimming, the latter raising its own animal welfare issues. Lay et al. (2011, p. 8) also state:

Cannibalism and feather pecking can be problematic in free-range flocks, especially in large flocks if only a small proportion of hens go outside because the outdoor area is devoid of vegetation, there is insufficient pophole space, or the weather is hot, windy, or rainy. Increasing use of range by rearing pullets with access to the outdoors, keeping roosters with the hens, and limiting flock sizes to ≤1,000 hens can lower the incidence of severe feather pecking.

Issue 8 – Caged Systems: According to Lay et al. (2011, pp. 6-7), hen welfare issues for conventional caged systems are significant:

Performance of locomotory, body maintenance, and thermoregulatory behaviors is greatly curtailed in conventional cages to an extent determined by cage size and stocking density. At high densities, rubbing against cage walls and other hens when moving across the cage can cause plumage damage and reduce thermoregulatory capacity. High density can also make it more difficult to gain access to food and water because other hens block the path, especially in deep cages with food at the front and water at the back. Increased group size in cages can elevate the risk of feather pecking, cannibalism, and smothering, risks countered by beak trimming and group selection. In some strains, dominant individuals aggressively defend the feeder, resulting in low-ranking hens obtaining less food. Conventional cages lack foraging materials that stimulate ground pecking and scratching and thus claw and beak wear. Depending on cage design, overgrown claws increase the risk of hens becoming trapped in cage fixtures. Sham dust bathing occurs in some strains, whereby hens repeatedly perform wing movements on the wire floor (that would normally result in scooping dust into the plumage) without completing the dust-bathing sequence (shaking off lipid-saturated dust). Hens of some strains pace repetitively in cages before oviposition, interpreted as a sign of frustration. This behavior arises when hens fail to find an enclosed location in which to lay their eggs. Caged hens lack substrates for nest building, which may reduce welfare given that hens prefer to deposit eggs in a molded nest rather than on a sloping wire floor and nesting behavior is a behavioral priority. Caged hens do not exhibit broodiness, in part because of genetic selection against this behavior and in part because eggs roll out of the cage immediately after they are laid, removing access to eggs that stimulate this behavior.

Many but not all of these behaviours are moderated in furnished cages. According to Lay et al. (2011, p. 7) furnished cages provide ‘varying amounts of horizontal space for locomotion and comfort behaviours and allow for some foraging, dust bathing, nesting, and perching but continue to limit behaviours in the vertical plane such as wing flapping and flying.’ There is some evidence that the provision of perches can result in cloacal cannibalism ‘if other hens are able to see the cloaca during oviposition’ (Lay et al., 2011, p. 7).

Behavioural studies have shown that hens will work hard to obtain certain opportunities, such as perching, nesting and dust bathing. Lay et al. (2011, p. 6) set out the predicted level of hen behaviour activities based on type of system (Table 4-1). It can be seen that there are a huge number of behavioural activities that hens may engage in, both positive

(e.g. flying, running, walking, wing flapping) and negative (e.g. stereotypy, cannibalism, social aggression and smothering).

Table 4-1 Predicted Levels of Behavioural Expression in Different Egg Housing Systems¹

Behavioral opportunity	Conventional cage	Furnished cage		Noncage (barn) ²		Outdoor (free-range) ³
		Small	Large	Slats/litter	Aviaries	
Flying	+	+	+	++++	++++	++++
Running	+	+	++	++++	++++	++++
Walking	++	++	+++	++++	++++	++++
Wing flapping ⁴	+	++	++	++++	++++	++++
Stretching	++	+++	+++	++++	++++	++++
Preening	+++	++++	++++	++++	++++	++++
Standing	++++	++++	++++	++++	++++	++++
Sitting	+++	++++	++++	++++	++++	++++
Feeding	+++	+++	++++	++++	++++	++++
Drinking	+++	+++	++++	++++	++++	++++
Foraging	+	++	++	+++	+++	++++
Dust bathing	+	++	++	++++	++++	++++
Nesting	+	+++	+++	++++	++++	++++
Brooding ⁵	+	+	+	+	+	+
Perching	+	++	++	+++	+++	+++
Mating ⁶	+	+	+	+	+	+
Stereotyped and sham behaviors	++++	++	++	++	++	++
Cannibalism and feather pecking	++	++	+++	++++	++++	++++
Social aggression ⁷	++	+++	+++	++	++	++
Smothering ⁸	++	++	+++	++++	++++	+++

¹+ = none or incomplete, ++ = relatively low, +++ = moderate, ++++ = full or relatively high. Results heavily influenced by other factors, including strain, rearing conditions, management, and precise details of the housing, within general housing type. An increased opportunity to perform a behavior does not necessarily translate into increased performance of the behavior. Comparative data supporting the above predictions across all behaviors in all housing types are limited or lacking.

²Predictions assume that hens have access to litter and perches. In the United States, there is no legal requirement to provide litter or perches. Barn systems may have all slatted or wire floors, resulting in outcomes similar to conventional cages for foraging, dust bathing, perching, and stereotyped and sham behaviors.

³Predictions assume that hens have access to litter and perches indoors and daily access to an outdoor range primarily covered with vegetation. In the United States, there is no legal requirement for daily time spent outdoors or provision of litter, perches, or vegetation. Hens may be confined indoors for extended periods on fully slatted or wire floors, resulting in outcomes similar to conventional cages for foraging, dust bathing, perching, and stereotyped and sham behaviors.

⁴If sufficient cage height.

⁵Broodiness toward eggs occasionally seen in noncage and free-range systems.

⁶Depends on presence of roosters (roosters are housed with hens rarely in noncage systems and occasionally in free-range systems).

⁷Depends on strain, group size (groups of around 30 hens show the most aggression), density (peaks at around 600 cm²/hen), and accessibility of resources (limited, defensible resources increase aggression).

⁸Depends on strain (risk higher in flighty strains), group size (larger groups increase risk), and presence of perches and other enrichments (reduce risk).

Source: Lay et al., 2011, p. 12.

CSES (2015) compared conventional and enriched egg production systems observing a number of trade offs. Enriched cages performed better in terms of measures of hen behaviour, tibia/humerus strength and foot condition, but worse on measures of mortality, cannibalism/aggression and keel damage.

Issue 9 – Non-Cage Systems: While non-cage systems significantly increase the opportunities for hens to express normal behaviour, other animal welfare issues emerge. According to Lay et al. (20011, pp. 7-8):

In these [non-cage] systems, there is sufficient space for performance of a full repertoire of locomotory and body maintenance behaviors, and the large enclosures and flock sizes (>1,000 hens) enhance opportunities for exploratory behavior. Locomotion is increased because resources are more spread out horizontally and, sometimes, vertically, although high densities impair movement. The incidence of cannibalism and feather pecking can be high if the hens have intact beaks, probably due to large flock sizes and spread of the behavior through social learning. Noncage systems may have 100% slatted floors, 100% litter floors, or various proportions of slats and litter. Litter accessibility, litter quality, and experience of litter during rearing thus appear to be critical factors

affecting behavior in noncage systems. Rearing chicks with access to perches by 4 wk of age has been associated with increased use of perches, and reduced cannibalism, in adulthood. Other benefits of perches include lower aggression and, anecdotally, calmer hens that may be less likely to pile and smother (e.g., during catching). Hens tend to prefer higher rather than lower perches. However, falls from perches may contribute to keel and furculum fracture. The effects of stocking density can be unpredictable in noncage systems. At lower densities, hens cluster around key resources, creating localized areas of high density. Declining numbers around a particular resource may trigger aggressive defense by the remaining hens. Furthermore, some feather-pecked hens are attacked by other hens if they venture onto the litter, effectively confining them to the slats. At higher densities, hens are more evenly distributed across all areas of the house, including the litter, which may explain their lower levels of aggression and feather pecking.

In free range systems, specifically, hens have significant opportunities to engage in normal behaviour although a range of new welfare issues emerge. Lay et al. (2011, p. 9) state:

Access to the outdoors allows hens to spread out to preferred distances when foraging, typically greater than 5,000 cm²/hen, and greatly expands behavioral options, especially if the range offers a variety of plant types. Hens may spend much of their active day engaged in foraging behavior, searching for, investigating, selecting, extracting, and ingesting preferred food items (e.g. grass seeds, earthworms, and flying insects). They also ingest grit and engage in sun bathing and dust bathing outdoors. Cannibalism and feather pecking can be problematic in free-range flocks, especially in large flocks if only a small proportion of hens go outside because the outdoor area is devoid of vegetation, there is insufficient pophole space, or the weather is hot, windy, or rainy. Inclusion of roosters in the flock is rare except in free-range organic production systems. The presence of roosters has been reported to reduce aggression among hens, and allows for mating behavior. Roosters sometimes injure hens and can be a target for feather pecking by hens.

Lay et al. summarise their analysis of egg production systems as follows:

The concern regarding conventional cages is that behavioural restriction is inherent to the system and hens are prevented from expressing highly motivated behaviors for their entire laying lifespan. Furnished cages allow for some expression of the most highly motivated behaviors prevented in conventional cages but retain a degree of restriction due to limited space. Noncage systems enable the expression of a more diverse array of ancestral behavior patterns, with the greatest behavioural diversity occurring in free-range systems. However, increased behavioral freedom can also be accompanied by welfare problems such as cannibalism and predation. Behavioral problems in noncage systems generally affect a proportion of hens rather than all hens and are potentially solvable but have not proved easy to solve.

CSES (2015) compared conventional and enriched cage systems to aviary systems, finding a range of differences. Aviary systems performed better on measures of hen behaviour, tibia/humerus strength and feather condition, but worse on measures of mortality, cannibalism/aggression and keel damage.

4.2 Key Issues in Hen Welfare: Interviews

In the guided interview, the interviewees were given an opportunity to respond to the question of what they thought were the major issues in the egg industry, taking into account the egg production chain from hatcheries to euthanasia of spent hens. Table 4-2 summarises the responses given and how they map onto the issues set out in the literature review in Section 4.1, providing an indication of the issues central to Australian scientists, most of whom have been heavily involved in hen welfare research.

The major finding here is that collectively the experts interviewed largely agreed with the issues highlighted in the literature review and the AECL expert review.

Of the generic issues identified, feather pecking/cannibalism/new strains, the euthanasia of spent hens, osteoporosis/bone density/fracture, and issues related to hatcheries, notably the slaughter of day-old male chicks, were identified as the major issues. An important issue that was also identified concerned poor stockmanship and the lack of formal training many employees involved in the industry had in animal welfare and handling.

With regard to welfare issues related to caged systems, the major ones identified in the interviews were behavioural opportunities and enrichment.

With regard to welfare issues for non-caged systems, especially free range systems, both stocking density and free range design, especially with regard to cover, were identified as a key hen welfare issue.

Table 4-2 Interviewees' Perceptions of Key Hen Welfare Issues

Inter-viewee	Generic Hen Welfare Issues							Caged-Hen Welfare Issues			Non-Caged Hen Welfare Issues		
	Osteoporosis/ Bone Density/ Fracture	Chick Hatching	Hygiene/ Biosecurity	Spent hens/ Euthanasia	Consumer/ Community Values	Stockmanship/ Competencies	Feather Pecking, Cannibal-ism, New strains	Furnished Cages	Minimum Housing Standards	Behavioural Opportunities/ Enrichment	Free rang design	Free range stocking density	Registration of veterinary medicines for free range
Int 1						X	X				X	X	
Int 2	X	X		X		X	X	X	X	X	X	X	
Int 3	X			X						X	X		
Int 4				X	X		X					X	
Int 5	X	X		X		X	X						
Int 6		X	X				X	X		X		X	
Int 7							X	X	X	X	X	X	
Int 8	X	X		X									
Total	4	4	1	5	1	3	6	3	2	4	4	5	

A few of the issues identified by AECL as animal welfare issues that were infrequently cited in the interviews were hygiene/biosecurity, consumer/community values and minimum housing standards, with no interviewee volunteering the registration of veterinary medicines for free range as an issue. This is not to imply that these are not animal welfare issues, only that they were not at the forefront of the minds of the interviewees when asked to identify hen welfare issues. In addition, 'consumer/community values' are not directly a 'hen welfare issue', as the question posed focused attention explicitly on the egg production chain.

Interviewees identified one major issue that did not appear specifically on the AECL list but has been noted in the literature. This was the issue of 'synchronicity' between the pullet rearing environment and the laying hen environment. One interviewee noted:

I think also there are issues around the rearing and laying environment. There is a need to have synchronicity here – a comparable environment in the rearing shed as there is in the laying shed to prevent those issues like severe feather pecking arising (Interviewee 2).

Another stated:

One of the issues we are just starting to understand is the effect of rearing pullets and early experience. And the fact that is if we are going to keep different housing systems, how are we going to give the birds the opportunity to learn about that system at an early age so they develop appropriately to their later needs... And we know that early experience has a big influence on how animals behave later in life so it is something very interesting and we are just starting to understand it and I think we will discover that this has major welfare implications for birds (Interviewee 8).

An analysis of the quality of the responses suggests that the hen welfare issues initially identified may reflect underlying differences in conceptions of what counts in assessing hen welfare. One interviewee noted:

If I'm talking about welfare, which I interpret as the welfare of the bird and whether it's suffering or not, then I would have to say that the controversies relate to housing and how the birds are housed and whether those birds are receiving adequate behaviour opportunities, so it's probably that space... So the major welfare issues that we don't fully have a good handle on are those issues about what is appropriate housing, what is necessary for the bird so that it doesn't suffer, or depending on your philosophy, that is has positive outcomes for its welfare (Interviewee 7).

Shortly after, this interviewee observed:

I guess I'm of the opinion that you can never create an environment which is completely positive, and that may be very anthropomorphic of me but I don't believe that human beings are always happy and I have a feeling that animals are in the same boat. So I'm not too worried about the positive and I think if you overcome the negatives then you overcome the extremes of compromise and that's the philosophy under which I work when I think about welfare (Interviewee 7).

This perspective focuses on ‘negative freedoms’ based on the conception of animal welfare as ‘freedom from suffering’. It forms a considerable contrast to an ethical perspective based on ‘positive freedom’ as the freedom to express normal behaviour. This latter perspective was very much to the forefront of the mind of Interviewee 3:

I guess the number one [hen welfare issue] would be confinement of the animals. There’s still an overwhelming use of the battery cage in Australia. I guess the second issue is the transportation, and of course hand in hand with confinement goes leg weakness and bone breakages when the animals are removed from the cages (Interviewee 3).

This Interviewee went on to observe:

My own view in relation to egg production is that all systems are pretty low welfare systems when we compare them to other farm animal production systems unless you’re down to a relatively small number of birds in the flock – 50 perhaps maximum. And these huge flocks of many thousands of birds just don’t work in providing good animal welfare standards (Interviewee 3).

Another interviewee too offered a very pragmatic, managerial approach to animal welfare issues:

Broadly speaking, you can perhaps divide issues into a couple of categories. The politically sensitive ones, the ones that hit the media regularly, such as the live export trade, and the handling and slaughtering of animals in abattoirs, labelling of eggs and the intensification of chicken production. These commonly require an immediate response. On the other hand, there are more medium to long term issues where a systematic approach to improving animal welfare overall is particularly important... So although immediate ‘political’ issues need to be addressed, a balance must be struck so that animal welfare can be improved overall in a progressive and sustainable way (Interviewee 4).

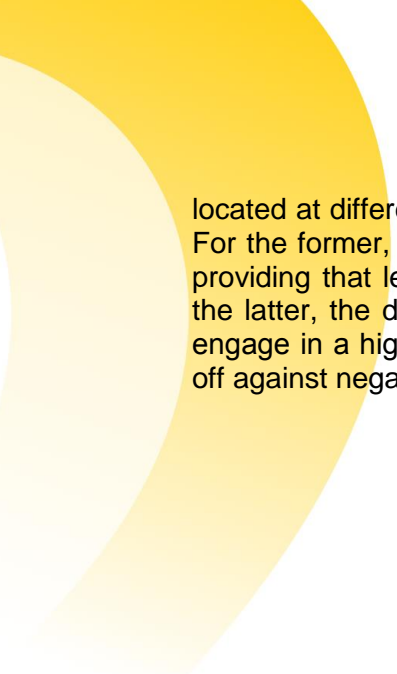
This pragmatic approach was also evident in the comments of another interviewee, also involved in issues management:

That’s a really big question because it’s hard for me to divorce my mind from what is perceived to be the major hen welfare issues and what really are. And certainly speaking from a policy point of view, the biggest issues I can see coming up are certainly the treatment of day-old male chicks. Personally, I’m not sure there are welfare issues there, and as far as I’m concerned a quick death is a humane death and I’m not going to get into the ethics of whether or not we can – I mean it would be nice if there could be a solution so they didn’t have to be hatched, but you know that’s another question (Interviewee 6).

4.3 Summary

A large number of animal welfare issues arise through the egg production chain from the choice of breed, the hatching of eggs, raising of pullets, egg production systems, stockmanship, and the disposal of spent hens. These hen welfare issues are clearly identified in the poultry literature and Australian experts are collectively well aware of them.

However, individual experts differ with regard to the hen welfare issues they identify, the order they put them in, and the degree to which trade-offs among them are possible. There was evidence in the interviews that experts in the field of animal and hen welfare are



located at different points along an ethical spectrum from consequentialist to deontological. For the former, the degree of hen welfare to be provided is linked to the consequences of providing that level of hen welfare – for the bird, producers, retailers and consumers. For the latter, the degree of hen welfare to be provided is linked to the ‘right’ the bird has to engage in a high degree of ‘normal’ behaviour. This is a right that cannot be easily traded off against negative consequences for producers, retailers and consumers.

