Australia's National
Science Agency

# Perspectives on risk to local markets and industries

## Final Project Report

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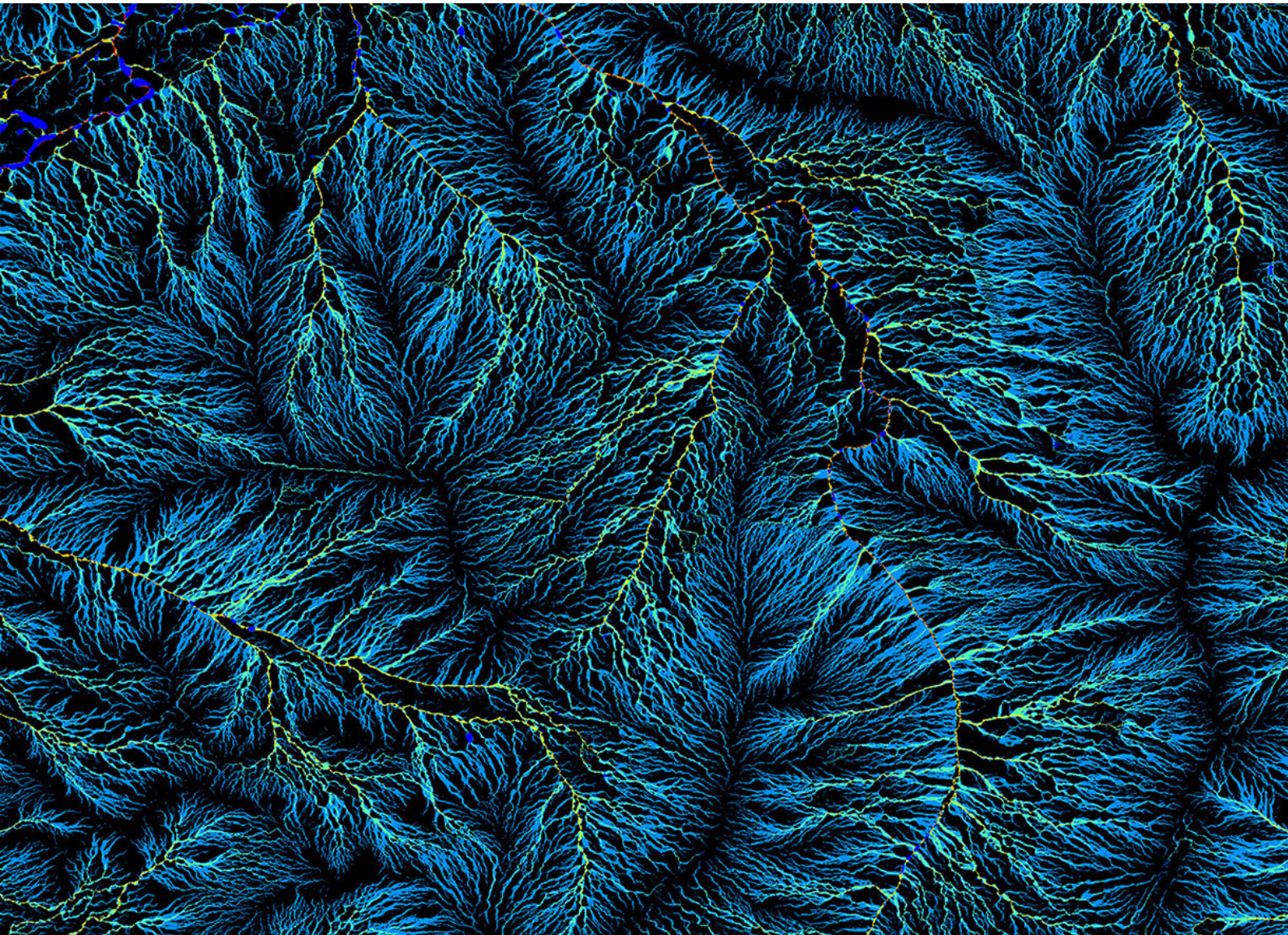
Report to the Gas Industry Social and Environmental Research Alliance



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We thank the members from the local advisory group who provided valuable input and guidance to the design of this study.

# Executive summary

This project explored potential market impacts and associated concerns relating to the value of place of origin labelling and regional branding in Australia, including concerns arising from conventional gas development in the southeast of South Australia. In a previous study focused on this region, local primary industries stakeholders emphasised the importance of the 'clean and green' reputation of the region and its produce. Results from this new consumer-focused research will assist community understanding and inform public communications and policy development.

