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ORIGINAL ARTICLE

Inter-sectoral action to support healthy and environmentally sustainable food behaviours: a study of sectoral knowledge, governance and implementation opportunities

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Abstract There is increasing attention to the importance of healthy and environmentally sustainable food supply and demand but little empirical research exists on how this might be achieved. This study examines the potential for inter-sectoral policy and action to support consumer adoption of healthy and sustainable food behaviours, focusing on three key themes: (1) sectoral understandings of healthy and sustainable food behaviours; (2) modes of governance for inter-sectoral action on healthy and sustainable behaviours; and (3) barriers and enablers to inter-sectoral action. We undertook 29 semi-structured interviews with representatives of key government, food industry and non-government organisations in food-related health and environment sectors in Australia. We found that while definitions of health and sustainability are still diverse and often siloed, the rationale of a combined concept was generally acknowledged. There was also consensus on the need for any action to be inter-sectoral, but diverse views on what such action should entail. The main barriers to inter-sectoral action identified included relationships between food system actors and a lack of organisational attention to the issue. Enablers included political and institutional leadership to drive action as well as sector-specific enablers such as market incentives. Overall a range of governance modes were identified that would potentially create a suite of actions across sectors, as well as opportunities to facilitate their implementation. Drawn together our findings outline a framework for action to move beyond the prevailing focus on individual-level change and develop inter-sectoral action and collaboration to support adoption of healthy and sustainable food behaviours.

Keywords Food policy · Health · Environmental sustainability · Qualitative research · Australia

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Introduction

The production and consumption of foods that are both healthy and environmentally sustainable are gaining increasing attention as critical issues for population and planetary health (See for example Burlingame and Dernini 2011; Buttriss and Riley 2013; Mertens et al. 2016; Millen et al. 2016; Hoek et al. 2017a, b; Meybeck and Gitz 2017). That the current food system is 'broken' with respect to health and environmental outcomes is now well documented (Lawrence et al. 2015), with research focus turning to the connections between the environmental impact of current food production and consumption patterns and human health in terms of food security and diet-related diseases (McMichael et al. 2007; Friel et al. 2009; Buttriss 2011).

A key area of research in this area is food behaviours[1] that are both healthy and sustainable (Lawrence et al.

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[1] As certain identified actions did not fit strictly into the concept of 'diet', we have chosen to utilise the broader term 'food behaviours' in our research.

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2015). While still the subject of scientific debate (Friel et al. 2014; Hawkins and Sabaté 2013; Van Dooren et al. 2014), central principles of healthy and sustainable food behaviours have been identified as: avoiding excessive food consumption beyond nutrition needs; reducing food waste; reducing consumption of highly processed foods that are energy dense-nutrient poor, and shifting dietary composition to one containing relatively more plant- and less animal-based foods (Mithril et al. 2012; Friel et al. 2014; Reisch et al. 2013).

Supporting consumer adoption of such behaviours represents a significant policy challenge. Making healthy and sustainable food behaviours the 'easy choice' for consumers requires action across the whole system of healthy and sustainable food supply and demand (James and Friel 2015; Meybeck and Gitz 2017). This 'whole of system' approach incorporates not only the sectors and actors within the food supply chain—from production through manufacturing, distribution, retail, and consumption—but also other non-food specific sectors such as environmental management, urban planning and social welfare that influence food supply and demand (Garnett et al. 2015; James and Friel 2015; Lawrence et al. 2015). Accordingly, the 'whole of system' approach to support healthy and sustainable food behaviours has implications for government policy as well as action by the food industry and non-government organisations (Barosh et al. 2014).

Despite calls for the adoption of healthy AND sustainable food behaviours for over 30 years (Lang 2016; Jones et al. 2016b), however, there is a lack of such inter-sectoral policy and action to support their adoption (James et al., submitted for publication). Policy action on sustainability and health have largely been siloed and concentrated on either end of the food system—production (sustainability) and consumption (health) (Bailey and Harper 2015). This means that key sectors of the food system, such as manufacturing and retail, as well as other sectors such as urban planning have yet to be effectively mobilised and, moreover, co-ordinated through inter-sectoral policy and action to support healthy and sustainable food behaviours. The emerging analysis of what such inter-sectoral policy and action might look like and how it might be achieved is still largely conceptual or descriptive of the types of actions that exist or are needed (Garnett et al. 2015; Wellesley et al. 2015).

The objective of this study is to empirically examine the potential for inter-sectoral policy and action to support consumer adoption of healthy and sustainable food behaviours. As this is an emerging area of research, such empirical research represent a critical, yet currently absent, basis to guide the development and implementation of any policy or action to support healthy and sustainable food behaviours. To this end, we present data from interviews with a range of key food system actors—government, industry and non-government organisations—on the challenges and opportunities for inter-sectoral action to address healthy and sustainable food behaviours. In structuring our research findings, we draw on three factors identified as key to the success of inter-sectoral action in previous health-related research: a shared understanding or definition of the issue being addressed and what needs to be done to address it (MacRae 2011); the roles the various actors will play in implementing action (Wegener et al. 2012); and how barriers for participation are overcome (DEFRA 2013). These are reflected in the three key themes of the paper: (1) sectoral understandings of healthy and sustainable food behaviours; (2) modes of governance for inter-sectoral action on healthy and sustainable behaviours; and (3) barriers and enablers to inter-sectoral action. In bringing together the findings from our research, we conclude by presenting a framework for action for the development of inter-sectoral action to support healthy and sustainable food behaviours.