5 Actor Attitudes to Hen Welfare

5.1 Public Attitudes to Animal Welfare

This section reviews some of the literature on public perceptions of animal welfare that has been produced in Europe and Australia. In 2007, the European Commission published a special edition of its Eurobarometer survey on Animal Welfare following fieldwork undertaken the previous year. The Eurobarometer survey included 30 countries with a sample of almost 30,000 participants. The survey covered a range of areas including perceptions and knowledge of animal welfare practices and standards, the impact of higher standards on producers, and consumer habits and labelling (European Commission 2007, p. 2). Overall, participants report a high level of concern for animal welfare (7.8/10) with considerable national differences between countries like Sweden (9/10) and Spain (6.9/10). With regard to knowledge of animal welfare conditions, a small minority reported they knew 'a lot' about them, while the vast majority (57%) reported knowing only 'a little' and 28% reporting they knew 'nothing at all'. Again there was substantial country variation, with participants from some countries like Sweden reporting being the most informed (86%) while participants from other countries like Spain reported being among the least informed (49% reporting they knew 'nothing at all'). Interestingly just over a quarter reported *not wanting* to be more informed about conditions while a majority (58%) reported they 'probably' or 'certainly' desired more information.

According to the Eurobarometer report, the results of the survey indicate a stratified population that can be divided into four broad categories based on the amount of knowledge they currently have and the amount of knowledge they desire. These groups are depicted in Figure 5-1 and highlight the existence of a large group of participants who are either uninformed but interested in more information or informed and desiring more information.

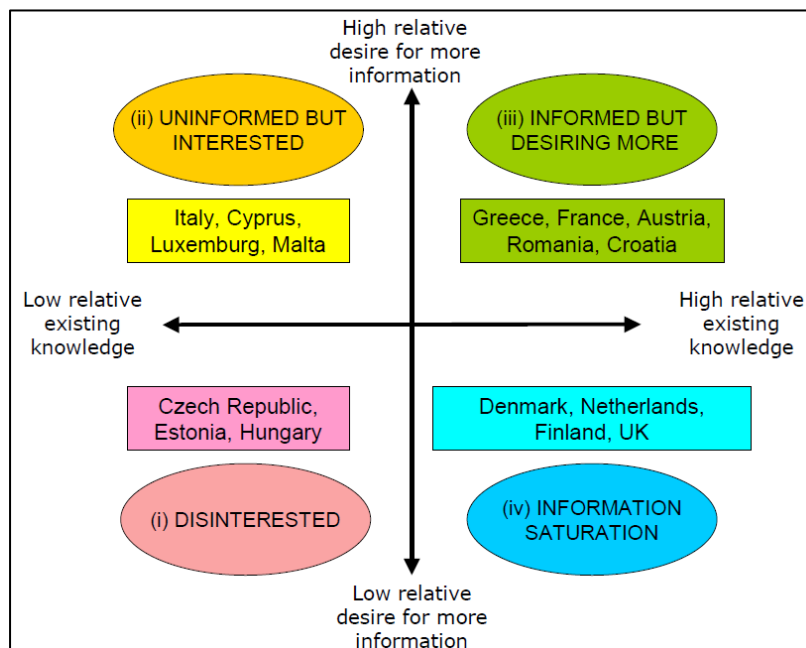


Figure 5-1 Typology of Existing Knowledge and Desire for More

Source: European Commission, 2007, p. 13.

A final element of interest in the Eurobarometer's survey was the degree to which European participants perceived it as easy to obtain information on animal welfare friendly products. As indicated in Figure 5-2, 55% disagreed (22% strongly) with the statement that 'customers can easily find information on products sourced from animal welfare friendly production systems', in contrast to 33% who agreed (including 7% who 'totally' agreed).

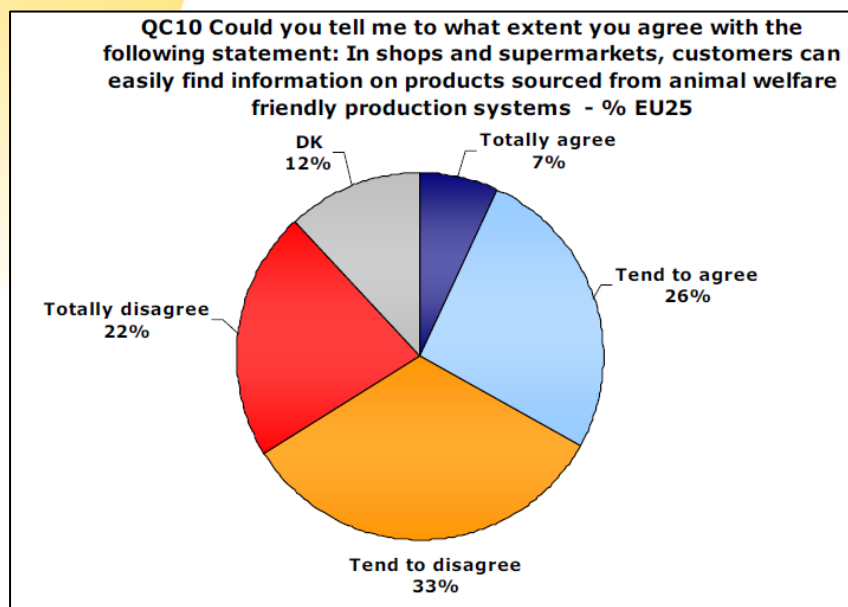


Figure 5-2 Easiness of Obtaining information on Animal Welfare Friendly Products

Source: European Commission, 2007, p. 41.

These and other results related to participants' perceptions led Eurobarometer to conclude:

Finally, the importance attached to the welfare of farmed animals is one of the clearest findings of this survey, with the average respondent rating the subject at almost 8 out of 10 on a maximum scale of 10 in this regard. The evidence presented here suggests that many are prepared to translate this view into their purchasing habits, if they are provided with the information to make such choices (European Commission, 2007, p. 50).

A number of assessments of Australians' attitudes to animal welfare have been conducted in the past decade although arguably none has been as specific, thorough and independent as the Eurobarometer survey outlined above. In one early study, Coleman (2007, p. 2) reported on the results of a survey of 1061 Victorians that found at least a quarter of respondents viewed animal welfare 'as a major concern', with greater concern expressed specifically for farm animal welfare (28%) and domestic pets (41%) (Table 5-1). In a follow-up study, Coleman (2008) reported that gender was a key variable that predicted attitudes to animal welfare, with women being more likely to express empathy with animals and concern over animal welfare and pain than men.

Table 5-1 Survey Responses to Animal Welfare Questions

	Demand for food is more important than humane treatment	Welfare of animals is a major concern	Farm animal welfare is an important consideration	Welfare of domestic pets is important	Welfare of native animals is important
Strongly Disagree	37.8%	6.4%	1.2%	1.5%	2.2%
	12.2%	4.7%	2.3%	1.9%	1.9%
	12.0%	5.2%	2.9%	1.4%	2.3%
Neither Agree nor Disagree	21.1%	24.2%	21.2%	13.9%	17.8%
	7.2%	18.4%	23.0%	16.4%	19.2%
	4.1%	16.8%	20.9%	24.2%	24.1%
Strongly Agree	5.8%	24.3%	28.4%	40.8%	32.5%

Source: Coleman, 2007, p. 2.

In a study conducted around the same time, Southwell et al. (2006) investigated Australian attitudes to animal welfare using qualitative and quantitative methods. In the survey component, the authors reported that 'preventing animal cruelty' and the 'humane treatment of animals' were ranked as more important than 'balancing the needs of animals and people' (Figure 5-3).

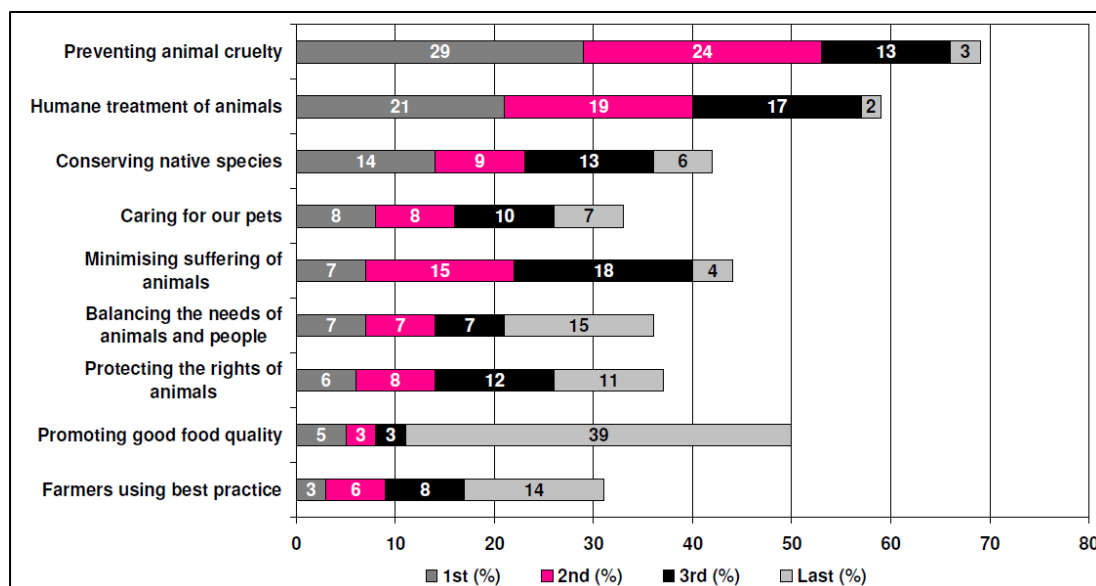


Figure 5-3 Respondents' Answers to What Good Welfare Means (%)

Source: Southwell et al., 2006, p. 12.

Southwell et al. (2006, p. 35) also reported that their sample of respondents differentiated between the quality of information based on the source provided (Figure 5-4). Thus reputable animal welfare groups, the internet and vets were considered highly reliable sources of animal welfare information whereas governments, industry associations and many non-interactive media sources were not seen as reliable. Based on these findings

Southwell et al. recommend a differentiated communication strategy to governments, designed to appeal to different segments of the public (general public, farmers, people from non-English speaking backgrounds, indigenous Australians and children) with different messages and different communication channels.

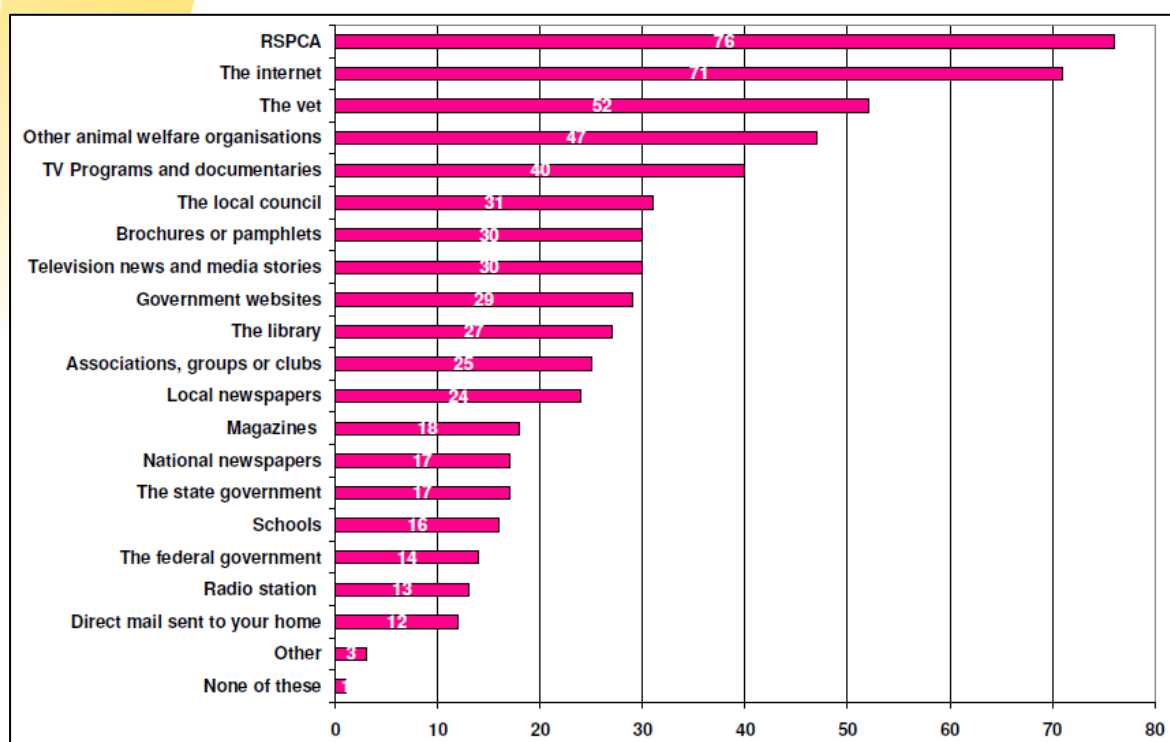


Figure 5-4 Respondents' Perceptions of Reliability of Animal Welfare Information (%)

Source: Southwell et al., 2006, p. 35.

In a more recent study of Australian attitudes, Devinney et al. (2012, p. 8) provide data that indicates that Australians prioritise animal welfare when making charitable donations to civil society organisations (CSOs). Figure 5-5 indicates that Australians make significant donations to animal welfare organisations – significantly more in fact than they donate to political parties, human rights groups, or museums and arts organisations.

Commenting on this donations profile, Devinney et al. (2012, p. 9) note:

Again, the causes that matter to Australians in their individual lives are likely to be the ones that matter when it comes to choosing where to target their support... What this reveals again is the importance of salient proximity when it comes to philanthropy. Australia has one of the highest incidences of pet ownership in the world: animals are part of the family in nearly two thirds of Australian households. No doubt this influences the fact that Australians' material support for animal welfare is, in total, significantly higher than the donations to people in poverty who are beyond the nation's borders.

Australians also volunteer their time to support animal welfare organisations, enabling these organisations to benefit from the social capital of individuals in addition to the financial capital raised through donations (Devinney et al., 2012, p. 10). Interestingly, however, when Australians are forced to trade off one issue against another in terms of 'salience' – that is importance or urgency – 'in the conduct of their own lives', animal welfare issues drop in importance and food and health issues rise to the top. According to Devinney et al. (2012, p. 15):

What the results reveal is that the most salient issues for Australians in the conduct of their lives are those most immediate and closest to their personal welfare. Food and health, local crime and safety, and rights to basic services are their top three concerns. Australians are effectively indifferent to global and societal issues, rating these significantly lower. The rights of minorities and commercial rights issues have virtually no real resonance with the population. Overall what we see is that issues impacting people's lives directly matter most, followed by economic issues within society, then social issues in society. After that Australians worry about animals, other global citizens, minorities and businesses.

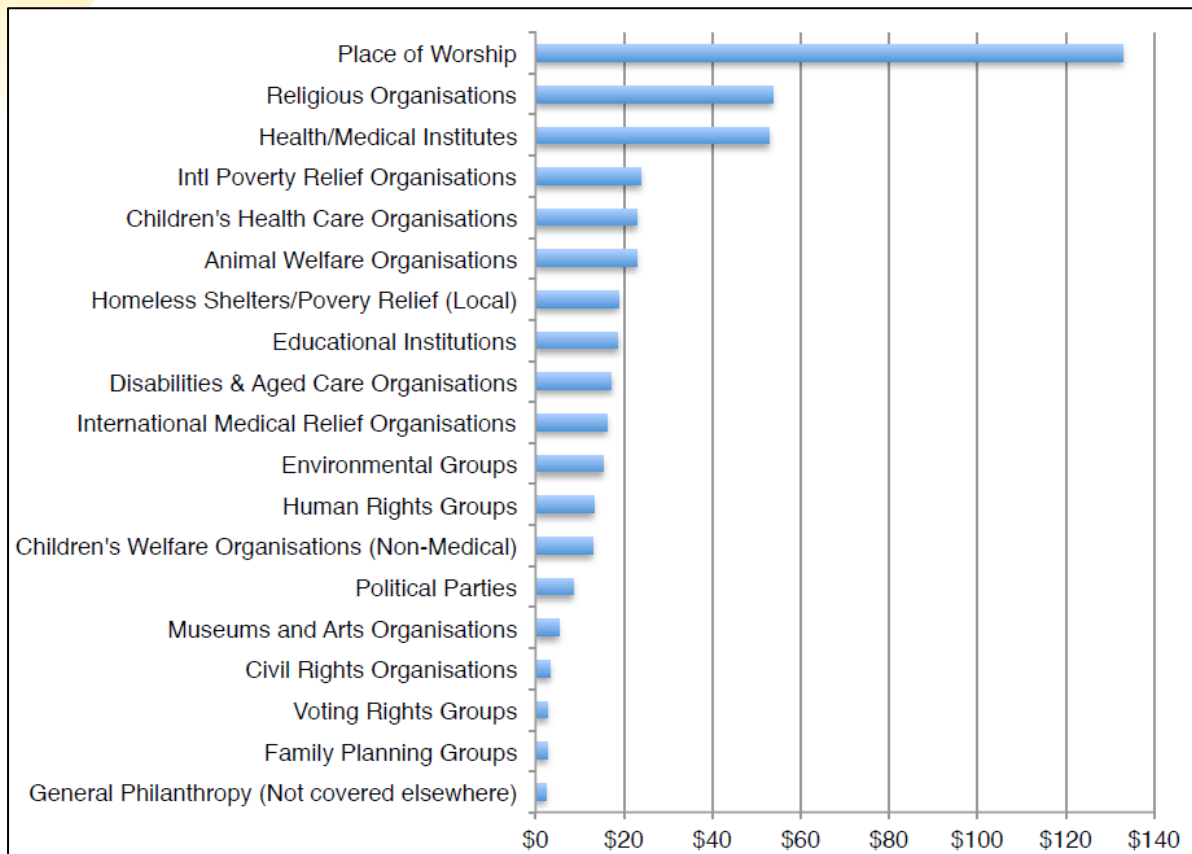


Figure 5-5 Average Donation by Type of Civil Society Organisation

Source: Devinney et al., 2012, p. 8.