The project initially engaged with primary industry and environmental stakeholders and then surveyed Australian consumers to understand their perceptions and preferences, decision making when purchasing food and beverages, knowledge of Australian regional brands and products, as well as exploring the impacts of any concerns about resource development on brand perception.

Key messages include:

1. Environmental or ethical issues, or concerns about energy or resource developments do not rank as highly as price or food quality in concerns or purchasing decisions of consumers despite consumers generally seeing themselves as ethical and environmentally conscious.
2. Perceptions about products or attributes of a region can be strongly affected by geographical awareness or proximity to the region.
3. Whilst consumers may share some concerns regarding environmental or gas/mining activities, it is not evident from this study that most consumers associate products with regions, or regions with energy or resource development.
4. Some established regional brands can have high value and there is evidence that this can be maintained whilst resource development is undertaken in that region. Survey results highlighted the high value of regional brands such as Hunter Valley, resulting in high desirability of products from this region notwithstanding the association of the region with the mining industry and some association with water quality concerns.
5. As mentioned, food and beverage quality rated highly in terms of grocery and food purchasing decisions, and in consumer concerns about their food. Previous research has identified the role of external influencers, such as governments, third-party institutions or the mass media, in affecting consumer trust in food or food production systems.
6. Concerns regarding risks to regional brands can be conceptualised as factors impacting consumer trust, as follows:
    - Threats to water quality may undermine trust in regional production systems to produce safe and high-quality local products
    - Loss of trust in local products undermines trust in government and industry quality assurance processes
    - Loss of trust in quality assurance processes undermines the value of country or region of origin as a tool for representing product quality

# 1 Introduction

## 1.1 Project Background

As found in a previous GISERA study (Gas Impacts and Opportunities on Primary Industries), there is concern among some stakeholders within the primary industries that southeast South Australia's agricultural exports and the value associated with “clean and green” primary production branding in important markets could be at risk by the development of the natural gas industry. The value of Australia's agriculture and livestock is inherently tied to the perception of Australia as a country of well-managed land and water, and fresh produce. The southeast of South Australia, and its Limestone Coast regional branding in particular, places ‘clean and green’ attributes central to its regional identity, stating the ‘epitome of clean, green environment’ as a current strength. Moreover, ‘maintaining the clean green image of the region’s produce’ is identified as a priority for maintaining comparative advantage and business competitiveness over other regions (Regional Development Australia Limestone Coast, 2016).

These concerns of natural gas industry development and potential impacts to markets arise from the value placed on a local southeast of South Australia ‘brand’. A brand can be described as any feature that identifies one seller’s goods or services from another’s. Brand is used extensively in business to add and store value for buyers and sellers. Agriculture in the southeast of South Australia region has placed great value in its local brand and there is a perception of risk to this brand from gas development. This project examines the value of the southeast of South Australia ‘brand’ from a consumer perspective and the potential risks to this value.

GISERA research over the past decade has included measurement and analysis of a range of possible risk pathways in efforts to identify any possible risks from effects on the environment (e.g. soil erosion or compaction). However, GISERA has not examined risks associated with markets, brands and associated consumer perceptions. This project seeks to address these issues. It also provides the opportunity to explore the relationship between perceptions that influence consumer purchasing decisions and the direct exposure a consumer has with the region and its resource industry developments. Intensity of visual exposure to mining activity has been associated with the expressed level of concern for residents in neighbouring towns in other regions (Moran and Brereton, 2013).

Finally, stakeholders raised concerns in the previous study that efforts to help protect the regional image could do damage to that which they seek to protect by bringing wider public attention to issues of unknown importance. Therefore, this project has been designed to minimize any risk to brands arising from the research itself. A broad survey of potential consumers within the Australian domestic market has been undertaken to draw lessons from respondents for a range of products from various regions, including some regions undergoing resource development.

# 2 Survey Methodology

## 2.1 Scoping Study

The project has been designed to pursue one of the key issues raised by primary industry stakeholders from the previous project (Gas Impacts and Opportunities on Primary Industries). A consultation phase with representative stakeholders in the local agriculture, food and wine sectors was undertaken within this project to further define the concerns and perceived risks to branded produce and the 'clean and green' image of the region.