Methods

A qualitative research design was used. Semi-structured interviews were conducted between November 2014 and March 2015, with 29 interviewees from all areas of the food system including: the food industry; federal and state level government departments, and public interest non-government organisations identified as key actors in the fields of food, health and environmental sustainability in Australia (Table 1). The industry sector included representatives of primary producers, manufacturers and retailers; and the government sector included national and sub-national government departments as well as government research organisations. The non-government organisations included those that addressed food and health and/or food and sustainability at state and national level. Interviewees were recruited using a purposive snowball sampling strategy (Gile and Handcock 2010). Of the 42 organisations invited to participate 13 declined, resulting in a response rate of almost 70 percent. Those who declined to be interviewed included large food corporations such as Nestle and Unilever; large environmental NGOs such as World Wildlife Federation, Greenpeace and the Australian Conservation Foundation; and farming organisations: the Australian National Farmers Federation, Horticulture Australia Limited and the NSW Farmers Association. Interviews were recorded and professionally transcribed verbatim, except for 2 interviews where data files were corrupted in transferring from the digital recorder. In these instances, interview notes were used as a record of responses.

Table 1 Overview of study participants by sector

Sectors	Number
Government [G]	10
[Federal Department of Environment; Federal Department of Health; Commonwealth Scientific and Industrial Research Organisation (CSIRO) IRO; Australian Capital Territory (ACT) Health Directorate; Australian Capital Territory (ACT) Environment and Planning Directorate; Federal Department of Education; Victorian Department of Health; National Health and Medical Research Council (NHMRC); Department of Agriculture; NSW Department of Health]	
Industry [I]	10
[Dairy Australia, Sanitarium, Australian Food and Grocery Council; Beverages Australia; Coles; Woolworths; Meat and Livestock Australia; the Australian Farmers Market Association; Master Grocers Association Australia and the Australian Food Hubs Network]	
Non-government public interest organisations [NGOs]	9
[The Heart Foundation; Dieticians Association of Australia; Public Health Association of Australia; Oz Harvest; Choice; ACT Red Cross; ACT Council of Social Services; The Climate and Health Alliance, Anglicare]	

Interview protocol

The interview guide for the semi-structured interviews was designed to examine the level of knowledge and interest in healthy and sustainable behaviours among the different sectoral actors, as well as capacity for the development and implementation of actions to support healthy and sustainable food behaviours. Here, we present the responses relating to the three key themes of this paper: (1) sectoral understandings of healthy and sustainable food behaviours; (2) modes of governance for inter-sectoral action on healthy and sustainable behaviours; and (3) barriers and enablers to inter-sectoral action. Interviewees were also given the opportunity to raise issues not specified in the interview guide.

Data analysis

Interview transcripts and notes were coded by the first author using the coding software programme NVIVO (Armstrong et al. 1997). An initial coding schema was developed based on the interview guide. Emergent issues not previously theorised within the interview guide were captured using 'open' coding, whereby additional codes were created to reflect new themes identified in the interviews. This reflects the coding protocol outlined by Basit (2003). The final interpretation of results was clarified through discussion among authors and cross checked with several key informants. Interviewees are presented in the results using a code that indicates the type of sector (e.g. G1, NGO1, I1 and so on) and the results were synthesised and presented under themes (outlined in the following section). This research was approved by the ANU human ethics committee (protocol no: 2014/049).

Results

The results are presented according to the three thematic areas identified as key to the development of inter-sectoral action: (1) sectoral understandings of healthy and sustainable food behaviours; (2) modes of governance to facilitate inter-sectoral action on healthy and sustainable behaviours; and (3) barriers and enablers to inter-sectoral action. Under each theme, the data are further arranged into several sub-themes that emerged during the data analysis.

Sectoral understandings of healthy and sustainable food behaviours

Disparate definitions

Given the importance of a shared understanding for successful inter-sectoral action, we first sought to establish how the concept of healthy and sustainable food behaviours was understood across the various sectors and actors. In providing their organisational perspective, many interviewees across the various sectors indicated they understood or appreciated the rationale of a combined concept. When asked to provide an organisational definition of this concept, however, the majority of interviewees described the two concepts of health and sustainability separately, as illustrated by the following example:

> 'In terms of healthy it would be food that contributes to good health [and] helps to prevent poor health, particularly chronic health conditions. And then environmentally sustainable being food that minimizes transport and minimizes damage to land in its production practices [NGO1]'.

In their definitions, interviewees also predominantly emphasised health over sustainability, aside from those organisations that were specifically focussed on sustainability. The terms 'healthy and sustainable' and 'healthy' food behaviours were also often used interchangeably in their definitions. These factors suggest a greater familiarity and focus on health among the majority of respondents.

There were, however, a small number of interviewees—primarily NGO but also industry—who indicated their organisations utilised more integrated definitions of healthy and sustainable food behaviours:

> 'Well, it's quite complex, but I think to put it in a nutshell, it's about what individuals do in their own home, it's about what companies do in food production, it's about what farmers do in terms of food production and land management, it's the type of food choices that people make, it's managing waste and it's choosing the types of food in your diet that are both good for you and good for the environment (NGO2)'.