When Devinney et al. compare their results with a 2007 survey, they find significant movements in a number of issues in terms of salience. For example, environmental sustainability was very important in terms of salience in 2007 (Rank 3) whereas by 2012 it had dropped significantly (Rank 8). Food and health rose, however, from Rank 5 in 2007 to Rank 1 in 2012. Animal welfare remained almost the same, being ranked 13 in 2012 and 14 in 2007 (Devinney et al., 2012, p. 16). The results are summarised in Figure 5-6.

In a recent industry study, Wilson (2014, pp. 28-29) reports on a survey of Australian consumers, which looked at purchasing behaviours to better understand issues concerning egg labelling. The findings indicated that price, size, quantity, 'best before' date and farming system were the top five criteria used. Significant differences in attitudes were evident in consumers purchasing caged and non-caged eggs with the former more likely to base their decision on conventional price, size, 'best before' date and so forth while the latter 'choose their eggs based on other attributes, such as the type of farming system used, stocking density, health of the hens, farm location and endorsements and accreditations on the egg

carton label' (Wilson, 2014, p. 28). The study highlighted consumer confusion and distrust with regard to the information on egg packages, and a strong desire to ensure 'truth in labelling' so that 'what they think they're buying is what they're getting' (Wilson, 2014, p.29).

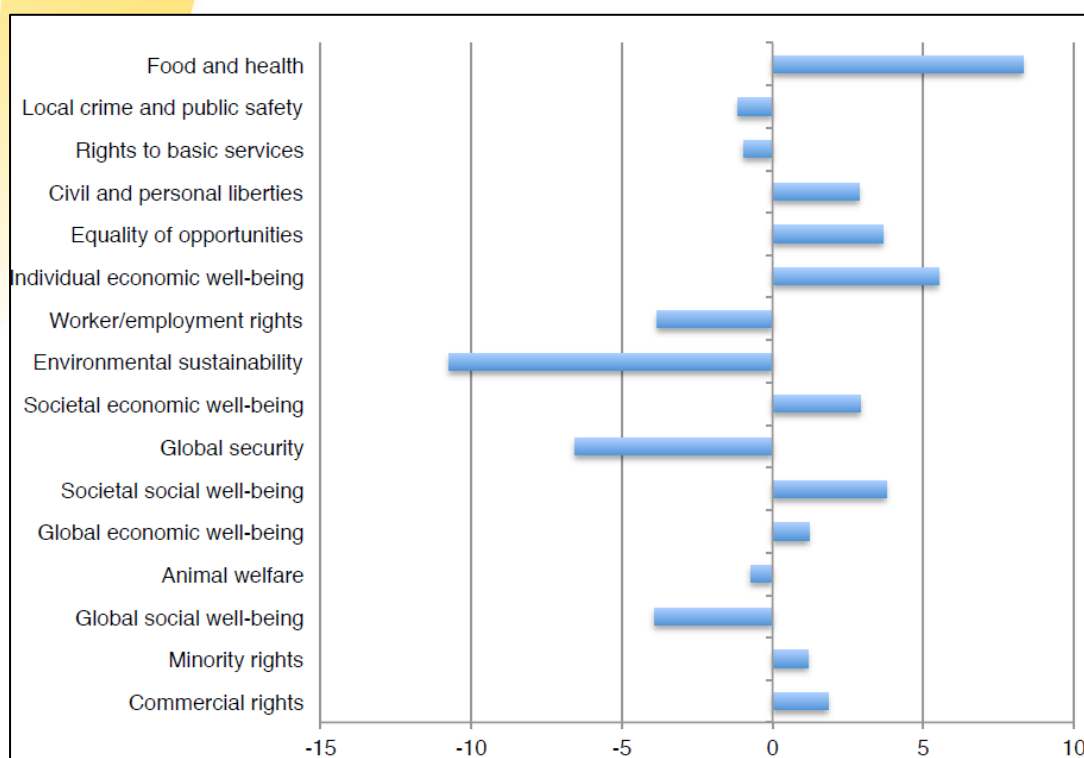


Figure 5-6 Percentage Point Change in Category Salience 2007 and 2012

Source: Devinney et al., 2012, p. 17.

The tentative conclusions of this overview of European and Australian attitudes to animal welfare would appear to be as follows. First, there is a significant segment of the general public that is quite concerned about animal welfare, with a significant minority very concerned and desiring strong animal welfare standards. In addition, there is a significant constituency that wants more information about animal welfare practices. Third, when it comes to communicating with the public on animal welfare, animal welfare groups, especially those that enjoy widespread public support like the RSPCA, are viewed as more trustworthy sources of information than governments and industry associations. Finally, many members of the public are confused by current egg labelling systems and desire clear, independent and meaningful labels that ensure what they intend to purchase is what they get.

5.2 Egg Supply Chain: Internal Actors

A large number of actors view themselves as having an ethical, social, environmental or economic stake in the Australian egg supply chain, and are therefore rightfully engaged in seeking to influence citizen/consumer responses with regard to regulatory arrangements and market choice. Figure 5-7 presents a summary of the Australian egg supply chain, highlighting the importance of three main sectors: producers, graders and distributors, and retailers. However, in the past decade the industry has become increasingly concentrated, with Scott et al. (2009) noting that there are 'only three major distributors of layer genetic material' and Smail (2010) reporting industry views that a small number of producers – Sunny Queen, Pace Farm and Farm Pride – now produce the majority of eggs for the two

major supermarket chains, Coles and Woolworths. The concentration has been accompanied by increased vertical integration such that the larger companies now manage hatcheries and pullet rearing as well as egg production, grading and distribution. In that sense, the industry is probably best characterised as having ‘producer’, ‘retailer’ and ‘consumer’ sectors.

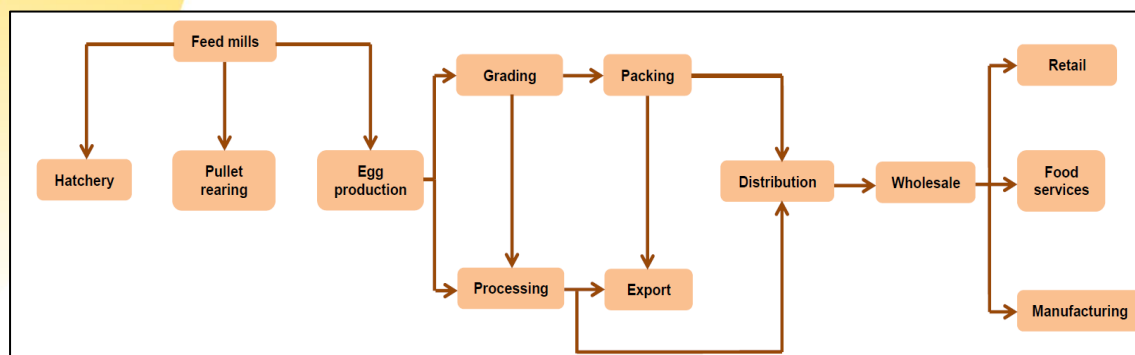


Figure 5-7 Supply Chain of Australian Chicken Egg Industry






Source: Government of Victoria, 2014.

However, it is also important to note that within this generic description of the egg supply chain outlined in Figure 5-7, a number of different ‘visions’ of egg production vie with each other to influence Australian consumers. These different visions reflect different ethical positions along the consequentialist-deontological ethics dimension. Thus, for example, at one extreme pure utilitarian consequentialists judge an egg production system by its consequences and endorse any high volume, low cost production system as delivering the greatest good for the great number of humans. At the other extreme deontological animal rights ethicists hold that animals are due full moral consideration and that only systems that imitate nature are acceptable.

Moderate consequentialist and moderate deontological producers can also be identified, however, who engage in egg production in different ways. Moderate consequentialists relax, to varying degrees, the trade-off between consequences and rights, approving of some degree of increased animal welfare even though it may impinge to some degree on the cost of an egg and therefore human welfare conceived of the greatest good for the greatest number. Deontological ethicists also compromise when they downplay or ignore aspects of the egg production chain – for example, the euthanasia of day-old male chicks – and focus on the behavioural advantages of barn and free range production systems over caged production.

Taking these different ethical positions into account, it is possible to identify four somewhat distinct egg production chains for caged eggs, intensive non-caged, extensive free range and backyard production. Building on the work of Parker (2013), the ethical orientation, key-actors and issue focus of each of these egg supply chains are outlined in Table 5-2. These four supply chains are associated with a range of different quality management, certification and labelling systems. Thus, for example, the caged and intensive non-caged systems use AECL’s Egg Corp Assured quality management system, the extensive free range chain is associated with a range of labels including the RSPCA’s Approved Farming Scheme, the Humane Society’s True Free Range, the Free Range Farmers Association’s True Free Range label and the Organic label. The differences between various approaches are set out in Table 5-2 (Parker, 2013, p. 60).

Table 5-2 Comparison of Private Codes and Standards

	 Egg Corp	 RSPCA	 Free Range Farmers Association Victoria	 Humane Choice	 Australian Certified Organic
Density inside	15 birds/m ²	7–9 birds/m ²	7 birds/m ²	5 birds/m ²	7 birds/m ²
Max birds per shed	No maximum	5,000 ^d	1,000	2,500	1,500
Density outside	No maximum (rotation) 1,500 birds/ hectare (ha) (no rotation)	2,500 birds/ha (rotation) 1,500 birds/ha (no rotation)	750 birds/ha	1,500 birds/ha	1,000 birds/ha
Groundcover requirements?	No	Yes	Yes	Yes (extensive)	Yes (very extensive)
Beak trimming?	Yes	No ^a	No	No	No ^a
Induced moulting?	Yes	No	No	No	No
Allows cage production on same farm?	Yes	Yes	No	No	No
Antibiotics?	Yes	Yes ^b	No	Yes ^b	Yes ^b
Yolk colorant in feed?	Yes	Yes	No	Not specified	Synthetic coloring prohibited
Mostly sold where?	Dominant supermarket chains	Dominant supermarket chains	Farmers' markets / organic stores (Victoria only)	Farmers' markets / organic stores	Organic stores ^c
Scale of farms mostly accredited?	Intensive, industrial, and medium scale	Intensive, industrial	Small scale, alternative farmers and medium scale	Small scale, alternative farmers and medium scale	All

a. But exceptions may be specifically allowed by the accrediting organization.
b. But not systematically, only for therapeutic purposes and under vet supervision.
c. Also available to limited extent in dominant supermarket chains and farmers' markets in Australian Capital Territory and New South Wales.
d. Recommended only.

Source: Parker, 2013, p. 60.

Producers within these supply chains produce eggs branded as caged, barn-laid, 'free range' and organic, with considerable tension over the definition of 'free range'. On the producer side, the industry is quite concentrated with an estimated 277 egg farmers collectively producing almost 400 million dozen eggs annually, with 53% from caged systems, 38% from 'free range', 8% from barn-laid and 1% from specialty systems (including organic) (AECL, 2014).

Table 5-3 Australian Egg Supply Chains

Supply Chain	Ethical Vision	Producers	Key Retailers	Advocates
Caged Systems	Low cost, high volume egg production to secure the greatest good for the greatest number of humans	Pace Farms, Sunny Queen, Farm Pride	Coles Woolworths IGA	AECL
Intensive Non-caged (Barn-Laid & Free Range Systems)	Efficient production of eggs that balances costs and volume against animal welfare	Pace Farms, Sunny Queen, Farm Pride, Rohde's Free Range, Silver Dale Free Range, Country Range Organic Eggs	Coles Woolworths IGA	AECL, RSPCA
Extensive Free Range	Higher cost production of eggs to ensure higher standard of hen welfare including significant opportunities for normal behaviour	Egganic, Home on the Range Genuine Free Range Eggs, Kangaroo Valley Free Range Egg,	Farmers Markets, Specialty outlets, farm gate	HSI, FRFA, Organic movement
Backyard	Very high cost of production of eggs to ensure very high hen welfare including opportunity to engage in fully normal behaviour	Some backyard producers	Farmers markets, local stores, specialty outlets	Some backyard egg producers

The situation is somewhat confusing, however, because some producers support a diversity of systems within their operations. For example, Pace Farms manages two million hens across multiple sites and according to its web site 'is an entirely self-sufficient company, whether rearing day-old chicks, blending our own feed, collecting and grading eggs, processing egg products, or delivering via our own fleet of vehicles' (Pace Farm 2015a). Likewise, Farm Pride, an ASE-listed company, states on its website that:

Farm Pride Foods is a grader, packer, processor, supplier and marketer of shell eggs within Australia and Asia. Today, we provide a wide range of eggs to Australian families and businesses including freshly laid cage eggs, barn laid eggs and free range egg varieties (Farm Pride, 2015).

Pace Farm also produces a diverse range of eggs for the market. Its web site states:

Pace Farm has long championed a humane approach to the production of eggs, launching such specialist brands as Liberty® Barn Laid RSPCA and Eco Eggs (a 100% organic free-range product) (Pace Farm, 2015b).

Sunny Queen also has several brands on its website, including Cage Free Eggs, Free Range Eggs, Organic Free Range Eggs and RSPCA Barn Laid Eggs (Sunny Queen, 2015).

The reason some companies are able to operate across the seemingly consequentialist/deontological divide is that for consequentialists, there is no ethical barrier to producing eggs according to higher welfare standards if there are sufficient consumers willing to pay a premium for such eggs. That is, animal welfare consequentialists are not locked in to *only* providing caged eggs on the basis that it would be ethically wrong to produce eggs using other systems.

Modified consequentialists engaged in intensive non-caged production aim to balance animal and human welfare concerns but have difficulty determining where to set the bar on

some key issues, especially outdoor stocking density. For some, 'free range' is compatible with an outdoor stocking density of 20,000 hens per hectare or more and with the possibility, rather than the practice, of chickens actually engaging in ranging. For other modified consequentialists, the meaning of 'free range' requires lower outdoor stocking densities coupled with ranges that are better able to provide protection and other behavioural options.

In contrast to these two supply chains that lie towards the consequentialist pole, two other extensive supply chains can be identified. In the extensive free range supply chain, supported by groups such as the Free Range Farmers Association (FRFA) and Humane Society International, the core idea that hens should be able to express normal behaviour represents a fundamental deontological position. Thus, producers operating within this ethical approach promote quite low outdoor stocking densities (e.g. 750-2000 hens per hectare) work to ensure that the range is appropriately covered and has amenities, and do not conduct industry practices such as beak trimming, routine vaccination and induced moulting. Because of their strong deontological commitments to hen welfare, these producers struggle with the ethical issues that remain related to the euthanasia of day-old male chicks. One FRFA-certified producer, Family Homestead, explains the issue on its website as follows:

The question of male chicks in hatcheries is difficult, because 50% of the chicks which hatch are males and the hatcheries destroy them as a 'waste product'. There are regulations in place which means that they should be destroyed humanely – but like everything there are some operators who don't abide by the rules. Research is being undertaken through the Poultry CRC into the identification of male embryos so those eggs can be discarded before they hatch. If this works (and it's probably still a few years away from knowing) it will have welfare benefits and will also lift the profitability of hatcheries.... Personally, we believe it would be great if someone could find a use for these male chicks somehow – find a demand for them. Unfortunately roosters are not always that suitable as a pet, as they can be very aggressive... therefore we don't know what the answer is (Family Homestead 2015).

Finally, one can recognise the existence of a group of highly committed deontological producers who seek to provide a fully natural environment for their hens that consists of full access to free range, the presence of roosters, natural hatching of chicks, and so forth. While there is a huge diversity of conditions in backyard production, at least some backyard producers view this as the only 'natural' way to produce and consume eggs. However, as noted in much of the literature on hen welfare, there is a paucity of research on the actual welfare of hens in backyard production systems and a high degree of variation is highly probable. Much backyard production is for subsistence but the eggs are also marketed in local corner stores and farmers' markets as 'free range' and 'organic' although usually without formal certification.

The existence of a diversity of supply chains raises interesting questions about whether there are systematic differences in actor attitudes within them. A large number of studies have been done on the attitudes of farmers to farming utilising a variety of different conceptual frameworks. In a recent survey study of farming and the environment in the United States, and building on Dual Interest Theory, Thomson and others (2014) identified four different attitude clusters based on two underlying factors. The underlying factors were (a) environmental stewardship and (b) farm as a business. Plotting farmers across these two factors generated the four clusters set out in Figure 5-8 below. According to these authors, farmers could be categorised as '(1) low stewardship, moderate to high farm as-business attitudes, (2) high stewardship, low business, (3) high stewardship, high business, and (4) very high stewardship, very low business' (Thompson et al., 2014, n.p.). These

correspond to G1, G2, G3 and G4 in the table. No similar study appears to have been carried out on farmers' attitudes to animal welfare issues. However, the methodology suggests that it may be possible that a similar four-fold approach exists to animal welfare and that this is partially reflected in the supply chains identified above.

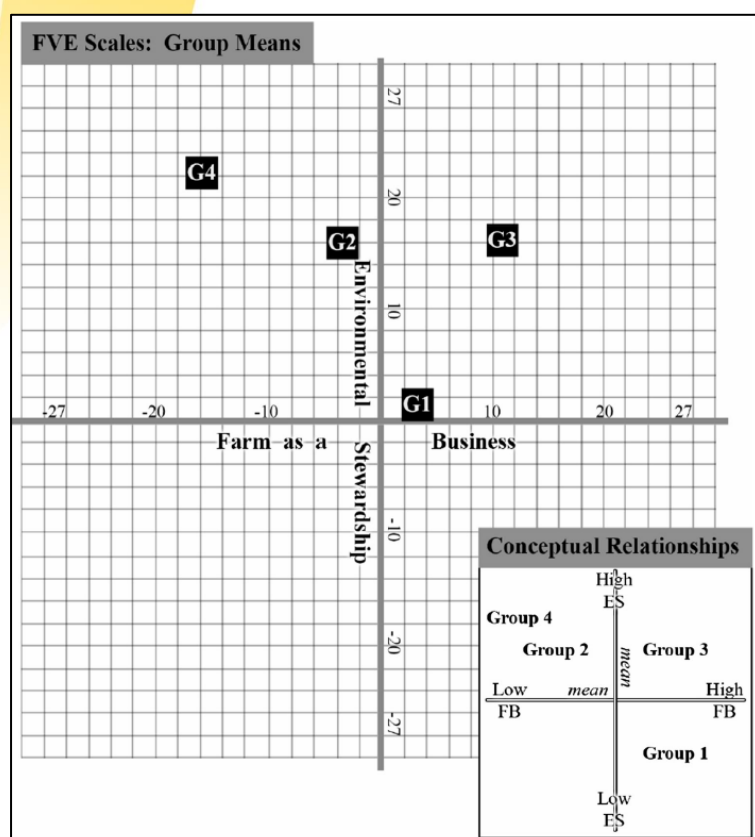


Figure 5-8 Four Farming Clusters

Source: Thompson et al., 2014, n.p.