Stakeholder engagement was undertaken during the years 2020 and 2021, and so were affected by travel restrictions and government health directives during the Covid-19 pandemic. Therefore, all engagement was conducted remotely, either by telephone or online video conferencing. An initial stakeholder meeting was conducted in December 2020 to identify potential focus topics for the main survey and other key stakeholders whose input would be beneficial for survey development. This initial meeting was also important in considering methods to minimise risks to brands arising from the research itself by inadvertently linking brands with potentially negative messages. This risk was raised by regional stakeholders in the preceding GISREA research project (Gas Impacts and Opportunities on Primary Industries). A series of semi-structured interviews were then undertaken with individuals representing different agricultural industries or government groups as identified in the initial meeting. A second online meeting was held with the initial stakeholder group to provide joint input into the survey questionnaire to refine and shape survey topics and items. Involvement across this entire process incorporated input from local and state governments, regional community and agribusiness, and the tourism, grape and wine, food, and livestock industries.

Stakeholder feedback was used to inform the design, of the consumer survey as follows:

1. To focus more generally on the value of Australian regional brands (including the Limestone Coast) rather than solely on individual brands or commodities within the study region.
2. To include Australian regions and their brands that
    a. Are similar to the study region but more mature within their market
    b. Are different to the study region for comparison
    c. Are in regions with existing energy or mineral resource developments
3. To evaluate the value of perceived environmental image of regions seeking the same "clean and green" image as the study region.
4. That the local brand of interest would be the relatively new regional brand of "Limestone Coast" (LCLGA, 2022)
5. That the consumer survey would investigate domestic customers only

Stakeholder participants in the scoping study were also asked to comment on wording within survey questions to ensure that the wording of image-related terms was in line with local branding.

## 2.2 Consumer Survey Design

The research methods within the consumer survey were designed to quantify the value placed by consumers on localized/regional branding and associated attributes. The research approach was aimed at eliciting consumer perceptions of regions and related food/drink purchasing desire relative to other potentially competing agrifood regions of Australia. Given the diversity of food and beverage produce from the Limestone Coast region, this approach supported a more appropriate general regional brand evaluation rather than specification of individual product types that would have been required for a willingness-to-pay study.

The online survey was administered by the market research company Pureprofile to Australian adults between 30 September and 4 November 2021 and took approximately 30 minutes to complete on average (median completion time was 17 minutes). Sample quotas were set for gender, age and location (metropolitan vs. regional/rural, and state/territory distribution) to obtain a sample that closely matches the characteristics (gender/age distribution) of the general Australian population. Additional responses were obtained from particular market areas of interest including Adelaide (the closest capital city), the Limestone Coast (to enable comparison of local resident perceptions of the region), regional Victoria (neighbouring the Limestone Coast region) and Perth (a comparable capital city to Adelaide and enabling potential analysis of comparable within-state perceptions of the Margaret River region). The market research company used a panel of Australian citizens and made the survey available to a random subset of panellists who fit the demographic criteria. Once certain sample quotas were filled from the random sampling, quota sampling was applied to fill the remaining quotas, which involved targeting panellists with key characteristics.

A pick-any approach (Driesener and Romaniuk, 2006) was used to collect information about the association of each region with various agricultural products, industries and regional qualities. This approach was first developed in the branding literature (Bogomolova and Romaniuk, 2010; Nenycz-Thiel and Romaniuk, 2009), but it has been applied to other research fields, such as tourism (Bowe et al., 2013), pricing (Sjostrom et al., 2013), sensory analysis (Jaeger et al., 2013), and wine (Corsi et al., 2011). The method consists of showing respondents a list of items for each dimension of research interest (i.e., agricultural products, industries, and regional qualities). For each dimension, for example, respondents are asked to indicate which, if any, brand/region they would associate with each item. Respondents select as many items as they want and can link the same attribute to multiple regions. The pick-any approach allows the survey to obtain similar information to other forced-choice approaches, but it is quicker to understand and complete (Bogomolova and Romaniuk, 2010). Such data is analysed in this project in two main ways.

Ethics approval for the study was provided by the University of Adelaide Human Research Ethics Committee (approval number H-2018-173).

## 2.3 Analysis Methods

**Numerical Analysis**

Throughout the survey, respondents were asked to associate attributes with regions. From these data, the number of times each region is associated with each attribute is calculated. The strength of association of each attribute with each region is evaluated using the deviation of a given count of associations for a given region and attribute from a weighted average of the number of associations accounting for the total number of times an attribute is associated to any region and the total number of times the chosen region is associated with any attribute (Corsi et al., 2011).

$$\%Dev_{ij} = \left[Count_{ij} - \frac{\sum_{n=1}^{N_{attributes}} Count_{nj} \times \sum_{m=1}^{N_{regions}} Count_{im}}{\sum_{n=1}^{N_{attributes}} \sum_{m=1}^{N_{regions}} Count_{nm}}\right] \Big/ N_{respondents} \times 100 \qquad (1)$$