When outlining their organisational definitions of healthy and sustainable food behaviours, interviewees included a range of different issues: ethical food (I3 and 10); trade (NGO2); food security (G5, NGO9, G4); affordability (NGO7, G4); accessibility (NGO 6); food safety (G9); culturally acceptable foods (I5); and consumption of food with low chemicals (I10). The most marked differences in definitions related to the concept of 'sustainable' food behaviours. This was compared to definitions of 'healthy' food behaviours, which were relatively similar. In addition to including issues as varied as 'active travel' (NGO 6); and 'local food' (I9), many industry interviewees also incorporated 'economic' themes in their definitions of sustainability (I1;3;5;9). This was illustrated by the following quote:

> 'We recognize the food and grocery sector plays a critical role of sustaining Australia and Australians, we help create the wealth of the country but we also help create and sustain the health of the country in many different areas, so we are aware that they are interconnected (I3)'.

The emphasis on economic factors as well as environmental and health factors is reflective of the 'triple bottom line' definition of 'sustainable development' (Elkington 1994; Mebratu 1998). This emphasis differs from the focus on environmental sustainability in the research questions and the definitions given by the majority of interviewees.

There was also at least one industry group that indicated they actively avoided the term 'sustainable' within their organisation due to connotations perceived as undesirable by other members of the organisation:

> 'We tend to, in terms of food stuff, talk about 'responsibly sourced' as opposed to 'sustainable'…We find that [other sections of the organisation] get all panicky - you know [imagining] tree-hugging and rampaging organic supporters - which is actually not what we are trying to do (I5)'.

It is important to note, however, that while the term 'sustainability' was considered problematic by certain sectors of the organisation, due to apparent associations with radical environmental activism, actors in the organisation were still seeking to improve the environmental impact of their food supply chain. To avoid negative perceptions, these actions had instead been re-titled with a less threatening term: 'responsible sourcing'.

Importance in the organisation

To examine the level of support for action on healthy and sustainable food behaviours, we also asked whether the combined concept was considered important by the respective organisations. The conceptual separation of health and sustainability by interviewees was further evident in the responses to this question. The majority of interviewees—particularly those from government and industry, and a lesser extent NGOs—indicated that in their work they focussed on either the health or environmental sustainability aspects of food. This was often to the exclusion of the other concept. Furthermore, if both health and sustainability were addressed in the same organisation, they tended to be allocated to different teams or in the case of government interviewees, different departments.

Some interviewees across the various sectors stated their organisation did not view a combined concept of healthy and sustainable as either important or in their remit. There were also a few industry and government representatives that went further, arguing that the concepts of health and sustainability are 'different issues which need to be tackled in different ways (I3)'. This perspective led to the conclusion for at least one industry representative that 'trying to wrap it up into "healthy and environmentally sustainable" could, at this particular moment in society, be a bridge too far (I4)'.

In contrast, there were also various interviewees from each of the sectors who indicated the combined concept was considered important by their organisations, even if their department/organisation focussed only on one area—health or sustainability—operationally. Some of these interviewees—particularly those from the government but also the NGO sector—further indicated that their organisation was moving towards greater integration of these concepts in their actual operations.

Modes of governance for inter-sectoral action on healthy and sustainable behaviours

To explore the way in which inter-sectoral action to support healthy and sustainable food behaviours might be achieved, interviewees were then asked about the roles and responsibilities of the various actors in realising such action.

Most interviewees, across the three sectors, considered supporting a shift towards more healthy and sustainable food behaviours a shared responsibility. As one food industry interviewee asserted: 'everything's so multi-linked, everything's so multi-factorial, and it has implications along the chain. So we have to engage all the different [sectors]... (I1)'. Determining the mode(s) of governance through which inter-sectoral action would occur, and in particular who would drive it was seen as critical to success. By governance, we mean the different actors and the roles they play in governing the food system, and the regulatory strategies that manage their interactions. The complex nature of the food system means that there are many actors and many issues that need to be addressed in the pursuit of healthy and sustainable supply and demand. The operation of the food system is not determined simply by command and control measures by the government but also by non-state actors operating through networks and hybrid alliances with government and other actors (Drahos et al. 2005).

There were, however, very different views among the various actors as to what modes of governance should be deployed. Some interviewees, particularly those in the NGO sector but also some in government, considered that the government should lead through greater statutory regulation. From this perspective, the government was the actor best positioned to direct action on issues of public interest and 'take a broader view than economics' (NGO2). They were also seen to hold the 'main levers for change' (NGO1) in terms of creating the regulatory settings in which the other actors operated, and should be 'a bit braver' in utilising these levers (G5). Another set of actors argued for a co-regulation approach, in which two or more actors would share a leadership role. In this mode of governance, governments would 'intervene when there's a market failure' (I3) and be the 'referee' between other actors when conflicts arose (NGO6).

A challenge for government-led action identified by government and industry representatives was the 'complex' (G2) and 'fragmented' (G5) nature of food system regulation which meant there was not 'an owner for this area, someone whose responsibility it is (G10)' to drive change. This suggests greater inter-governmental coordination is needed in developing policy to support healthy and sustainable food supply and demand, particularly from the key departments of health and agriculture which currently 'come at it from different perspectives (G2)'.