A similar relationship between animal welfare and business efficiency appears to exist in Australia as represented by the four supply chains described in Table 5-2. Caged producers appear to represent a 'strong consequentialist animal welfare ethics' and 'high farm as business' cluster, whereas some backyard producers represent 'strong deontological animal welfare ethic' and a 'low farm as business' cluster. In between these two extremes it is possible to identify intensive non-caged producers as 'modified consequentialist animal welfare ethic' and 'high farm-as-business' cluster; and extensive free range producers as 'modified deontological animal welfare ethic' and 'moderate farm-as-business' clusters.

However, it needs to be cautioned that this notion of linking supply chains to attitudinal clusters is fraught with difficulty as Vanclay and others (2006) note in relation to the intuitively appealing notion of 'farming styles'. In a detailed analysis of over a decade of literature on this topic, the conclusion these authors reach is that while the concept of 'farming styles' is heuristically useful, its actual application in specific contexts results in a lack of consensus over how many styles exist, what kind of styles they are, and what key factors influence their formation. The conclusion reached – that 'there was no support from our collective fieldwork for the existence of a single set of farming styles of which farmers were acutely aware and by which they consciously conceived themselves', and that 'Farming is a social activity about which there is much mythmaking, and stories or parables about farmers abound in farming discourse' – should make analysts cautious about

whether there actually exist animal welfare attitudinal clusters that map directly on to supply chains. It is thus probably best to view it as a heuristic device – useful for analysing the problem but not descriptive of how actual farmers perceive what they or other farmers are doing.

5.3 Egg Supply Chain: External Actors

In the previous section, the focus was on producers and retailers directly involved in different supply chains. A range of external actors are also involved in the egg supply chain including industry associations, professional associations, research institutes and civil society organisations. To illustrate the range of actors involved, each actor is briefly described below and allocated to one of the four supply chains noted in the previous sections. This will enable the identification of the policy networks that are engaging in efforts to persuade audiences with regard to views on animal welfare practices.

Focusing first on industry associations, we note that the major industry association is the AECL. Established in 2003 as an Industry Services Body (ISB) under the *Egg Industry Service Provision Act 2002*, AECL supports the Australian egg industry's mission to achieve 'A cohesive, profitable and growing Australian egg industry meeting the needs of consumers while operating in a socially and environmentally sustainable fashion' (AECL, 2012, p. 11). To do this, AECL's mission is 'To develop and drive integrated on-farm solutions and through chain and market services that maximise benefits and revenue for the Australian egg industry and the community while minimising barriers and costs for Australian egg producers' (AECL, 2012, p.12). AECL has identified five broad strategies to achieve its mission, which include: monitoring consumer attitudes; launching egg marketing campaigns; identifying supply chain inefficiencies; encouraging innovations that enhance competitiveness, credibility and sustainability; and building stakeholder-responsive research, development and extension capacity. It operationalises the strategy via three pillars linked to consumption (with a focus on marketing), credibility (with a focus on research, development and extension (RDE), and cohesion (with a focus on outreach to 'influencers' in the government, NGOs, media and the local community).

AECL members pay an egg levy linked to the number of layer hens they manage. The egg levy funds AECL's strategy, including its RDE strategy, which is co-funded by the Commonwealth Government. As AECL notes in its strategy document:

The Australian Government recognises this [R&D role] and as a result, provides 50% of all investments the Company makes in valid, defined and eligible R&D as per the Statutory Funding Agreement (SFA) with the Company as part of the Government's broader R&D policy. AECL is cognisant of the Australian Government being a key funding source (AECL 2012, p. 20).

In practice, AECL's approach to hen welfare, science and ethics focuses on the lack of public information and the role science can play in rectifying the situation. According to AECL's CEO:

While it is regarded by some that egg producers are not welfare-friendly, a large percentage of the community remains unaware of the many advantages and disadvantages pertaining to the egg production systems operating within the egg industry. The availability of rigorous, replicated and peer reviewed science and the communication of key research outcomes as it pertains to best management practice and on-farm animal husbandry will be critical in shaping community attitudes towards the egg industry. Such operational concerns as bird stocking

densities, farm raids and public opinion will all depend on the industry's ability to counter biased information 'peddled' by minority groups (Kellaway, 2012, p. 212).

The major professional association engaged in the egg industry and directly involved in hen welfare is the Australian Veterinary Association (AVA). AVA aims to 'promote and advance veterinary and allied sciences in Australia', and its range of functions include promotion of the profession, publication of research and influencing public policy. It undertakes these activities by providing services to members, hosting conferences, editing the *Australian Veterinary Journal*, and making submissions and commenting on key issues with regard to animal health, biosecurity and animal welfare. According to Pearson (2013, p. 400), the AVA's Special Interest Groups (SIGs) were established in the 1960s with one of the first being the Veterinary Poultry Association. This early interest in poultry continues today with the AVA's website stating that the Commercial Poultry Veterinarians (CPV) SIG 'focuses on poultry production, health and medicine. CPV has a close association with the Australasian Veterinary Poultry Association (AVPA), an independent association of scientists with an interest in the health and welfare of commercial poultry. CPV members are automatically members of AVPA' (AVA, 2015a).

The AVA has quite large state branches such as the Victorian, Queensland and New South Wales Division Offices. According to the AVA website, for example, the Victorian Division 'has nine branches across the state and is active in lobbying government on issues relating to animal welfare and veterinary practice in Victoria' (AVA, 2015b). An indication of this lobbying activity is evidenced in the Victorian Division's newsletter VicVet, which highlighted legislation and regulatory issues related to restrictive breed legislation and veterinarian access to firegrounds (VicVet, 2014, pp. 5-6). It is also evident in the NSW Division's 2015 newsletter e-Ruptions, which highlighted the recent issues with regard to live baiting in the greyhound industry. Its President, Dr Geoff Scarlet, expressed disappointment at the AVA's NSW Division being left out of the initial discussions and indicating they had 'written to the chair of the Special Commission of enquiry into the greyhound industry and asked that we be included in discussions and for AVA to be kept informed as the conduit between the enquiry and veterinarians. Our concerns are not only with the current live baiting atrocity but the welfare of all animals at all levels of the GH industry' (NSW e-Ruptions, 2015, p. 1).

In addition to industry associations and professional associations, the hen welfare sector also includes research institutes that are located in various universities and research agencies across Australia. These include the Poultry CRC, CSIRO Animal Health Laboratory, the Animal Welfare Science Centre (University of Melbourne), the Poultry Research Foundation (University of Sydney) and the Centre for Animal Welfare and Ethics (University of Queensland). The Poultry CRC aims 'to help Australia achieve sustainable, ethical poultry production in the face of population growth and climate change' (Poultry CRC, 2015). It includes seven 'essential participants' including AECL, Bioproperties Pty Ltd, CSIRO Livestock Industries, DAFF Queensland, the Rural Industries Research and Development Corporation (RIRDC) Chicken Meat Program, the University of Melbourne and the University of New England (UNE). A large number of 'other participants' are also listed on its web site including meat producers like Baiada Poultry and Inghams Enterprises, and several other universities including the University of New South Wales, the University of Sydney and the University of Western Australia. According to its 2014 Annual Report:

One of the objectives of the Poultry CRC is to produce evidence-based tests for the welfare status of birds. Our researchers have found that the expression of some microRNAs differs between eggs from relaxed and stressed hens. This is a world first discovery that could revolutionise the way bird welfare is assessed. Another very exciting development is the use of a fluorescent protein to

differentiate male and female embryos. This technology has the potential to offer a lasting solution to what is seen as a major welfare issue faced by the egg industry – the discarding of day-old male chicks (Poultry CRC, 2014, p. 5).

The hen welfare sector includes a range of external civil society organisations representing consumers, animal rights and welfare groups, as well as support groups for backyard producers and breeders. Some of the most important of these are RSPCA Australia, Humane Society International Australia (HSI), and CHOICE. RSPCA Australia plays a major role at the state level in enforcing animal cruelty laws. It also seeks to influence policy on animal health and welfare at the state and Commonwealth levels. It has adopted a clear stand with regard to hen welfare, which is set out in its RSPCA Approved Farming Scheme Standards Layer Hens (RSPCA, 2015b). Its current campaigns include one against producing eggs from caged systems and its website states: 'Hens are intelligent, social creatures that don't deserve to live in a cage. Unable to stretch, flap their wings, lay their eggs in a nest, perch, dust bathe, scratch and forage, hens suffer intensely and continuously throughout their confinement in a cage' (RSPCA Australia, 2015c).

Finally, the consumer group CHOICE has a longstanding perspective on the need to better publicly define the concept of 'free range'. On its website it states: 'There's no official national standard for free range eggs, and the label on your carton can have any number of meanings depending on the producer', and that 'Without an official standard for free range products, consumers are at real risk of being misled by businesses wanting to cash in on the premium price that they can charge for free range eggs' (CHOICE, 2015). It is concerned that its members are being duped into paying higher prices for 'free range' eggs that are not produced in line with member expectations and also that caged eggs are being labelled and sold as 'free range' to take advantage of the price premium attached to the latter. It has released a very recent report, *Free Range Eggs: Making the Claim Meaningful*, in which it calls on governments to develop 'a consistent and enforceable national standard for eggs labelled as free range' (CHOICE, 2015, p. 11), to which the government subsequently responded (see Section 6.3 below).

A large number of external actors claim to have a stake in egg production, ranging from industry associations to professional associations to civil society groups. Some of these external actors are closely associated with support for specific production systems, with AECL continuing to support caged production and intensive free range production, and RSPCA and CHOICE supporting non-caged, more extensive systems of production.

5.4 Actor Coalitions and Hen Welfare Norms

Given the structure and actors involved in Australia's egg industry, it is possible to identify two broad actor coalitions that seek to validate their perspectives on hen welfare to the public. The first actor coalition mobilises around a consequentialist ethics of 'the greatest good for the greatest number' based on a 'negative freedom' ethics of individual animal suffering, is very business oriented, and is prepared to trade off many of the behavioural components of hen welfare against the physical health of birds and the production of high volumes of low-cost eggs. This Intensive Production Coalition (IPC) is composed of caged- and intensive barn and free range egg producers, has strong links to industry, supports productivity-enhancing research and expresses concerns about the public's knowledge and understanding of the pros and cons of different egg production systems. The situation in Australia thus appears to map quite well on to the situation analysed by Morris (2009) in New Zealand as described in Section 2.4.

The second actor coalition mobilises around a deontological ethics of animal rights. This Extensive Production Coalition (EPC) includes the RSPCA, FRFA, the Humane Society of

Australia, Animals Australia, CHOICE, and organic egg producers. The EPC endorses an ethics of 'positive freedom' based on an animal's right to express 'normal' behaviour, holds significant 'social capital' in terms of public legitimacy, and argues in favour of free range production with low outdoor stocking densities and the termination several husbandry practices (e.g. beak trimming, induced moulting).

5.5 Summary

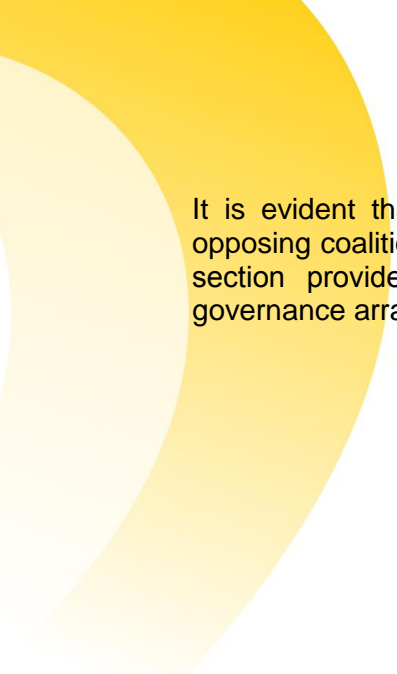
A significant percentage of egg consumers are uninformed about egg production, but a significant segment of these desire more information. Trustworthy sources of information are thought to be animal welfare organisations, the internet and veterinary organisations. Industry associations, and governments appear to be viewed as less trustworthy sources of information.

The egg supply chain consists of producers, retailers and consumers who are locked into complex relationships based on different systems of production. Four different supply chains can be identified along a consequentialist-deontological ethical spectrum. Strong consequentialists support caged-egg production as the one that maximises overall social utility. Modified consequentialists support intensive barn- and free range egg production as one that optimises both hen welfare and egg production. Modified deontological welfare ethicists support extensive free range egg production as the approach that best optimises hen welfare and egg production. Finally, some local backyard producers support production systems that maximise a hen's behavioural freedoms and accept much lower productivity rates as a consequence.

The existence of a segmented market of consumers demanding eggs produced to different animal welfare standards and the emergence of different egg production chains to meet this demand has given rise to a 'politics' of egg production over the meaning of 'free range' that is contested by two broad actor coalitions. The IPC, composed of large-scale, integrated, intensive companies and supported by wider industry associations, is concerned that the banning of caged production systems and the move to extensive free range production will result in significant costs to the industry, society (via higher egg prices) and the environment (via more extensive egg production). They also worry that the animal welfare benefits of extensive free range production come at a significant cost to conventional 'freedom from' measures of animal welfare (e.g. increased exposure to disease).

The EPC, led by organisations like the RSPCA and CHOICE, and supported by small- to medium-sized free range and organic producers, are concerned about the welfare implications of caged-egg and intensive free range systems. The former are perceived not to meet the basic behavioural needs of animals to express 'normal' behaviour; the latter are perceived to be not in conformity with the provisions of the 'Model Code' or consumer expectations and to result, in practice, in forms of barn-laid systems as many chickens do not, in fact, range in intensive 'free range' systems due to a variety of reasons including flock size, stocking density and the size, location and operation of popholes (see CAANZ, 2015).

Each coalition enlists science to resolve the debate over egg production. The IPC anticipates that science can highlight the extensive range of hen welfare issues that arise in all systems of production, resulting in an increased public appreciation of the benefits as well as the drawbacks of caged and intensive free range production. The EPC perspective is that science has already demonstrated that caged systems deliver poor animal welfare; and that 'free range' must mean that most hens are ranging most of the time.



It is evident that science cannot resolve such deep ethical divisions between the two opposing coalitions. Before examining what the role of science might be, however, the next section provides an overview of the structure and operation of Australia's current governance arrangements for hen welfare.

6 Governing Hen Welfare: Commonwealth and State Governments

6.1 The Australian Federation

In political theory, there is a huge diversity of ways of conceptualising the nature of the modern state with no clear and unambiguous criteria to choose among them. Along one dimension, analysts distinguish states based on the degree to which they have the capacity to act autonomously from society or fully reflect the view of the majority (e.g. Skocpol, 1985). According to Theda Skocpol, states have considerable autonomy from society to undertake the task of governing; and while this autonomy can from time to time be compromised (due to stakeholder and societal pressure or the regulatory capture of state agencies by industry for example), such situations are a departure from a more normal situation in which elected governments rule independently from society and in the broad public interest. This popular conception of the autonomous state is challenged by another highly respected approach to understanding state-society relations, pluralism (e.g. Dahl, 1974). Based on an analysis of local government decision making in New Haven, Dahl argued that the democratic state is necessarily responsive to society's demands and that the policy compromises that emerge from political negotiations represent the power of relatively equally positioned and non-structurally determined interest groups who compete for influence within an open and responsive political system.

There are many other ways of characterising the nature of government, however, beyond the notion that it is either largely independent of, or responsive to, society. Theorists operating within the 'Varieties of Capitalism' tradition (e.g. Hall and Soskice, 2001) contrast two modes of governance based on how governments manage interests. In 'coordinated market economies', governments engage with a small number of peak organisations (business, labour and more recently the environment), which are given a seat at the policy table to bargain over fundamental policy. These corporatist links between the state and society endure through political cycles, creating considerable policy stability but at the risk of policy innovation. In contrast, in 'liberal market economies', governments operate at arms length from societal interests, policy influence via lobbying is vulnerable to political cycles and policy is both potentially more innovative and more unstable.

A third way of conceptualising how the state operates is the policy community and policy network approach (e.g. Atkinson and Coleman, 1989). From this perspective, the capacity of a government to operate autonomously from society depends on the structure and operation of the policy network in operation in that policy sector. This literature has spawned a large number of different typologies of policy networks, one early and useful approach being that of Coleman and Skogsdad (1990) based on the relative strength of state and societal actors. Using these two dimensions, these authors develop a 2X2 matrix that identifies four basic policy network types (Table 6-1). When a state agency has a clear policy purpose and high policy capacity in a context where societal interests are poorly organised and there is a lot of stakeholder competition, then a policy network will emerge characterised by State Direction, recapitulating Skocpol's autonomous state. Policy within this network will be state directed and while societal interests will be consulted, the state can ensure its own autonomously determined interests are met. In contrast, where a state agency has a complex, multifaceted mandate and limited capacity and societal interests are well organised, the network is characterised by 'clientele pluralism', a situation where powerful interests dominate the policy process and where the government comes to see those interests as compatible with its own. Pressure pluralism corresponds to Dahl's conception of a state that lacks capacity to impose its own agenda and so mediates among

relatively equal competing interests, while concertation describes a situation not dissimilar to the role the state plays in coordinated market economies – a kind of state-society corporatism where a small number of peak bodies gain policy making influence.

Table 6-1 Types of Policy Networks

		State Agency Organisation	
		Low	High
Organisation of Institutional Interests	Low	Pressure Pluralism	State Direction
	High	Clientele Pluralism	Concertation

Source: Coleman and Skogsdad, 1990.

A large number of other approaches to understanding policy making and state-society relations also exist and the above has only touched on a portion of the available literature. What emerges from this brief summary is that social and political theorists are in substantial disagreement as to which theory best characterises the capacity of the state to act with regard to societal interests and which, if any, interests will have the most say in policy making. Moreover, given the diverse forms of state in existence in space and time, and the diverse ways in which societal interests can be organised and structured, the way a state enacts policy may vary from place to place and over time. Sufficient has been said, therefore, to warn against 'essentialism' with regard to the 'correct' way to characterise the Australian state. Instead, there is evidently a great deal of room for debate and contestation over what the state is, how it functions, the ideas that infuse it at any point in time, and its capacity to achieve its objectives.

6.2 Legislative Arrangements

Writing in 2012, Thornber et al. (2012, p. 8) set out a detailed account of the basic structure of Australia's approach to animal welfare. Under Australia's federal arrangement, primary responsibility for animal welfare is vested in the states and territories. The Commonwealth's formal responsibilities relate to the export of animals and animal products. In this federal context, Australia's overall approach to animal welfare is based on the concept of 'duty of care'. Existing legislation, codes, guidelines and advice are designed to provide information to the community, including especially those responsible for animals, about what their duty of care is and how to ensure that they exercise it so as not to fall foul of the law. Thornber et al. note (2012, p. 8) that:

Although there is no national animal welfare legislation, the Australian Animal Welfare Strategy (AAWS) is Australia's key policy document for improving animal welfare outcomes. In accordance with the AAWS, the jurisdictions are making efforts to harmonise the key features of their legislation to ensure that consistent laws, policies and arrangements apply across Australia.

Thornber et al. state that Australia's starting point for animal health is the World Animal Health Organisation's (OIE) definition and guiding principles, although it needs to be noted that Australia has played an important role in OIE, contributing to shaping these. The OIE's definition is based on the 'five freedoms' (Thornber et al., 2012, p. 10). Thornber et al. note that:

...scientific assessment of animal welfare involves diverse elements, which need to be considered together, and selecting and weighing these elements often involves value-based assumptions, which should be made as explicit as possible... The use of animals carries with it an ethical responsibility to ensure the welfare of such animals to the greatest extent practicable... Equivalent outcomes (based on performance criteria), rather than identical systems (based on design criteria), should be the basis for comparison of animal welfare standards and recommendations.

Table 6-2 indicates the state departments responsible for administering animal welfare legislation in Australia, and the relevant ministry in New Zealand, as of 2012. The majority of states locate responsibility in departments of agriculture and primary industry.

Table 6-2 Departments Responsible for Animal Welfare

Jurisdiction	Department	Comments
Australia	Agriculture, Fisheries and Forestry	Animal welfare, animal health and OIE guidelines are managed by DAFF Biosecurity
Australian Capital Territory	Territory and Municipal Services	
New South Wales	Trade and Investment, Regional Infrastructure and Services	Animal Welfare Unit within Biosecurity NSW
Northern Territory	Housing, Local Government and Regional Services	
Queensland	Agriculture, Fisheries and Forestry	Biosecurity Queensland within the department
South Australia	Environment, Water and Natural Resources	Formal memorandum of understanding with Primary Industries South Australia; welfare is linked to animal health for livestock
Tasmania	Primary Industries, Parks, Water and Environment	Welfare is linked to animal health directly
Victoria	Primary Industries	Welfare Bureau within the Biosecurity Division of the department (animal health, product integrity, animal welfare, emergency management and pest control)
Western Australia	Agriculture and Food	
New Zealand	Ministry for Primary Industries	Ministry for Primary Industries links to Department of Conservation (wild animals), Ministry of Foreign Affairs and Trade (export of animals), Ministry of Agriculture and Forestry

Source: Thornber et al., 2012, p. 15.

6.3 Commonwealth Arrangements

Thornber et al. (2012, p. 25) set out a detailed chart of the animal welfare arrangements in Australia at the Commonwealth level; unfortunately these arrangements were changed in a fundamental way with the Commonwealth's decision to defund the Australian Animal Welfare Advisory Committee (AUSAWAC) that oversaw the implementation of the Australian Animal Welfare Strategy (AAWS) in the 2013 budget. The revised arrangements effectively dismantle the 2005 Australian Animal Welfare Strategy, which saw the

Commonwealth Government play an increasing role in coordinating animal welfare policy across the country. In 2012, Thornber et al. commented that 'The AAWS was developed by the Australian Government as a strong driver for good welfare standards from all animal interest groups and the Australian community. It is based on a working partnership between government and civil society, and is a contemporary model of the public policy cycle...' (Thornber et al., 2012, p. 32). With its disbanding, Australia has lost this important coordinating capacity, as a number of interviewees noted. For example, Interviewee 2 noted:

Well obviously the situation we're in now where the Federal Government has moved away from being involved in the process, facilitating the process and encouraging harmonisation across states and territories. It's really left up to the state and territories as to whether they want to regulate the standards and I think what we've seen now with the cattle and sheep codes, they been ready to be endorsed by state and territory ministers for over a year now I think and no state has done so and the expectation is that no state will. That's because there's no driving force anymore and in fact there's some states who believe that the cruelty legislation is enough and the codes are enough. In other words they don't want that external pressure to get the industry to do better than they are (Interviewee 2).

This view was endorsed by Interviewee 4, who observed with regard to the decision to cut funding to the Australian Animal Welfare Advisory Committee (AUSAWAC) overseeing the implementation of the AAWS:

One of the ideas of the Strategy was in fact, to have national and simplified approaches to standards, codes and guidelines that would have reduced red tape. Governments have the responsibility to adopt policies as they best see fit and this is accepted. In my view however, abolishing AUSAWAC was unwise because for just a million dollars a year it was proving its worth through leverage of funds and gaining 'free' advice of 140 committed scientists and experts generous with their time.

Finally, Interviewee 6 stated that the Commonwealth Government's decision to defund the AUSAWAC had had a 'huge impact':

... because what DAFF used to do was they actually provided some leadership in that space. They provided the Secretariat for national committees. You need someone as a central point, and working with the Animal Welfare Task Group in Victoria provided the Secretariat for that but it was added on to somebody's work plan and you just don't have those central people to coordinate things.

With the demise of AAWS and AUSAWAC, Australia has lost the oversight and drive DAFF provided at the national level to implement a federal animal welfare strategy and policy. The new post-budget arrangements are described by Potard (2015) in a recent report for the Australian Farm Institute and set out in Figure 6-1. Under the new arrangements, states collaborate with each other on animal welfare through 'task groups' and 'networks' that are managed by a sponsor from the Agriculture Senior Officials' Committee (AGSOC), which reports to the Agricultural Ministers' Forum (AGMIN) chaired by the Commonwealth Minister of Agriculture. According to DAFF, the Animal Welfare Task Group (AWTG), which is chaired by an individual at the Deputy Secretary level within the Government of Victoria's Department of Environment and Primary Industries, 'focuses on animal welfare issues that support improved long-term and sustainable economic, social and environmental outcomes that are informed by community expectations and are of national interest or concern', and is 'a high level task group which reports to AGSOC on national animal welfare policy issues.

The role of the AWTG is to deliver priorities referred to it by AGSOC and identify key strategic issues for consideration by AGSOC' (DAFF, 2014).

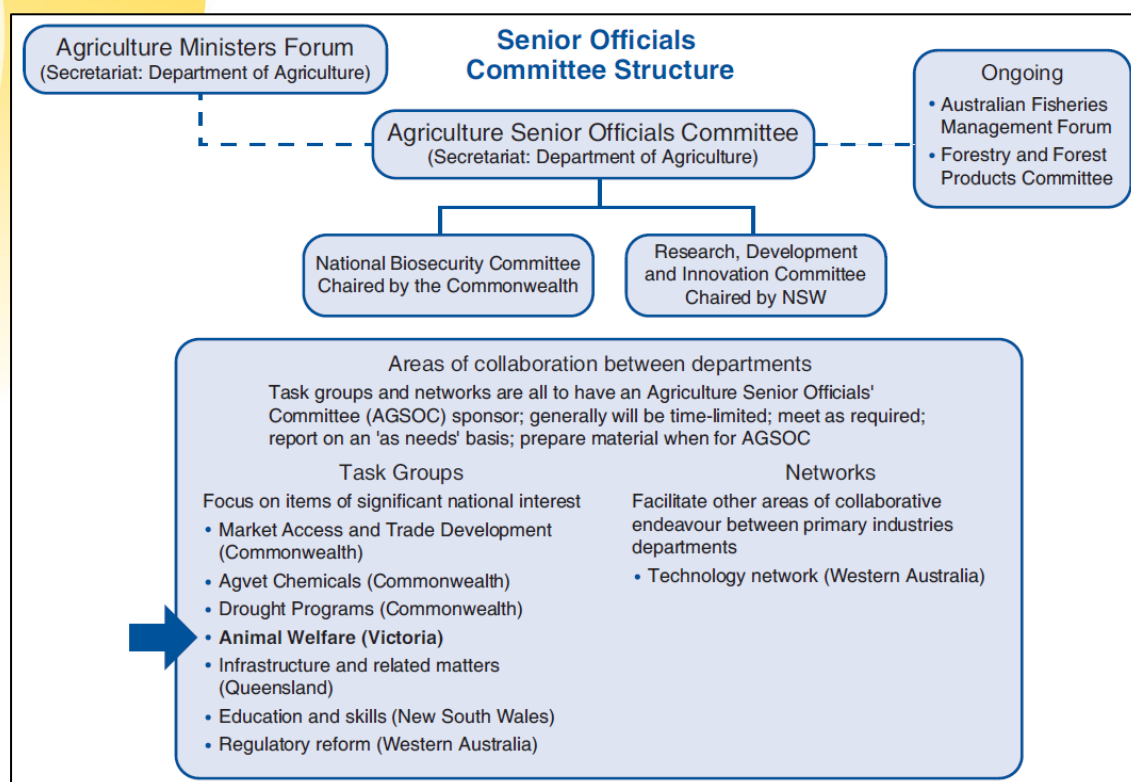


Figure 6-1 Australia's Current Animal Welfare Institutions

Source: Potard, 2015, p. 41.

To the formal arrangements for directly addressing animal welfare issues must be added a set of arrangements that are broader in scope and linked to trade practices, especially 'truth in advertising', under the Australian Consumer Law (ACL). According to CAANZ (2015, p.11), 'The ACL is a national law applied in all states and territories since 1 January 2011 which aims to protect consumers and ensure fair trading in Australia'. Under the law 'a person must not engage in misleading or deceptive conduct, or make false or misleading representations with respect to goods or services'. A number of cases have already been heard regarding allegations of misleading and deceptive conduct with regard to the 'free range' designation, prompting CAANZ to release a consultation paper on the topic in October 2015. The paper set out three basic options for the government to consider: the status quo option, an information standard for free range, and an information standard for all types of egg production systems. The Government is now considering the 149 submissions it received on the consultation paper with a view to further considering what action it might take on claims regarding free range and other systems of production.

6.4 State Arrangements

Thornber et al. (2012, p. 43) note that:

State and territory animal welfare legislation includes laws relating to cruelty to animals (criminal law) and more contemporary laws relating to a 'duty of care' to animals. In addition to this primary animal welfare legislation, local government regulations and environment protection legislation affect the management and welfare of animals. Animal welfare is governed by:

- Acts of Parliament
- Regulations made pursuant to these Acts
- Codes of practice referenced in legislation
- Case law
- Quality assurance programs and other non-regulatory instruments.

To regulate animal welfare, states pass their own legislation, with Table 6-3 listing the regulations for Tasmania (as of 2012). Similar legislation exists in other states and territories, although the precise provisions vary from state to state.

Table 6-3 Tasmanian Legislation Dealing with Aspects of Animal Welfare

Name of legislation	Agency	Web link	Description
<i>Animal Welfare Act 1993</i>	Department of Primary Industries, Parks, Water and Environment	www.austlii.edu.au/au/legis/tas/consol_act/awa1993128	An Act to prevent neglect of, and cruelty to, animals, to ensure the welfare of animals and for related purposes.
<i>National Environment Protection Council (Tasmania) Act 1995</i>	Department of Primary Industries, Parks, Water and Environment	http://www.austlii.edu.au/au/legis/tas/consol_act/nca2002237/	An Act to make provision with respect to the conservation and protection of the fauna, flora and geological diversity of the State, to provide for the declaration of national parks and other reserved land and for related purposes
<i>Veterinary Surgeons Act 1987</i>	Department of Primary Industries, Parks, Water and Environment	http://www.austlii.edu.au/au/legis/tas/consol_act/vsa1987258/	An Act to provide for the registration of veterinary surgeons, the regulation of the practice of veterinary surgery, and incidental matters
<i>Nature Conservation Act 2002</i>	Department of Primary Industries, Parks, Water and Environment	http://www.austlii.edu.au/au/legis/tas/consol_act/nca2002237/	An Act to make provision with respect to the conservation and protection of the fauna, flora and geological diversity of the State, to provide for the declaration of national parks and other reserved land and for related purposes
<i>Dog Control Act 2000</i>	Department of Premier and Cabinet	http://www.austlii.edu.au/au/legis/tas/consol_act/dca2000134/	An Act to provide for the control and management of dogs
<i>Animal (Brands and Movement) Act 1984</i>	Department of Primary Industries, Parks, Water and Environment	http://www.austlii.edu.au/au/legis/tas/consol_act/aama1984232/	An Act to provide for the compulsory identification of cattle, sheep, pigs and other animals, the regulation of the movement of animals, a system of permanent identification of animals, and incidental and other purposes
<i>Cat Management Act 2009</i>	Department of Primary Industries, Parks, Water and Environment	http://www.dpiw.tas.gov.au/inter.nsf/WebPages/HBAW-7HE28G?open	An act to provide for the control and management of cats.

Source: Thornber et al. (2012, p. 65).

On a practical day-to-day basis, animal welfare legislation in most states is the combined responsibility of staff within animal welfare units usually working in partnership with the RSPCA, which is recognised in much state legislation as having formal rights of inspection. Again, Table 6-4 sets out Tasmania's arrangements as an example.

Interviewees recognised Australia's fragmented animal welfare, with most arguing for more centralisation and leadership. One interviewee with experience of other countries noted:

In my opinion one of the largest difficulties is the fact that legislation in terms of animal welfare and the way we treat animals is left to the states. And so the difficulty is that most of the stakeholders, not only the industry but others like the retailers and so forth, are actually organised at the national or federal level whereas animal welfare is regulated at a state-to-state basis. So the difficulty for industry, and industry will tell us, and everyone involved will actually accommodate differently from one state to another when the welfare of animals are probably quite similar, just a few variations like weather conditions for free range. But in general those welfare requirements are probably quite uniform in terms of what animals require at the federal level (Interviewee 8).

Another interviewee noted:

You've highlighted an important topic that probably goes broader than just the egg industry. The fact that we're a federation of states means that a lot of rules come down to what the states require. In terms of animal welfare, it really should be national and I know that there are national codes and I guess there are some differences in terms of what's acceptable on the national scale and the state scale and that always is a risk (Interviewee 7).

Table 6-4 Tasmanian State Animal Welfare System

Responsible minister	Minister for Primary Industries and Water
Location of animal welfare in departmental structure	Animal Biosecurity and Welfare Branch in the Biosecurity and Product Integrity Division of the Department of Primary Industries, Parks, Water and Environment (DPIPWE)
Staffing of the animal welfare unit (full-time equivalent staff numbers)	3.5
Role of the animal welfare unit	Development of animal welfare policy for continuous improvement in animal welfare standards and practices; providing secretariat support to, and departmental representation on, Animal Welfare Advisory Committee; administration of the <i>Animal Welfare Act 1993</i> , including investigating animal welfare complaints and taking appropriate action (in practice, the branch funds the RSPCA inspectorate to do most of this work and provides the RSPCA inspectors with backup and expertise); monitoring welfare of livestock (farms, saleyards, in transport, etc.); regulation of animal research.
Enforcement arrangements	Under a contract agreement with RSPCA, animal welfare complaints are investigated by RSPCA inspectors, with a reporting arrangement back to DPIPWE. DPIPWE animal welfare officers assist RSPCA and may also undertake larger scale investigations of production animal cruelty complaints. Both RSPCA and DPIPWE staff may undertake inspections of production animals (e.g. poultry, pigs and dairies). Police both assist animal welfare officers and undertake some prosecutions in their own right.
Appointment of inspectors	By the Minister for Primary Industries and Water

Source: Thornber et al., 2012, p. 80.

6.5 Codes of Practice

A key aspect of Australia's governance arrangements for animal welfare have been model codes of practice, with poultry coming under the *Model Code of Practice for the Welfare of Animals: Domestic Poultry*, 4th Edition, 2002 (CSIRO 2002). The basic idea behind the model code approach is that in a federation such as Australia where constitutional responsibility for animal welfare is vested in the states, the only way to obtain a degree of commonality across the country is by negotiating and agreeing 'voluntary' minimum practices. For some, the hope is that such codes will ultimately be referenced in legislation, making some or all of their recommendations more prescriptive and binding. Based on this approach, Australia undertook a range of negotiations on model codes of practice in the early 1990s in the cattle, sheep and poultry industries, as well as cross-cutting codes related especially to saleyards and the slaughter of animals. The full list of model codes is available on the CSIRO website.