> 'Food is administered at government level in I don't know how many different departments…Even the regulatory system in Australia is so pathetically disjointed and as a result not administered in a way that supports healthy eating. It certainly supports safe eating, but no one is taking a big picture view of the food system at government level…I'm not one for you know big government, but it's just wrong at the moment, and it's not effective and anyone can see that (I2)'.

Other interviewees, particularly from government and industry, argued that governments driving change through statutory regulation was unlikely to be successful. As one industry interviewee asserted: 'government could legislate but fundamentally it'll become an overly-bureaucratic nightmare that probably won't deliver the result (I5)'. Those respondents critical of greater government intervention argued instead for a market-led process driven by industry (through self-regulation) or by individual consumer choices driving demand. A common view among pro-market respondents was that 'industry's probably got the biggest role to play…ideally through voluntary codes' (I5). This approach would result in reduced government intervention: 'what needs to change now is the government needs to step back and let the market place take those things… to put it in the hands of the consumers or the organization' (G9).

Many NGO groups expressed concern, however, about the effectiveness of action driven by industry: 'What we see is that when, for example, industry go off and create their own initiative such as their 'daily intake guide', we see a system that is beneficial to industry but not necessarily to consumers. So that initiative is inherently flawed (NGO5)'. That industry had a conflict of interest in supporting consumer adoption of healthier and more sustainable food behaviours was a view also expressed by at least one government respondent: 'there's a question about whose got what interest here and so there are some very, very powerful large lobbying groups who want to be able to make profit from selling things and the people who want us all to be healthy and to behave sustainably are not from large profit making concerns (G1)'. Due to this perceived conflict of interest, the NGO respondents argued that rather than lead action, industry was more effective acting in response to leadership from government and civil society: 'Industry has a huge role to play, but industry will only pull the levers if there's enough pressure, if there's pressure from the government or there's pressure from the consumers or both' (NGO7).

Another view of the market-led approach was that 'consumer is king' and consumer demand should drive food system change as 'people will produce what people want to consume' (G9). Conversely, interviewees from the NGO sector argued a focus on individual consumer choice divested responsibility from government and industry (NGO7, 9, 2):

> 'At the moment the balance of responsibility seems to be on consumers with a regulatory framework that does not actually fully protect the interests of consumers. And certainly we have an industry for whom you know… the market operates in a way that actually undermines consumer's interest around both levels of consumption [and] types of food and drinks consumed (NGO2)'.

There were also those who argued that consumers should lead but through bottom-up activism, in conjunction with NGOS, to force action from government and industry. As one industry interviewee asserted: 'Most things change because a group of consumers or a group of non-government organisations get together and berate the government until they give in' (I2).

The disparate views on who should lead any action to support healthy and sustainable food behaviours, and what type of model—statutory regulation, market-led or bottom-up activism—should drive such action, need to be addressed to facilitate the inter-sectoral approach all actors advocated for.

Barriers and enablers to inter-sectoral action

Interviewees were then asked to identify key barriers to and enablers for inter-sectoral action to support healthy and sustainable food behaviours. Responses fell into various themes, namely relationships between actors; incentives for action; and the role of evidence. These are detailed below.

Relationships between actors

The greatest barrier to inter-sectoral action on healthy and sustainable food behaviours, as identified by the majority of respondents, was the relationships between food system actors. While there was common agreement that these relationships were dysfunctional and a hindrance to united action, the cause and solution to this differed significantly between sectors.

According to the majority of NGO actors, the key barrier to the development of inter-sectoral action was unequal power dynamics between NGO and industry groups. Powerful industry groups were seen to have greater access and political attention in any process to develop policy and action. As such, NGO respondents asserted, it is 'how strong your lobby group that determines what the policy will be (NGO6)'.

A number of industry interviewees also identified unproductive relationships as a key barrier to inter-sectoral action. Their framing of this issue was slightly different to that of the NGO and government actors, however, emphasising 'a significant amount of mistrust (I4)' between different groups. Primarily this mistrust was seen to be between 'industry, civil society and consumers back and forth', but also 'there are some occasions where government might have been burnt with what industry was trying to achieve, and certainly vice versa' (I4, also I3).

While actors from across the various sectors emphasised the need to improve relationship dynamics, the way in which this should be addressed differed between the sectors in line with their perception of the problem. NGO representatives argued that 'more power and trust needs to be given to consumer and health groups to address the unbalanced nature of the debate (NGO5)'. In contrast, industry representatives argued for the 'mistrust to be put behind us so we are able to come at this from a clean slate (I4)'.

Interviewees from all three sectors indicated that an inclusive and sustained dialogue was critical to improving relations and fostering inter-sectoral collaboration on action to support healthy and sustainable food behaviours. As one industry interviewee asserted: 'If you had a magic wand? It is to do with face to face consultation between the players within the sector (I8)'. This call for early and sustained engagement was often raised as an enabler with reference to the inter-sectoral committees that contributed to the development of the 'Health Star Rating' for Australian foods in 2012–2014 (Department of Health and Aging 2015). This example was given with the caveat, however, that there had been many challenges with the process. In particular, NGO respondents emphasised actions by some industry representatives that were perceived to purposely undermine and ultimately limit the effectiveness of the outcomes.

The design of the process by which actors engaged to determine and implement action to support healthy and sustainable food behaviours was, therefore, seen as critical to its success, particularly by industry and government representatives. The importance of agreed-upon targets and timelines in this process was emphasised: 'Unless everyone's bought in and everyone's working towards a goal with achievable time-specific measures, it wouldn't be a priority (I6)'. Consensus on a definition of healthy and sustainable food behaviours, as the basis for establishing common objectives that all actors agreed to work towards, was seen as an integral part of this process.

Making it 'core business'

A second key barrier identified was that healthy and sustainable food behaviours were not currently perceived as 'core business' for many organisations (I7). One of the main reasons given for this was a lack of political or institutional interest in, or prioritising of, healthy and sustainable supply and demand food issues. As one NGO representative argued 'the current [Federal] government doesn't have any interest as far as I can see in environmental anything, and that is definitely a barrier (NGO2)'. The perspective of other government, NGO and industry representatives' was that there were so many issues competing for attention; it was difficult for healthy and sustainable food supply and demand issues to get 'airspace' at the organisational level (G5).

There was a range of perspectives among interviewees on how to create incentives for action and make it 'core business'. Echoing responses in "Modes of governance for inter-sectoral action on healthy and sustainable behaviours", consumer demand was raised by a number of interviewees across government, industry and NGO sectors as a driver for action 'upstream' by government and industry. In the view of at least one government interviewee, there was a lack of consumer demand in this area stemming from a prevailing view that 'we're a rich country. (That) it doesn't matter in terms of food security because we have got enough money to buy from whomever we want (G9)'. In this market-led view of change, increasing consumer awareness of the potential threats to Australia's future food supply through education and information was seen as a key means to improve consumer demand for healthy and sustainable food behaviours.

In contrast, NGO interviewees argued that increasing consumer demand for healthy and sustainable food behaviours required the introduction of measures that address the affordability and accessibility of healthy and sustainable food behaviours, such as increased consumption of fresh fruits and vegetables, particularly for lower socioeconomic groups. Suggested policy and action such as ensuring a living wage through increasing welfare payments and base wages, and monitoring competitiveness among food retailers were seen as relevant and important steps towards increasing the affordability and accessibility of healthy and sustainable food behaviours (NGO7 and 9).

Creating economic incentives for action was also seen as an important lever for sectors such as industry. The most significant enabler, in the view of at least one industry representative, was:

> 'putting a dollar value on what you want changed. I feel that there's an opportunity for change in the way an organization's ASX (Australian Stock Exchange) rating

is determined, because currently there's no real mechanism for valuing a company's environmental or sustainability credentials in terms of their share price (I5)'.

The interviewee argued that creating a market mechanism through which to put an economic value on healthy and sustainable supply and demand was important as industry responded to different pressures than government. As a business, they asserted, industry action was perhaps most determined by the shareholders.

Increasing organisational attention to healthy and sustainable food behaviours, interviewees argued, required individual champions as well as organisational leadership. Leadership in the industry sector in particular was seen as important to ensure that any changes were 'done industry wide, so it's not just us [a single company] trying to do something on our own (I1)'. The value of key industry or government actors making change was seen as particularly important, with their actions having the most influence to inspire others in their sector to act.

The role of evidence

A perceived lack of sufficiently robust evidence on what constitutes healthy and sustainable food behaviours was also identified as a barrier to inter-sectoral action. As one industry representative argued: 'We are just not far enough along the line in understanding and having rigor around what is a sustainable food system or diet or healthy eating, it is multifunctional and we need some more evidence in obtaining it (I1)'. In particular, some interviewees emphasised a current lack of research on the potential unintended consequences of behaviour change (I1, 3, 5 and 7; G1 and 3; NGO3):

> 'What is proposed in terms of both a healthier and sustainable diet are system wide changes. When system wide changes happen they have all sort of effects that you might not have forseen (G3)'.

The solution to this barrier, these interviewees asserted, was more research and evidence on healthy and sustainable food behaviours as well as the potential impacts of behavioural change, to provide a basis for the development of inter-sectoral action.

The responses from NGO representatives challenged this analysis, however. These interviewees argued that the barrier to action was not a lack of evidence per se but a lack of political will to engage with existing evidence that did not fit with the prevailing political agenda. As one interviewee stated: 'evidence is wonderful if you have an environment where it can make a difference. I mean we know the [current] federal government is pretty much an evidence-free zone (NGO8)'. Another went further,

suggesting that evidence alone was not enough to generate change: 'well you know there is a bit of saying in social advocacy, "good evidence never changed anything" (NGO7)'. A shift to greater engagement with available evidence in the process of policy making was, therefore, an opportunity to facilitate action from the perspective of these interviewees.

Discussion

We now discuss the implications of our findings for inter-sectoral action for healthy and sustainable food behaviours, and outline a framework for developing and implementing such action.