According to a recent PricewaterhouseCoopers report (PwC, 2013, p. 13), the process of developing codes of practice has strengths and weaknesses. Strengths include inclusiveness of process, effectiveness of consultative mechanisms, the role of the Animals Health Australia (AHA), the national approach to standards development and the inclusion of science in standards development. However, weaknesses in the process are inefficiency and poor time management, difficulties with conflict management, barriers to state and territory implementation and lack of clarity around objectives.

A concern to improve the structure and authority of existing model codes and upgrade them to standards and guidelines was a key element in the AAWS, and one where AUSAWAC played an active role. The demise of both entities has generated something of a vacuum in the animal welfare policy field, with guidelines and standards for sheep and cattle still awaiting sign off by AGMIN (AHA 2015). Notably the process to develop standards and guidelines for cattle and sheep, which commenced in 2008 and still is not fully completed, illustrates clearly PwC's concern over 'efficiency and time management'. Currently, while AECL is ready to engage with the process of developing standards and guidelines for the egg industry (Kellaway, 2014b, pp. 18-20), the final decision to do this awaits action by AGMIN and AGSOC as advised by the AWTG. At the time of writing it was unclear when the process might begin.

In its review of the model code approach, and the potential of a more specific, measurable and nationally based standards and guidelines approach to improve animal welfare governance, the PwC report noted with regard to knowledge and evidence that:

Standards need to reflect best available evidence, based on both scientific and economic research. In consultations, stakeholders were generally supportive of the use of scientific research within the Standards and Guidelines development process, though not all agreed that there is sufficient scientific research being conducted to support the decisions that need to be made in the Standards development process. In relation to relevant economic analysis, there are significant gaps in knowledge around current practices, and costs of alternatives, which would support the impact analysis within the RIS analysis. Without an understanding of the nature and extent of application of current practices it is difficult for government to understand the extent of the 'problem' that the Standards are seeking to address (a key element of the RIS process) (PwC, 2013, p. v).

Specifically with regard to the role of science, PwC notes:

The Standards being developed are tools for government to ensure that animal welfare principles are being met to a level which, as the Standards objective statement notes: 'meet community and international expectations and reflect Australia's position as a leader in modern, sustainable and scientifically-based welfare practice'. In meeting this objective, the Standards need to reflect best available evidence, based on both scientific and economic research. In consultations, stakeholders were generally supportive of the use of scientific research within the Standards and Guidelines development process, though not all agreed that there is sufficient scientific research being conducted to support the decisions that need to be made in the Standards development process (PwC 2013).

In the current research project, interviewees were specifically asked about their views on the 'scientificity' of the model code and standards and guidelines approach and a variety of opinions emerged. Some interviewees questioned the scientificity of the model code process, which they viewed as rather limited. One interviewee stated

I think one of the recommendations we made when the standards and guidelines approach was reviewed was the whole issue of having a thorough review of the literature conducted before we started talking about the standards and any required changes. Because it's all very well to say in the introduction to these documents that the standards are science-based but we always had to have a good laugh at that because they weren't really. And so a change that was made was that a bare minimum literature review was conducted on some of the key contentious areas, for example invasive husbandry practices (Interviewee 2).

Another interviewee queried the processes used to develop codes, standards and guidelines:

I think the writing groups that are selected are generally using researchers that are already working with industry. That's one problem. I think government is very conscious of the need to support the rural industries and the need to keep them profitable. Australians are still very keen to support the rural industries, even though we're predominantly a city-dwelling nation. It's not so long ago that their forebears were making money on the land and they feel a strong empathy with people who are struggling to get a living off the land. In reality of course the egg industry is very much a factory-based industry in the countryside and whether that deserves that sympathy I'm not sure really (Interviewee 3).

In contrast, a number of interviewees thought the model codes, and standards and guidelines processes, were science based. One interviewee noted:

Generally, my view would be that they [codes and standards and guidelines] are science based. From my experience – and that's not really with chickens, that's with pigs – the people around the table represented many of the different stakeholders from Animals Australia and the RSCPA right through to farmers. There was pretty good input from all of those groups but by and large when there's facts required or an understanding of facts you know it's based on the science component (Interviewee 5).

Another interviewee who supported the scientificity of past approaches noted:

I don't know about science driven. I think science has its say in the development of them but it's probably in a way establishing the framework that guides the formulation of those. But I would say increasingly they don't drive the agenda. I think ethical issues are increasingly driving the agenda. So I would have said historically science has been setting the benchmarks and I think science still sets benchmarks but I have a feeling the representation on those standards and guidelines are probably being influenced more by community attitudes now than they ever were (Interviewee 7).

6.6 Implementation of Animal Welfare Legislation and Codes

Whereas it appears that Australia's animal cruelty laws, legislated under animal cruelty acts in all states, are being implemented, significant doubts attend the implementation of model codes of practice. PwC noted problems with implementation of the model codes that, left unaddressed, could impact the implementation and effectiveness of standards and guidelines. A key barrier to implementation was that the codes were not 'regulation ready' and required substantial revision, rarely undertaken, to translate them into policy and legislation. Another problem militating against implementation of codes was a lack of clarity as to their objective and whether they were to set minimum or best standards. If codes and standards set minimum standards, they may not drive industry practices towards community expectations; if they set best standards, they may be resisted by industry and/or create economic hardship.

One interviewee was very critical of the model code process:

This idea of codes and the model codes that we have, they're completely irrelevant in a modern society... We've got some data at this university that we've coded – we looked at pigs – how many farmers selling pigs through sale yards, which are places where you are going to see welfare problems, and we found that 40% of farmers either didn't know what the code was or had never read it. So you've got a code here that presumably is there to protect animals and the fact is that the animals that probably need protecting by these codes, farmers just aren't even aware of the codes to be honest. Or if they are, they are not looking at them (Interviewee 1).

Another, very supportive of codes and standards, recognised they could also be used to prevent action from being taken.

Yes, codes of practice are a double-edged sword. You've got to get something up and running and review them from time to time. If you spend an inordinate time re-reviewing agreed positions, the commitment to implementing codes is not always there. It can provide a good opportunity to some to avoid implementing agreed approaches. It's always going to be tricky and you need to have the people who are elaborating these standards pretty well balanced, committed, and on the ball so ensure codes are meaningful. You can't have a preponderance of any one group (Interviewee 4).

6.7 Summary

Australia's federation locates formal responsibility for animal welfare legislation and governance in the hands of states and territories leading to a fragmented approach that is increasingly problematic given increased public concern over animal welfare and the fact that many agricultural commodities, including eggs, are traded across state boundaries. The approach to tackling animal welfare in Australia is bifurcated between mandatory and enforceable animal cruelty regulation on the one hand and largely voluntary codes of conduct on the other. While upgrading the codes to standards and guidelines was intended to standardise practice across the country, the demise of AAWS and AUSAWAC appears to have thwarted that objective.

There is significant disagreement among the interviewees in this study as to the degree to which the model codes and the standards and guidelines approach embrace a 'science-based' approach to development. For some, the codes and standards and guidelines are decidedly not science based because the science has not been done, negotiation processes do a poor job of integrating science, and they are dominated either by industry-friendly scientists or animal rights activists.

Other problems with regard to codes and standards and guidelines relate to unclarity as to their objectives (minimum or best standards), the fact that in the past they have not been 'regulation ready', and the length of time they take to negotiate and renegotiate.

The decision by the Commonwealth Government to pass responsibility for negotiation of animal welfare provisions back to the states creates further uncertainty. It is clear from the interviewees and from comments in the industry literature that this has been a poorly considered decision that has removed critical leadership from a process fraught with problems.

7 Governing Hen Welfare

7.1 Wicked Problems

In the 1970s, Rittel and Webber developed the concept of a ‘wicked problem’ within the discipline of planning to capture a distinction between ‘closed’ and ‘open’ ended problems that were either amenable to conventional processes and technical solutions or were not. These latter, ‘wicked’ problems they argued had a range of characteristics that made them especially hard to solve using standardised bureaucratic processes coupled with the deployment of available science and technology. Thus, according to Rittel and Weber (1973), some features of wicked problems are that they:

- Cannot be definitively formulated;
- Endure over time;
- Are qualitative as well as quantitative in nature; and
- The process of seeking a solution alters the context in which future solutions might be sought.

The concept has endured since it was formulated due to the increasing complexity of the ethical, social, political and scientific problems that society confronts as we move into the ‘Anthropocene’ – an era in which human activity has replaced natural processes as the major driver of planetary change (Biermann et al., 2012).

In the current context, there can be little doubt that reaching a social and political compromise on hen welfare is a wicked problem. As has been outlined in this report, the issue of hen welfare raises profound ethical, scientific, socio-economic and political issues that defy simple solutions and that necessitate robust, deliberative policy processes if a way is to be charted to the satisfaction of all major interests and society at large. No group acting alone will be able to achieve its objectives.

In recognition of the wicked nature of the hen welfare issue, social scientists have increasingly joined with natural scientists to better understand the intersection between ethics, science, policy, politics and deliberation. The past decade has seen an increasing collaboration across these fields as witnessed in the EU’s Welfare Quality® project and the 2010 Social Sustainability of Egg Production Symposium organised by the North American Poultry Science Association (see Lay et al., 2010). In this section, I canvass some of the ways that social science may be able to provide process solutions to the wicked problem of hen welfare governance in Australia.

7.2 Governing Hen Welfare

Ingenbleek et al. (2012) tackle the ‘wicked’ problem of animal welfare by documenting and assessing the large number of potential public and private policy instruments available for governing animal welfare matters related to legislation, farmer education, incentive systems for farmers, consumer education, and labelling. These researchers note that different combinations can lead to ‘a multitude of different approaches that policy makers can take when trying to realize their animal welfare ambitions’ (Ingenbleek et al., 2012, p. 690). Their study of eight European countries’ aims identified a range of policy options, which are set out in Table 7-1.

Ingenbleek et al. (2012, p. 692) divide policy interventions into those that are government-based, market-based, and farmer-based. Of the various measures identified against each section, the authors draw attention to: (a) capacity building via the training of local advisors;

(b) consumer subsidies (which are not often used because of high administration burdens); and (c) conditional subsidies (which can be enforced through cross-compliance). In terms of implementation, they note:

The question of which (combination of) policy instruments are most effective and feasible in improving animal welfare is still a matter of discussion. McInerney (2004) suggests that the choice of policy instruments depends on the desired level of animal welfare. For example, legal measures and the enforcement of these measures are generally suitable for lower animal welfare levels while market-based measures, sometimes in combination with farmer-based measures, are more suitable for higher animal welfare levels. In addition, different stakeholders may suggest different evaluation criteria according to their interests, i.e. animal welfare effectiveness, cost-effectiveness, distributional effects (meaning whether the policy instrument will affect all or just a few sectors), effects on the competitiveness of chains, administrative feasibility, and institutional feasibility (meaning whether the instrument fits the current governmental and non-governmental organizations who implement and monitor the instrument) to name but a few (Ingenbleek et al., 2012, p. 692).

Table 7-1 Types of Policy Interventions with Examples

Approach	Instruments	Example
Government-based	Legislation	Animal welfare act
	Enforcement	Penalties, strengthening enforcement
	Capacity building	Training local advisors
Market-based	Farm assurance schemes	GlobalGap, Label Rouge
	Labelling	EU label, Free Range, Freedom Food, Whole Food
	Information and education programmes	Government: awareness of market standards Campaigns of animal interest groups Media attention
	Demonstration	Procurement of welfare friendly products by public sector organisations
	Consumer subsidies	Education programs
Farmer-based	Welfare taxes/subsidies	Investment tax deduction
	Cross-compliance	Conditional subsidies when compliance to higher welfare standards

Source: Ingenbleek et al., 2012, p. 692.

Kilschperger et al. (2010) pick up many of these same themes in a study for the EU's EconWelfare project, taking an explicitly governance approach that includes the role that industry and civil society might play in defining and implementing arrangements. Kilschperger et al. commenced their study by undertaking a survey of European countries regarding policy instruments in use and the degree to which they were used. Building on FAWC's model of policy instruments for animal welfare (FAWC, 2008), they elaborate a range of possible options as set out in Table 7-2.

Using this policy instrument typology, Kilschperger et al. investigate which policy instruments are actually used, by comparing and contrasting those in use in eight European countries (Germany, Spain, Italy, the Netherlands, Poland, Sweden, the United Kingdom and Macedonia). According to Kilschperger et al. (2010, p. 44):

The main instruments used to promote animal welfare are regulatory instruments, which are both public (legislation, EC Regulations for organic production) and private combined with penalties; labelling, which may be public (public only for organic products) or private; financial incentives (private and public), Codes of practice (assurance schemes or guidelines) in combination with standards requirements and private information campaigns or other forms.

Table 7-2 Policy Instruments

Instrument	Public Aspect	Private Aspect
Regulatory	Regulation: Public	Regulation: Private
	Penalties (Fine)	
	Cross-Compliance	Cross-Compliance
Labelling	Labelling: Public	Labelling: Private
Financial Incentives	Incentives: Public	Incentives: Private
Assurance, Guidance	Codes of Practice: Public	Codes of Practice: Private
Education, Information	Education: Public	Education: Private
	Training: Public	Training: Private
	Information: Public	Information: Private
Development	Research: Public	Research: Private

Source: Extracted from Kilschperger et al., 2010, p. 44.

Shaded instruments are those most used by the study countries.

While the policy instruments identified by Kilschperger et al. are not dissimilar to those identified by Ingenbleek et al., the revised organisation and greater detail renders them more practically applicable. The Kilschperger et al. analysis leads them to promote a 'dynamic governance model' in which actors located in civil society and business linked to production chain goals and perspectives promote, via a variety of different forms of cooperation (and presumably conflict although they do not state this), a set of common learnings that can lead ultimately to an optimised mix of public and private policy instruments to promote good welfare outcomes. Whereas the classic model of governance by governments involves a small number of actors seeking to achieve a single objective, via a small number of policy instruments, in their dynamic governance model, groups of actors seek to achieve multiple goals utilising a diverse set of policy instruments in varying combinations. Their dynamic model is depicted in Figure 7-1, and provides interesting options for deployment in the Australian animal welfare policy context.

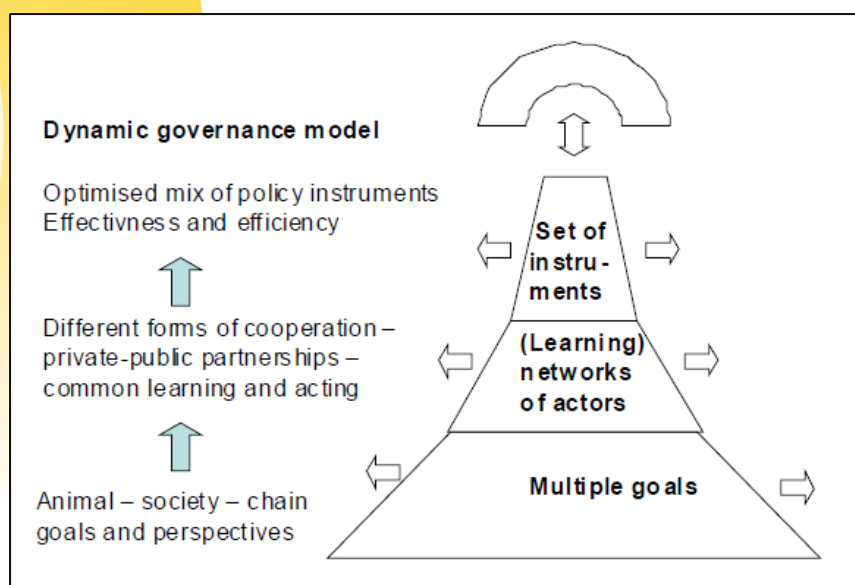


Figure 7-1 Dynamic Model of Governance

Source: Kilschperger et al., 2010, p. 13.

In another recent study, Escobar and Buller (2014) investigate the potential role of the social sciences in illuminating animal welfare issues. In a critique of the UK's Department of the Environment, Food and Rural Affairs' (DEFRA) past approaches to understanding farmer behaviour, they argue that the Department has adopted an individual, cognitive-level, psychological approach that focuses on the attitudes, values and cost-benefit estimates of farmers, which are then segmented into groups such as 'leaders' and 'laggards'. From Escobar and Buller's perspective, this approach significantly underestimates the degree to which farmers are enmeshed in complex social relationships linked to their identities as farmers, as well as to the wider political-economic context (about which they say rather little) in which they engage in decision making. Thus, for example, Escobar and Buller (2014, p. 28) state that:

...recent work by sociologists, geographers and other rural social scientists has re-emphasised the importance of the wider social, structural and environmental factors to which people relate when they take actions and make decisions. The crucial difference is that from a social science perspective... behaviour is not understood as an outcome, but as an instance through which farmers relate to their local and professional communities, build their professional, cultural and personal identities and relate to the institutional, economic and political context in which they farm.

DEFRA's characterisation of the factors contributing to human behaviour is reproduced in Figure 7-2 below, and Escobar and Buller argue that it represents a hodgepodge of individual and social factors that seriously underestimates how the latter cognitive factors are conditioned by the former structural and institutional factors. A further critique that one can make of the DEFRA approach is that it explicitly ignores the political economic context within which human behaviour occurs and which establishes the economic, social and psychological rewards that reinforce some behaviours and punish others.