Theme 1: sectoral understandings of healthy and sustainable food behaviours

The definitions of healthy and sustainable food behaviour varied considerably across the interviewees. This reflects broader public and academic debate on the nature and validity of combining the two concepts (Auestad and Fulgoni 2015). The stronger coherence on the health aspects and diversity of sustainability definitions in interviewee responses also reflects the more established nature of the 'healthy food' debate and the more emergent nature of debate around sustainable diets (Trevena et al. 2014). However, many interviewees were responsive to the combined concept and some were already utilising it within their organisation. This suggests a basis on which further dialogue and action can develop.

In terms of creating a common definition of 'sustainable food behaviours', perhaps the clearest way forward is the inclusion of such a definition in official dietary guidelines based on scientific evidence (Nylen 2013; Lang 2016). This has already been undertaken by countries such as Qatar (Seed 2014). Creating an official definition is also likely to help redress negative associations, indicated by some industry actors, of the term 'sustainable' with radical politics. There is a question here as to whether industry should be part of the creation of such a definition with other papers on intersectional action on healthy food behaviours concluding that industry should be kept out of such discussions (and indeed setting of the policy agenda) and only be involved in the implementation of actions (He et al. 2014; Jones et al. 2016a).

Theme 2: modes of governance for inter-sectoral action on healthy and sustainable behaviours

In addition to receptivity to the combined concept of healthy and sustainable food behaviours, there was a clear

call from the various sectors for any action to support consumer adoption of healthy and sustainable behaviours to be inter-sectoral. This is consistent with findings from research on the development of healthy food policy, in which Australian government representatives also called for greater inter-sectoral action (Shill et al. 2012; Crammond et al. 2013; Trevena et al. 2014). Policy actors identified different modes of governance, reflecting different levels of government intervention that could be further explored in developing inter-sectoral action to support healthy and sustainable food behaviours.

Such different modes of governance are not necessarily contradictory nor mutually exclusive, however, with a suite of policies found to be the most effective approach to changing food behaviours (Hawkes et al. 2013; Garnett et al. 2015). A guide to how different modes of governance might be implemented in a complementary manner is a 'responsive regulation' approach (Gunningham and Sinclair 1998). This approach allows for an escalation of regulatory intervention when 'softer' approaches fail to achieve the desired goal of supporting food behaviour change (Jones et al. 2016a). The principles of responsive regulation recognise that regulation is not just about government intervention and enforcement; it is about 'influencing the flow of events' using different structures and strategies and that this involves multiple mechanisms and actors (Braithwaite et al. 2007). To better illustrate what a responsive regulation approach might mean for action to support healthy and sustainable food behaviours, we have adapted the regulatory pyramid from Ayres and Braithwaite (1992), showing what an escalating array of regulatory strategies might involve based on responses from interviewees (See Fig. 1).
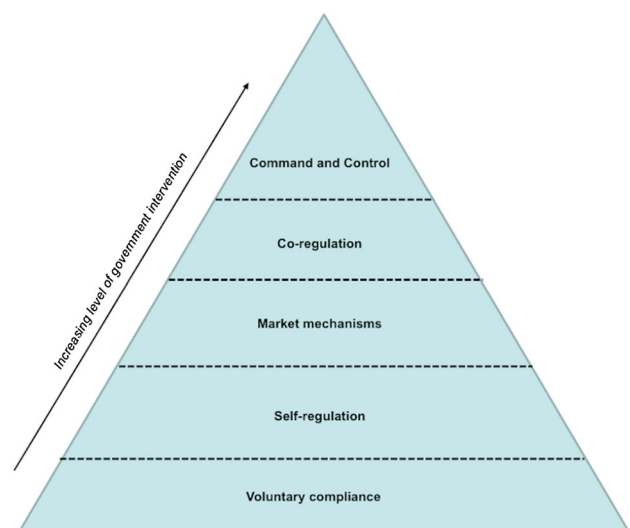
Fig. 1 Governance and regulatory framework for action to encourage H&S food behaviours

At the bottom of the regulatory pyramid, with the least governmental intervention, is voluntary compliance. In the case of healthy and sustainable food behaviours, the ideal scenario is that people voluntarily choose to consume healthy and sustainable foods. Strategies such as information campaigns to educate consumers seek to achieve this goal by encouraging individual behaviour change. This was a preferred policy approach by many government as well as industry interviewees, echoing previous research findings in relation to health food policy (He et al. 2014). In practice, however, information and education measures have been found to be largely ineffective in driving behaviour change on their own (Garnett et al. 2015).

The next level of the pyramid is self-regulation by industry, such as adherence to voluntary codes of practice. This approach was strongly supported by many government and industry actors, as it is in existing healthy-food policy (Carter et al. 2013). The capacity for industry to 'lead' action on healthy and sustainable food supply and demand through self-regulation, however, is brought into question by the concerns of a conflict of interest expressed by our interviewees, as well as existing evidence of ineffective industry self-regulation (Sharma et al. 2010; Galbraith-Emami and Lobstein 2013).

Moving to the next stage of the pyramid—market mechanisms—involves incentive-based structures (Drahos et al. 2005; Garcia Martinez et al. 2007). Respondents, particularly those from the food industry, emphasised the need to value environmental sustainability and health impacts in terms that can be interpreted by the market to incentivise action by businesses. This approach is supported by previous research on health-related inter-sectoral action (Jones et al. 2016a).

Other actors, particularly industry and government but also some NGOs, supported an additional level of government intervention in the form of co-regulation. In this mode of governance was expected that government would be supporting and steering rather than commanding and controlling.

At the top of the regulatory pyramid are what are known as 'command and control' measures, representing the greatest level of government intervention. Other NGO and at least one government actor argued that governments had to drive change as they had 'the main levers for change' (NGO1) in the form of statutory measures such as mandatory labelling. This form of governance tends to affect the 'middle system' actors of the food industry more directly, which means they are often unpopular with both government and industry (He et al. 2014), as indicated by our research findings.

Theme 3: barriers and enablers for inter-sectoral action

Our research identified a number of barriers to inter-sectoral action to support healthy and sustainable food behaviours, but also opportunities to address them. These are identified below:

Barrier 1: dysfunctional relationships between food system actors

A significant barrier identified was relationships between actors, which were seen as marred by unequal power dynamics and mistrust. Concerns raised by interviewees around unequal power dynamics were supported by previous research on health-related food policy which emphasised the extensive influence of the food industry in the policy process (Jenkin et al. 2012; Richards et al. 2012; Shill et al. 2012).

Enabler 1: creating collaborative, inclusive, and sustained processes

To redress this perceived imbalance in power, interviewees particularly from the NGO sector followed Seed et al. (2013) in arguing that governments would need to give more support and access to non-government groups to balance the influence of industry groups in the policy-development process. Overall, creating more collaborative, inclusive and sustained processes for the development and implementation of policy and action was seen as a key step, by actors from all sectors, to addressing the barriers of unequal power dynamics and mistrust among actors.

The need for accountability measures in such processes, including clear, agreed-upon targets and timelines for action, was highlighted by at least some actors as critical to its success. Analysis of past inter-sectoral collaboration in Australia to support healthy food behaviours supported this argument, and provided additional criteria for success: strong government leadership; adequate funding; management of conflict of interest; comprehensive monitoring and evaluation; and a plan for responsive regulation, if initial action did not achieve desired outcomes (Jones et al. 2016a).

Barrier 2: a lack of attention to healthy and sustainable food behaviours

Another key barrier identified to the development of inter-sectoral action was the lack of organisational attention to healthy and sustainable food behaviours, as many actors did not see it as 'core business'. This could be explained by

the theory that dominant groups in any system are unlikely to challenge the existing paradigm without considerable incentive, as it supports their position of power (Weible et al. 2009). Our findings can be understood via this theoretical perspective, with many interviewees in the sectors with the most direct power over policy and action—government and industry—challenging the need for action to achieve a more healthy and sustainable supply and demand. Creating incentives for participation for these powerful food system actors is, therefore, critical to the success of any proposed inter-sectoral action (Jones et al. 2016a).

Enabler 2: creating incentives for action

There were a number of enablers identified in our research that could be implemented to encourage garner greater support for action on healthy and sustainable food behaviours. These included: individual champions and organisational leadership; early and sustained inter-sectoral engagement; and agreements on common objectives with concrete deliverables. Sector-specific incentives were also identified, echoing findings by Hawkes (2009) in relation to health food policy. For industry, as an example, economic incentives were central to driving action in their sector. Our research suggests that other incentives, such as consumer demand for change, may also serve to drive action by both government and industry. How such incentives might be created and implemented need to be further explored. Another such lever for change, albeit an indirect one, was evident in our finding that most interviewees responded to the question of healthy and sustainable food behaviours from a predominantly health framing. This suggests that action on healthy eating would serve to move forward the healthy and sustainable agenda, even if this was not the explicit focus [similar to findings on consumers responses to healthy and sustainable food behaviours (Hoek et al. 2017b)].

Barrier 3: unintended consequences of action

There were also concerns regarding potential unintended consequences of action that may result in negative affects on health and sustainability, with calls for further evidence to be provided prior to the development of any action.

Potential enabler: developing effective monitoring and evaluation processes

Research participants did not discuss a means to address the barrier above as such. Some respondents did, however, challenge the notion that a lack of definitive evidence should delay action. Rather than an excuse for inaction, such concerns can instead drive monitoring and evaluation

of outcomes as well as a flexible and responsive approach to address unforeseen consequences (Bailey and Harper 2015). As has been noted in relation to public health initiatives such as the anti-tobacco movement (Brownell and Warner 2009), arguments to suspend action on the basis of a lack of concrete data can be a tactic to obfuscate action that threatens existing powerful actors. Countering this logic, Garnett et al. (2015) have argued that one reason for a lack of evidence on the consequences of action to support healthy and sustainable food supply and demand is inaction in this area. Action would, therefore, provide further evidence on which to develop and hone policy and action in this area.

Framework for action

To illustrate how inter-sectoral policy to support consumer adoption of healthy and sustainable food behaviours may be developed and implemented, we have translated the findings of our research into an action framework (Fig. 2). At the centre of this framework are the various modes of governance and regulatory strategies identified through this research through which inter-sectoral action could occur. The first step (Step 1) of our framework is, however, creating a dialogue between actors from across the different sectors—government, food industry and NGO. Getting policy-actors interested in adopting such governance structures to support healthy and sustainable food behaviours, however, has also been identified as a substantial barrier to inter-sectoral action. Our research findings emphasise that currently the majority of food system actors are not prioritising action to support healthy and sustainable food behaviours, as it was not considered 'core business'. Step 2 is, therefore, the use of incentives outlined by interviewees to encourage participation in inter-sectoral action including market-based incentives and consumer demand.