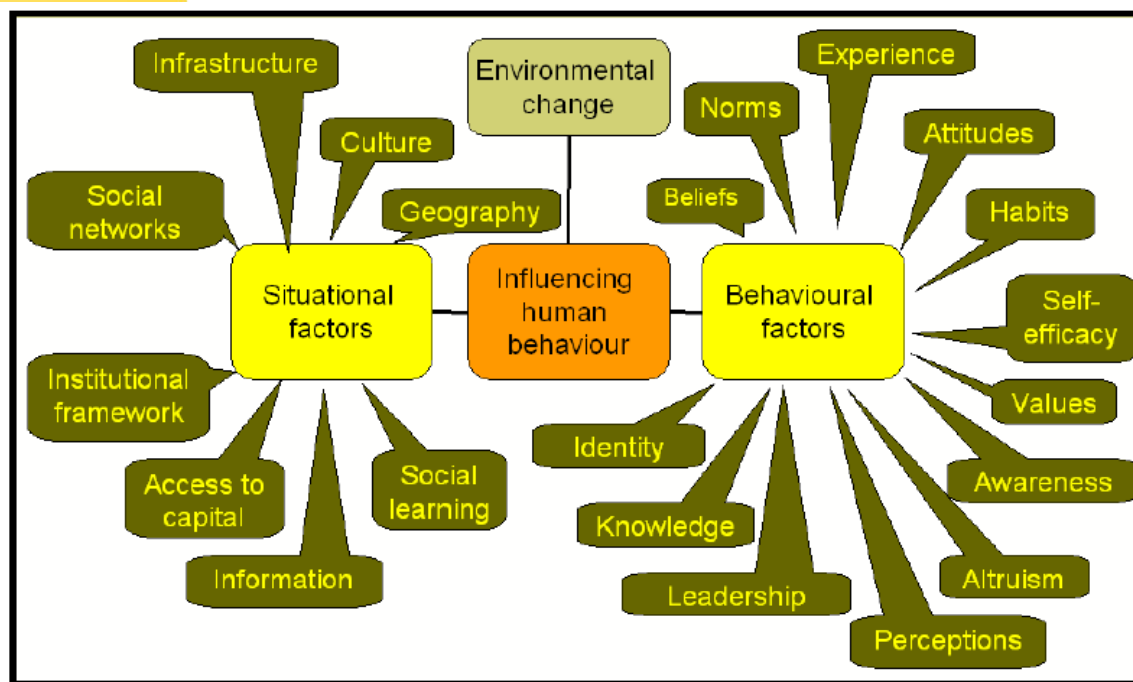


Figure 7-2 Factors Contributing to Human Behaviour

Source: Escobar and Buller, 2014, p. 29.

Moving beyond a policy and governance focus, Maciel and Bock (2013, p. 224) state that to understand the *politics* of animal welfare reform it is important to consider the ‘policy arrangements’ in play. They state:

The concept of a policy arrangement allows one to distinguish analytically between the content and the organization of a policy domain. The organizational aspect is analysed along three dimensions: 1. the actor coalition involved, 2. their power relations and resources, and 3. the rules of the game that regulate their behaviour. The content of a policy arrangement is analysed as an additional dimension that regards 4. the policy discourse enacted.

Later, and building on an earlier studies, Maciel and Bock (2013, p. 225) observe:

Businesses have an interest in the new economic opportunities that market differentiation (such as private labels) brings. In addition, private labels are also important for building a reputation. Such coalitions are attractive to NGOs as they seem to be more effective in achieving real results than their traditional education and lobbying activities. Each group sees a real benefit from joining forces and exchanging resources within such a policy coalition.

Building on this ‘policy arrangement’ approach, Maciel and Bock argue that in the Dutch case civil society coalitions (CSCs) can occupy one of four positions depending on their relative power on the one hand and the salience the issue has with the public on the other. They depict the various potential outcomes as set out in Figure 7-3.

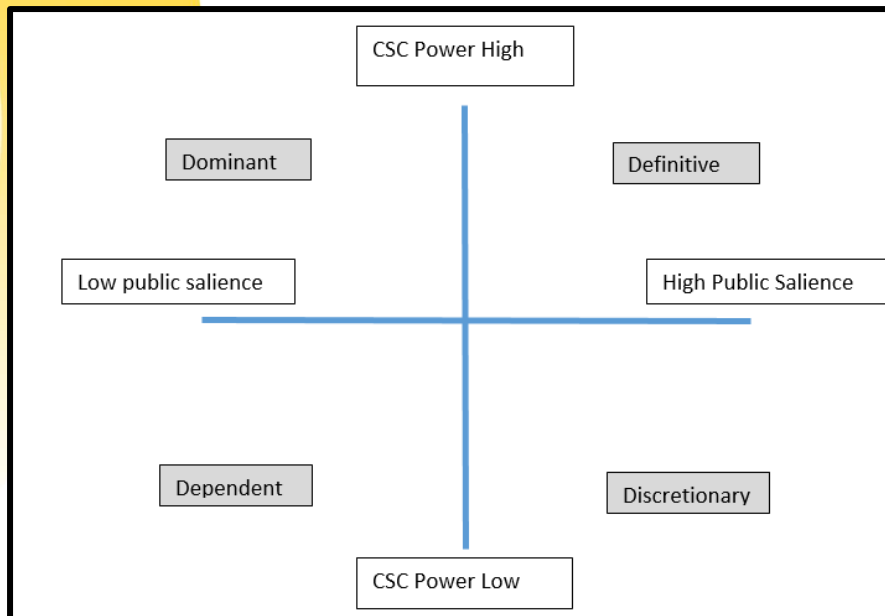


Figure 7-3 Typology of Civil Society Coalitions Engaged in Animal Welfare Standards

Source: Adapted from Maciel and Bock, 2014, p. 226.

As they explain in the Dutch case:

In a case of low urgency, NGOs with little power will be in a position of dependency. Ingenbleek and Immink (2010) use the example of minimum standards for pork sold in supermarkets to illustrate this position. Common standards for pork were established by the Dutch retail association without any significant involvement of the animal protection group. By contrast, the NGO holds a discretionary position for veal, because of the contested nature of veal and the resultant high urgency of the claim. Whereas in the first example, the NGO needed to rely on the willingness of businesses to implement animal welfare criteria above the legal requirements, in the second example they could use their legitimacy and credibility among consumers to negotiate for higher production standards for veal calves. In cases where NGOs have considerable power, and the claim is urgent, they can gain a dominant position. When a new brand of poultry (Volwaard) was being formulated (Volwaard, 2013), the Dutch NGO held a dominant position as poultry welfare was a high-profile public issue. Lastly, when negotiating standards for organic pork the Dutch NGO held a definitive position because organic production is of interest to many Dutch citizens (Maciel and Bock 2012, p. 226).

Maciel and Bock then focus on the discourse content of the power that CSCs may have to influence animal welfare policy. In their analysis of the Dutch industry, they note three discourses tied to (a) quality and safety of end production; (b) animals as sentient beings; and (c) organic production. They also observe that CSCs have the capacity to alter the 'rules of the game', in this case bypassing traditional state-based regulatory mechanisms and instituting private regulation to secure their objectives. Thus they observe:

The analysis of the four dimensions of policy arrangement leads us to conclude that the practice and institutional organization of the political arena for animal welfare in Europe has indeed changed. Private scheme standards for animal welfare are a clear example of modern policy arrangements. The establishment of new coalitions of actors, the mobilization of resources, the redefinition of rules

of the game and the enactment of new animal welfare discourses are all, to a varied extent, embodied in every private standard. Since these private policy instruments are gaining more importance as a complement to (or even replacement of) traditional 'command and control' state instruments (Veissier et al., 2008) we can also consider private standards as a manifestation of political modernization: entailing a shift from primarily state-initiated regulatory strategies towards new styles and practices of animal welfare governance (Van Tatenhove and Leroy, 2003) (Maciel and Bock 2012, p. 228).

In another study of the politics of animal welfare, Millman et al. (2010, p. 289) examine the evolution of animal cruelty legislation in Canada, noting how changes are often resisted by producers.

In Canada, efforts to strengthen this century-old [animal cruelty] law, by making cruelty a felony and by moving it out of the property section of the Criminal Code, have been debated since 1999, generating more letters of support than any other issue. A significant obstacle has been lobbying of government officials by commodity groups, because of concerns about "nuisance lawsuits" that contest standard husbandry practices rather than address overt animal abuse. Changes were eventually made to the animal welfare section of the Canadian Criminal Code in 2008, but these only amounted to increasing the penalties for breaking the Code; the wording describing offences was left intact.

Millman et al. (2010, p. 293) identify a struggle between producers and consumers over the implications of higher welfare standards. They state:

Responses by the agricultural industries to animal welfare concerns have often been ambivalent, with producers viewing animal welfare as an issue that could have negative impacts on their lives and livelihood. This concern probably has its foundation in a disparity between producers and the public in their attitudes towards animals. For example, Te Velde et al. (2002) conducted interviews of farmers and consumers in The Netherlands to assess their perceptions of farm animal welfare. They found that farmers believed that they treated their animals well, but that they largely viewed animal welfare as relating to animal health and provision of food, water, shelter, hygienic conditions and gentle handling. Consumers, on the other hand, felt that the welfare of farm animals was not good, not because of poor health but because the animals lacked freedom to move and carry out their normal behaviour. The increasing emphasis on animal welfare and environmental regulations made the farmers feel unappreciated and unwanted. They feared that working conditions would worsen if they were forced to farm in more traditional ways to assuage these public concerns. Similar attitudes are expressed in many articles about animal welfare in industry publications.

It is in this context of relative unresponsiveness of producer interests to consumer concerns that retailers appear to offer alternatives. According to Millman et al. (2010, p. 294):

National and multinational retailers are playing an increasingly critical role in the development and implementation of animal welfare standards. In the UK, Tesco supermarket helped to guarantee the success of the RSPCA Freedom Food programme by initially pricing Freedom Food products competitively despite their higher production costs. Producers are typically paid only about 55% of the retail price (Bell, 2002), so retailers have pricing flexibility to promote particular product lines.

Finally, it is worth highlighting a potential cross-cutting policy instrument that has been developed in the European context, called Welfare Quality®. Funded by the European Commission, the Welfare Quality® project aims to develop ‘standardized ways of assessing animal welfare and a standardized way of integrating this information to enable farms and slaughterhouses to be assigned to one of four categories (from poor to good animal welfare)’ (Welfare Quality® 2009). The Welfare Quality® protocols are innovative in a number of respects. Firstly, they are based on four principles – good feeding, good housing, good health and appropriate behaviour – that are holistically designed to capture the full range of animal welfare concerns. Secondly, the principles were developed in a detailed dialogue between animal welfare scientists and stakeholders, which is described in detail by Miele et al. (2011). Finally, Welfare Quality® uses a principles, criteria and indicators approach to assess animal welfare *outcomes* rather than production system inputs and resources. A diagram outlining Welfare Quality®’s basic approach is reproduced as Figure 7-4 to demonstrate the basic approach.

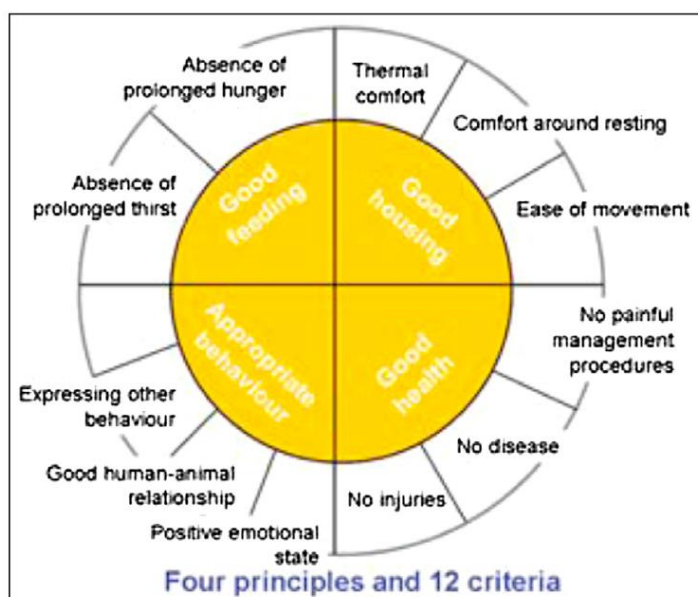


Figure 7-4 Welfare Quality® Principles and Criteria

Source: Welfare Quality®, 2007

To date, Welfare Quality® has produced three protocols covering pigs, poultry and cattle, all of which have been trialled. The Poultry Protocol (Welfare Quality® 2009), which covers both broiler chickens and laying hens, was produced in 2009 and there have been a number of studies of its application in diverse contexts. Miele and Lever (2013) report a degree of scepticism among free range broiler farmers regarding aspects of the protocol, especially regarding ‘positive emotional state’, while Heath et al. (2014) report difficulties with regard to data availability, score aggregation and assessor reliability in a study of UK dairy farms. They concluded that these and other challenges meant it could not easily be employed as a certification assessment tool although it did generate very useful information from which selections could be made.

7.3 Gradations of Animal Welfare

The recent animal welfare science literature identifies the existence of a spectrum of animal welfare options that range from unacceptable to highly acceptable, and that move the debate over animal welfare beyond an historical dichotomy between ‘good’ and ‘bad’ animal welfare.

FAWC, for example, has developed a three-level approach to animal welfare built around the idea of a 'life worth living' (Figure 2-1). The schema distinguishes the 'good life' (enhanced animal welfare) from 'a life worth living' (basic animal welfare) and 'a life not worth living' (poor animal welfare). Commencing at the highest welfare level, the good life, this would be a life for animals where the animal is not only physically kept in good health, with any injury or sickness quickly attended to, but also a life where the animal is free to express a range of preferences for food, bedding, movement and so forth in conjunction with the highest level of stockmanship.

To recognise and differentiate this highest form of animal welfare from the stages beneath it, FAWC recommends a robust certification and labelling system such as that put in place by the RSPCA's Freedom Food scheme. It further notes: 'It is hard to conceive how certain systems of husbandry could ever satisfy the requirements of a good life because of their inherent limitations. Examples include the barren battery cage for laying hens, and the long-term housing of beef cattle on slats, denied access to pasture' (FAWC 2009, 16).

At the basic level of acceptable animal care, it is expected that animals will lead 'a life worth living'. As defined this appears to justify a range of common industrial farming interventions including various forms of mutilation of animals 'for the greater good' when herded together in large groups. The essential requirements for the ethical treatment of animals for this level of care are Banner's three principles, especially where the harm done is outweighed by the good.⁵ That there are large number of qualitative decisions that need to be made in judging whether an animal is leading a life worth living is evident in FAWC's statement that 'Any pain, suffering, distress or lasting harm must be necessary, proportionate and minimal, and the system of husbandry and care should provide for the animals' needs and certain wants' (FAWC, 2009, 14). According to FAWC, this minimal level of animal welfare should be encoded in law and regulation, and enforced.

Finally, 'a life not worth living' is one where, at the physical level, the animal is in pain with no realistic capacity to recover, and is one that many farmers and veterinarians are already very familiar with. According to FAWC, the questions one needs to ask are:

Does the system or practice lead to negative mental states, frustrate normal behaviour, preclude positive experiences or cause physical debilitation? Does the system fail to meet the physiological and mental needs of the animal? Examples of a life not worth living are 'an animal suffering a severe debilitating disease that is untreatable, a severe physical state such as starvation or dehydration, and severe negative mental states, such as chronic, intense pain, fear or distress' (FAWC, 2009, 15-16).

In other literature, an effort has been made to employ the concept of Quality of Life (QoL), which has emerged from a focus on humans, to animals. While sympathetic to this approach, Green and Mellor (2011, p. 266) note: 'Hence, QoL in animals must be inferred from a number of outward signs. Empathy is needed in determining what animals may be experiencing, but caution is also required to avoid becoming inappropriately anthropomorphic'. Following a detailed review of QoL literature, Green and Mellor observe how it has recently focused on how QoL might intersect with FAWC's and others' focus on

⁵ According to FAWC (2009, p. ii), 'The most important ethical issue relating to farm animal welfare is the minimum acceptable treatment of farm animals. In addressing this, FAWC has accepted Banner's principles: "i) harms of a certain degree and kind ought under no circumstances to be inflicted on an animal; ii) any harm to an animal, even if not absolutely impermissible, nonetheless requires justification and must be outweighed by the good which is realistically sought in so treating it; and iii) any harm which is justified by the second principle ought, however, to be minimised as far as is reasonably possible".'

'a life not worth living', 'a life worth living' and 'a good life', and discuss whether indicators can be developed to distinguish among these notions. In a critique of the 'life not worth living concept', which appears to refer to such extremes that it may not be useful, they draw on Yeates' concept of 'a life worth avoiding' to identify a similar concept. They also consider the value of the concept of 'a life worth nothing' that, however badly stated, drives at the idea that an animal's experience of life is worth nothing because there are no positive experiences in it. These considerations lead Green and Mellor to build a five-level model as set out in Table 7-3.

Table 7-3 Quality of Life Scale

Category	General Description
A good life	The balance of salient positive and negative experiences is strongly positive. Achieved by full compliance with best practice advice well above the minimum requirements of codes of practice of welfare
A life worth living	The balance of salient positive and negative experiences is favourable but less so. Achieved by full compliance with the minimum requirements of codes of practice or welfare
Point of balance	The neutral point where salient positive and negative experiences are equally balanced
A life worth avoiding	The balance of salient positive and negative experiences is unfavourable, but can be remedied rapidly by veterinary treatment or a change in husbandry practices
A life not worth living	The balance of salient positive and negative experiences is strongly negative and cannot be remediated rapidly so that euthanasia is the only humane alternative

Source: Green and Mellor, 2011, p. 268.

In another study, Edgar et al. (2013) investigated the welfare of layer hens according to five levels of performance. These were identified depending on whether performance met basic regulation, adhered to a code, or exceeded the code somewhat (welfare +), a lot (welfare ++), and/or significantly (welfare +++). Edgar et al. developed a template of what these different levels of welfare might mean across the five criteria of 'comfort', 'pleasure', 'confidence', 'interest' and 'healthy life', and then employed a tiered checklist to assess 12 egg production operations ranging from organic to caged. They claim that the assessment framework discriminated significantly between egg production systems and was also useful in discriminating within systems. Their results are reproduced in Table 7-4.

In an effort to validate their approach, Edgar et al. (2013, p. 597) consulted 12 experts from five different research centres who made the following comments: 'To achieve a "good life" health and behavioural freedom should be delicately balanced'; 'Conception of a "good life" needs to be compatible with production objectives'; 'Minimising harms is paramount in promoting positive welfare'; 'Outcome-based welfare assessment should be incorporated into the framework'; 'The framework should provide scope for modification if future research dictates this'; 'Producers should be encouraged to provide input into tiers'.