Once actors were willing to engage, the process of collaboration was viewed as critical to the success of inter-sectoral action. Interviewees across the different sectors emphasised the importance of inclusive processes to generate consensus on goals and pathways to achieving them (Step 3). A potential caveat to this is extent to which industry should be involved in determining a common definition of healthy and sustainable food behaviours (and indeed in agenda setting) due to perceived conflict of interests (He et al. 2014). Concerns about a lack of action or disruption of the process, by industry in particular, indicate the need for accountability and evaluative measures (Jones et al. 2016a). This means clear targets, timelines and concrete deliverables must be agreed upon, Step 4 in the framework, and modes of governance and regulatory strategies determined (Step 5). Then, once actions have

Fig. 2 Framework for action
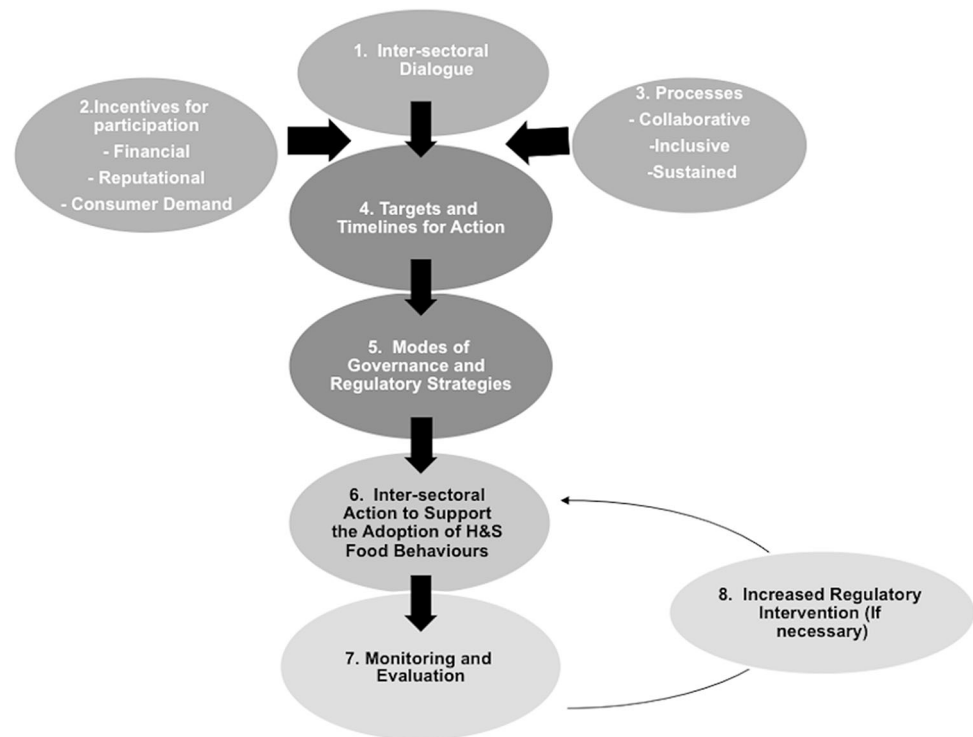
been implemented (Step 6), monitoring and evaluation must occur to determine whether targets are being met (Step 7), and a plan for an escalation of regulatory intervention—such as responsive regulation—implemented if targets are not being achieved (Step 8).

This approach, our research suggests, creates enabling conditions for the development and implementation of various modes of regulation and governance and the facilitation of inter-sectoral action.

Strengths and weaknesses of the study

To our knowledge, this is the first published qualitative analysis of the views of food system actors on the potential for inter-sectoral action to support healthy and sustainable food supply and demand. In integrating health and sustainability, this paper builds on previous research in the health field looking at policy and governance to support behaviour change. In selecting our interviewees we engaged actors from across the food system. This represents a significant change from previous food-related health policy research, which primarily engaged government actors. Our interviewees reflect a strong cross section of the actors in the food system from the largest players—the major supermarkets and industry bodies—to smaller groups, as well as from the mainstream to 'alternative' sectors. The main weakness in terms of a cross-section of participants was the lack of engagement from major international NGOs, particularly environmental groups, as

well as farmer organisations that declined to participate. Although we ensured that interviewees would remain anonymous in reporting, we cannot rule out that in some instances interviewees gave desirable or politically correct answers. In addition, the study focussed on Australia and care should be taken to directly translate the findings to other countries. The greatest challenge overall for this research is that the concept of healthy and sustainable food behaviours is still emergent, making the discussions of challenges and opportunities largely abstract. Further research on actual policies and actions as they are implemented will provide additional insight and recommendations for how inter-sectoral action to support healthy and sustainable food behaviours may be improved.

Conclusion

The findings presented in this paper indicate a significant disconnect between the international calls for a shift to healthy and sustainable food behaviours and the relatively benign responses by many Australian food system actors. This disconnect derives from a lack of institutional attention to healthy and sustainable food behaviours and insufficient demand for greater action from consumers. Moving forward, our action framework could help guide the development and implementation of different modes of governance and policy, informed by context and reflective of the different policy actor drivers.

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