Table 7-4 Number of Farms Attaining Compliance with Criteria for ‘Good Life’ Tiers

Opportunity	Resource need	Number of farms attaining ‘good life’ scores		
		Welfare +	Welfare ++	Welfare +++
Comfort	Comfortable physical environment	5	3	2
	Comfortable thermal environment	12	7	5
	Safe environment (opportunities to avoid physical hazards)	8	7	2
Pleasure	Enhanced learning opportunities	7	7	6
	Food enrichment	9	3	3
Confidence	Positive experience with stock keepers	12	9	4
	Facilitating egg laying	7	4	2
	Promoting positive social interactions	11	5	5
Interest	Enriching the environment	6	4	3
	Promoting ranging	6	1	1
Healthy life	Opportunities to dustbathe	6	5	5
	Management policy for positive health	10	9	8
	Breeding for positive welfare	7	3	0

Source: Edgar et al., 2013, p. 598.

NB: Farms must attain ‘good life’ scores for welfare + to be considered for welfare ++ and +++. N=12.

7.4 Interviewee Views on Animal Welfare Governance

Interviewee attitudes to existing arrangements for governing hen welfare differed significantly from each other and are summarised in Table 7-5. Several questions were posed in this broad area including a question on the strength and weaknesses of Australia’s current approach (codes, standards and guidelines), the role that science plays in current standards and guidelines approaches, and the role that science might play in governing animal and hen welfare arrangement. The data are organised to take account of the interviewees’ views with regard to the current public system (regulation, codes, standards and guidelines), the emerging private system (especially the supermarket standards and guidelines), the relevance of overseas research to informing Australia’s approach, and the role of science in informing Australia’s governance arrangements.

With regard to the current governance arrangements, a wide spectrum of opinion was expressed. Interviewee 1 argued that the current system is outdated, stating that: ‘This idea of codes and the model codes that we have, they’re completely irrelevant in a modern society’. In direct contrast, Interviewee 5 stated that the existing arrangements are largely science-based, that the people undertaking the negotiations were broadly representative with ‘different stakeholders from Animals Australia and the RSPCA right through to farmers’, and that ‘there was pretty good input from all those groups but by and large when there’s fact required or an understanding of the facts you know it’s based on the science component’.

Table 7-5 Interviewee Views on Animal and Hen Welfare Governance

	Int 1	Int 2	Int 3	Int 4	Int 5	Int 6	Int 7	Int 8
Public Regulation (Codes, Standards & Guidelines)	Out of date, obsolete, narrow focus	Commonwealth should be involved; Support upgrading codes to S&Gs; Disappointed industry backing minimalist, business-as-usual, approach	Code should be upgraded to binding standard; industry supports minimalist approach; retailers should develop guidelines	Codes may not be followed; legislated standards and guidelines better approach	National code required although flexibility for states required; system currently science-based	Regulation important for effectiveness; codes involve horse trading, not really based on science	Scientists contribute to code development, so science-based to that extent in the past; but increasingly driven by advocacy groups	National regulation important; science should inform codes, standards and guidelines, but scientists also have limited knowledge
Private Codes, Standards & Guidelines	Up to date, useful, science-based	Up to date, useful, science based	Retailers should develop guidelines to meet public demand	n/a	Private codes and market playing a bigger role; need to raise money drives some private codes	n/a	Supermarkets are driving change through marketing based on private standards	n/a
Relevance of Overseas Research	Highly relevant	Highly relevant	Highly relevant although climatic variation exists	Sometimes yes and sometimes no	n/a	Overseas research not directly applicable in Australia	Overseas research requires interpretation for Australian conditions	Depends on system and conditions
Role of Science	Science can contribute to animal-based measures	Science panel could undertake meta analysis; Shed and range cams could inform public	Science panel could undertake meta analysis	Selection of scientists on to panels is an issue	n/a	Science panel could do meta analysis	ABMs useful and grounded in science, but do not take account of individual animal welfare	Science panel could do meta analysis

It is also possible to identify a range of intermediate positions, such as Interviewee 2's position, which backed the current approach of moving from a model code to regulated standards and guidelines, but who expressed a great deal of concern over industry's approach and the Commonwealth's recent decision to pull out of coordinating the process. According to Interviewee 2:

Regardless of the industry that you deal with, they don't see it as an opportunity to promote best practice. So the practices, the technologies, techniques and tools are described in the guidelines and are not enforceable and the bare minimum is described in the standards. Very little has to change within the industry and if anything has to change it's usually because the change was happening or the vast majority of industry was already there.

And in stark contrast to Interviewee 5's views about the relative representativeness of the process, Interviewee 2 also noted:

The room is dominated by industry representatives and I suppose there is variation in the level of interest in the livestock industry in terms of wanting to improve practices. Whether they see the need, with some being more progressive than others, it appears to me that they don't like rocking the boat too much. In the cattle industry, one sector is very reluctant to be critical of another sector.

This diversity of views about the current public governance arrangements was recapitulated with regard to views about private governance arrangements. From the perspective of Interviewees 1, 2 and 7, supermarkets were driving change through the development of private standards, and two thought these guidelines were science-based. Thus, Interviewee 1 stated:

Actually, Coles sent theirs to me for review and I sent them comments on it. And the RSPCA have done the same with their guidelines, sent them to me for review and I gave them my comments. Now, there's always some negotiation with these processes and there's always a bit of compromise and always a bit of nobody being totally happy with them but everybody prepared to live with the outcome. But on the whole they have tried to canvass the opinion of the scientific community when devising these within the constraints that they have and you know it's pretty similar to how other people are doing it.

This endorsement of the private standards and guidelines process forms a nice contrast with the views of Interviewees 3 and 7, who viewed private standards and guidelines as not especially science-based and as appealing to popular demand, and being market and profit focused. Thus, Interviewee 5 stated:

The market now has such a big sway and then their goal is just to make profit so that's not necessarily going to improve the welfare of the animal. There's a good example in the dairy industry where certain supermarkets decided to only pay farmers a certain amount of money for milk and if farmers want to stay in the industry basically they have to go and get another job and cut staff on their farms. And the biggest risk there for animal welfare is the lack of stockpeople and the risk of that to the animals.

Interviewee 7, who viewed community attitudes as being quite influenced by the lobbying undertaken by animal rights groups and marketing, endorsed this view, stating:

Yes, the marketing frameworks of the supermarkets would use to promote or highlight particular issues. Now what they are doing is using what they see as changes in community attitudes to help them sell a product but I think that's quite influential and if I talk to students here about that, how much they're influenced by it, it's quite clear that they are.

With regard specifically to how to integrate science into governance arrangements, the interviews explored the relevance of non-Australian research to animal welfare issues in Australia, and whether there were alternative institutional arrangements for integrating more science into policy and governance processes. With regard to the first question, again a range of opinions was provided, with some stating emphatically the relevance of, especially, European research and others being far more circumspect. On balance, all interviewees expressed a view of overseas research as either highly or partially relevant, the caveat being that it depended on the aspect of the egg production system being investigated. As Interviewee 8 noted:

It depends on the conditions... free range systems are inherently subject to external conditions, one of the big one's being weather conditions so in that case because we know that the weather in Australia is quite different from the weather in the UK where most of the studies on free range welfare have been conducted, I think for that scenario that the justification that the findings from the UK may not be applicable to the Australian conditions is fair enough because there is a rational justification for that. You know, free range is subject to weather conditions and weather is really drastically different between Europe and Australia. Now if we talk about other types of system or situation, there might not be such a large difference between how other systems are managed.

In considering the role of science in informing governance arrangements, there was a large consensus that a science panel could play a useful role in conducting meta-analysis of existing literature, which could be used to inform negotiations on the standards and guidelines that might apply with regard to various production systems. Interviewee 6 stated:

What we did for the sheep and cattle standards writing groups was, at the first writing group meetings we sat down and talked about what are the major issues that have to cover off. And what we did then was write referenced discussion papers around those issues, which tried to come with what was the case based on science... I do think that's the way to go; to try and look at the literature reviews and see what they come up with in terms of recommendations and see if they apply.

Endorsing this perspective, Interviewee 3 noted a problem with the increasing close links between industry and science:

A very important issue is that we need researchers who are relatively unbiased and independent and not dictated to by industry. While the universities are putting so much emphasis on getting industry money, and people's careers are dependent on getting that money and publishing as a result of it, it is hard to achieve unbiased science... A lot of what is done is fixing problems for the next 2 or 3 years perhaps, or just delaying and putting off the decision for a few years. Where is the work that is going to really be far thinking enough to take the industry forward in the next 20 or 30 years?

In the interviews on the role that science could play, a couple of interviewees commented on the potential utility of animal-based measures (ABMs) for assessing on-farm welfare. Interviewee 1 commented:

There's another area as well, I don't know if that's what you're asking, but the auditing and assessing of welfare on farms. It's just massive in places like Europe and over here we're really at least 15 years behind. It's really rudimentary and we're really not getting the traction and not seeing the benefits that other countries are seeing from having really efficient welfare assurance schemes and auditing mechanisms... It's developing standards that are usually higher than basic standards, but looking to actually go out to farms and audit them to make sure they're meeting these standards... And there's been some fabulous research for the past 12-15 years on methods of how to go out onto farms and do that really well. Essentially Animal Based Measures, so we look at the animals and record how they are, not simply what size is the barn and how many animals are in it. And there's been huge amounts of work, really quite advanced, really created a lot of benefits. I think the industry's received it really well and it's just completely alien over here.

Interviewee 7 provided a somewhat more circumspect assessment of ABMs for assessing animal welfare.

To me, it's a compromise. It's about saying 'How do we monitor welfare?' that tells the community we're doing something and that can differentiate between managers who are doing it well and those who are not. What it doesn't do is, it doesn't address issues of welfare which to me are about individual animals. So you can get some kind of ranking if you like of farms and whether farms are doing things correctly or not by a series of measurements and those measurements are based on science. What concerns me about the Welfare Quality approach is that it doesn't take into account individuals. There's still going to be potentially birds that are suffering in a situation that is reasonably 'good' in terms of the Welfare Quality standard.

7.5 Summary

Australia's approach to animal welfare governance does not appear to be working well for producers, retailers, consumers and animal welfare groups, and there is widespread recognition that reform is required. However, because animal welfare is a 'wicked problem' that is highly politically salient, no consensus exists among stakeholders on the direction or content of reform. While both the IPC and EPC lobby governments to undertake reform, estimating the potential effect of that lobbying depends on the degree to which the state is considered to be autonomous from, or embedded in, society, the structure and operation of the relevant policy network, and the political character of the state at a particular moment in time. The decision of the Commonwealth Government to terminate funding to AAWS and its oversight body, AUSAWAC, appears to be widely regarded by all parties as unfortunate, resulting in a significant decline in Commonwealth capacity to exercise leadership on animal welfare issues. The only way forward, therefore, is for concerned actors to attempt to engage in 'political modernisation' and 'dynamic governance' by recognising the plurality of public and consumer preferences on the one hand, while seeking to have these preferences continuously informed by the best science available.

8 Governing Hen Welfare

8.1 Competing Perspectives

Two coalitions – an Intensive Producers Coalition and the Extensive Producers Coalition – adopt different ethical perspectives with regard to hen welfare. Members of the IPC view hen welfare through an ethics of ‘negative freedom’, consequentially trading off behavioural freedoms against the efficient production of a high volume of low cost eggs to the benefit of some producers and some consumers. Members of the EPC view hen welfare through an ethics of ‘positive freedom’, and this deontological commitment prevents them from endorsing production systems that restrict such behaviour.

These coalitions are in conflict over caged egg and free range production systems, and both seek to persuade governments and the public about the correctness of their ethical position. Both view science as a potential ally in this effort at persuasion – the IPC because it views the science as demonstrating that there are pros and cons in terms of the animal welfare benefits of caged and free range systems; and the EPC because it views the science as demonstrating that behavioural freedoms cannot be achieved in intensive production using restrictive technologies.

8.2 Pluralistic Consumer Animal Welfare Values

Consumer studies indicate that the coalitions both reflect and endorse different consumer animal welfare perspectives. A segmented market for eggs has emerged in the past two decades with a portion of consumers focused exclusively on quality, price and availability while another segment is very concerned about animal welfare issues. In between appear to be consumer segments—a public audience—that is aware of animal welfare issues, interested in finding out more about them, but that does not (yet) act on its concerns. The two competing coalitions are vying to persuade this middle group of the validity of their ethical perspectives.

To address consumer concerns, private certification and labelling schemes like RSPCA’s Approved Farming Scheme and Humane Society International’s Humane Choice scheme have emerged. Major retailers have also identified consumer concerns as a marketing opportunity and responded by establishing supplier guidelines.

8.3 Governance Arrangements

Australia’s governance arrangements are not fit for purpose in balancing producers’ and consumers’ interests, and mediating between the IPC and EPC coalitions. While moderate capacity existed under the AAWS and AUSAWAC arrangements, the decision not to continue funding both initiatives has created a vacuum at the national level and devolved responsibility back to states. The likelihood of a patchwork quilt of hen welfare laws emerging across the country is enhanced as each coalition lobbies to have its interests met in different political and bureaucratic contexts.

Current arrangements also make it very difficult for the full range of science – natural and social as well as physiological, behavioural and affective – to be marshalled to provide high quality information with regard to the animal welfare consequences of different production systems. In the absence of the capacity to establish a standing panel of representative, balanced and qualified scientists to inform policy, there is an incentive for each coalition to

cherry pick studies and data that support its perspective and cast doubt on the other perspective.

8.4 Way Forward on Hen Welfare

Consumers, retailers and producers all benefit from clearly established standards and guidelines on what constitutes hen welfare.

They also benefit when those standards and guidelines are based on comprehensive science.

The difficulty, however, is to ensure the standards and guidelines are in fact based on comprehensive science and do not reflect the views of specific scientific communities.

It is recommended that an independent body with no real or perceived allegiance to the IPC or the EPC be established to manage a governance process to develop graduated standards of welfare in the egg industry.

The independent body should establish a balanced, representative, deliberative forum of individuals from both the IPC and EPC to debate all aspects of a graduated standard.

A graduated standard (i.e. a standard consisting of several levels of welfare) is required to recognise the existence of segmented consumer markets and a demand for animal welfare friendly products.

The process should be advised by a panel of scientists with a legitimate claim to comprehensiveness, which is proposed and endorsed by members of the IPC and the EPC and that balances ethical perspectives, research methodologies and generations.

The science panel should undertake meta-analyses of hen welfare issues including those related to specific egg production systems to provide high-quality information regarding generic and system-specific hen welfare issues.

This 'dynamic governance', or 'political modernisation' approach to governance offers the best hope of establishing both a minimum hen welfare standard and a set of graduated standards for different egg production systems that best meets consumers' diverse preferences.

9 References

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10 Plain English Summary

Project Title:	Governing Hen Welfare: Beyond Standards and Guidelines?
AECL Project No	1UT111
Researchers Involved	Assoc. Prof Fred Gale
Organisations Involved	University of Tasmania
Phone	03 6324 3376
Fax	03 6324 3652
Email	Fred.Gale@utas.edu.au
Objectives	To investigate hen welfare governance and the role science can play in codes, standards and guidelines, and other approaches.
Background	Hen welfare has emerged as a key dimension of consumer concern, with public and private codes, standards and guidelines seeking to govern practices. However, the degree to which these codes, standards and guidelines are informed by science is disputed, and drawbacks with the overall approach suggest there may be merit in investigating alternative governance arrangements.
Research	The research utilised a combination of literature review and conceptual analysis supplemented by interviews with animal welfare experts to examine Australia's current approach to hen welfare governance and alternatives.
Outcomes	Hen welfare practices are deeply contested by producers, consumers and the wider public. Science can contribute in a limited way by providing high-quality information on specific, clearly stated animal welfare issues. Since ultimately consumer choices are based on ethical considerations, a combination of public and private governance to ensure 'truth in labelling' will prove the most effective, efficient and equitable outcome.
Implications	Participants in standard setting processes need a better understanding of the strengths and weaknesses of science to avoid politicising science in the pursuit of sector interests. The division of animal welfare considerations into a simple dichotomy of 'good' and 'bad' animal welfare is no longer helpful in the context of increasing value pluralism and the desire of segments of consumers to act on their values by purchasing products that match those values.
Key Words	eggs; hen welfare Australia; animal welfare; science; ethics; governance; codes; standards and guidelines
Publications	<p>F. Gale, 'Australian forest governance: a comparison of two certification schemes', <i>Australasian Journal of Environmental Management</i> 21, 4 (2014).</p> <p>F. Gale, 'Four models of interest mediation in global environmental governance', <i>Global Policy</i> 5, 1 (2014): 10-22.</p> <p>F. Gale and T. Cadman, 'Whose norms prevail?' <i>Society & Natural Resources</i> 27, 2 (2014): 170-184.</p> <p>F. Gale, <i>Certification and Labelling the Australian Egg Industry</i> (North Sydney: Australian Egg Corporation Limited 2013).</p>

11 Appendix

11.1 Interview Schedule

**Certification and Labelling Models for the Australian Egg Industry
Stage 2: Regulating Hen Welfare: Beyond Standards and Guideline?**

Key Informant Questionnaire

1. What is your background in animal/hen welfare issues?
2. What do you think are the key animal/hen welfare issues in Australia?
3. What do you think are the strengths and weaknesses of the current 'standards and guidelines' approach to animal/hen welfare?
4. What role do you think science is currently playing in Australia's approach to animal/hen welfare?
5. What contribution do you think science can make to resolving animal/hen welfare issues?
6. What do you think would be the best way to integrate science into animal/hen welfare issues?
7. What other comments, if any, would you like to make regarding animal/hen welfare, science and ethics?
8. Who else do you think I should interview with regard to these issues?