*Where:*

| | |
|---|---|
| $\%Dev_{ij}$ | *= percentage deviation in association by respondents for the i-th attribute and the j-th region and the weighted average* |
| $Count_{ij}$ | *= number of times the i-th element has been associated to the j-th region by respondents* |
| $N_{attributes}$ | *= number of attributes within the survey question* |
| $N_{region}$ | *= number of regions within the survey question* |
| $N_{respondents}$ | *= number of respondents to the survey* |

For the purposes of this study, all the deviations greater than 5% (i.e. > 5% or < -5%) from the weighted average are considered important and therefore characterise unique perceptions of a specific region in relation to a specific element. Deviations >5% will be referred to as above average associations, deviations <-5% as below average associations, and deviations with an absolute value less than 5% as near average associations.

**Graphical Analysis**

Correspondence analysis (CA) is also used to analyse the data. This multivariate statistical technique is conceptually similar to principal component analysis (PCA), but instead of using continuous variables, it is applicable to categorical data. As in PCA, the output of CA is a set of coordinates onto i dimensions of a CA plot for each of the items included in the analysis (in our case regions and descriptors). For ease of interpretation, the plot is often reduced to two dimensions. However, whereas in PCA where each axis can be defined by the factor scores each original variable is loaded into, the axes in CA have no other meaning than a bi-dimensional representation of the associations between the items displayed in the plot (Beh, 2004; Greenacre, 2007).

# 3 Survey Results

This section begins by summarising the survey respondents and their demographics, before exploring consumer beliefs and preferences around food production and consumption. It then examines associations between different growing regions using the pick-any approach and correspondence analysis.

## 3.1 Review of the Survey Respondents

A total of 1511 respondents completed the survey (Table 1). This includes a sample of 1036 respondents who are nationally representative of Australian adults with respect to gender, age and location (metropolitan vs. regional/rural, state/territory distribution) according to the Australian Bureau of Statistics, 2016.

A further 475 respondents are from oversampled locations: regional Victoria, Adelaide, Perth and Limestone Coast.

Of the total sample (n=1511), 32 respondents live in the Limestone Coast. Oversampling of this region was undertaken to provide local insights about the region and branding.

**Table 1 Breakdown of survey respondents.**

| | N |
|---|---|
| **Total sample** | 1511 |
| **Nationally representative sample** | 1036 |
| **Respondents from oversampled areas** | 475 |
| **Total respondents from Limestone Coast** | 32 |

## 3.2 Respondent Demographics

Overall, 40% respondents in the nationally representative sample are university-educated (a higher share than the general adult population: 31%), 76% were born in Australia, 19% represent one-person households, and 33% have children under the age of 18 years living in the household (Table 2). The average age of respondents was 46.8 years and 64% were employed.

The majority of respondents stated that they either do most of the food (grocery) shopping for their household (73%) or are jointly responsible (24%) and so the sample within this study should represent decisions made by domestic customers when making purchasing decisions.

Table 2 Demographic characteristics of respondents.

| | NATIONAL SAMPLE (N=1036) | | TOTAL SAMPLE (N=1511) | |
|---|---|---|---|---|
| | n | % | n | % |
| **Female** | 532 | 51% | 914 | 60% |
| **Male** | 504 | 49% | 597 | 40% |
| **Age (years)** | | | | |
| **Mean (Standard Deviation)** | 46.8 (16.7) | | 47.2 (16.4) | |
| **18-24** | 109 | 11% | 128 | 8% |
| **25-34** | 191 | 18% | 289 | 19% |
| **35-44** | 201 | 19% | 304 | 20% |
| **45-54** | 186 | 18% | 269 | 18% |
| **55-64** | 164 | 16% | 242 | 16% |
| **65+** | 185 | 18% | 279 | 18% |
| **Education** | | | | |
| **University degree** | 414 | 40% | 555 | 37% |
| **Household income (pre-tax)** | | | | |
| **≤$35,000)** | 174 | 17% | 297 | 20% |
| **$35,001 - $65,000** | 236 | 23% | 354 | 23% |
| **$65,001 - $105,000** | 228 | 22% | 334 | 22% |
| **$105,001 - $165,000** | 249 | 24% | 340 | 23% |
| **>$165,000** | 149 | 14% | 186 | 12% |
| **Employed** | 667 | 64% | 934 | 62% |
| **Metropolitan area** | 679 | 66% | 963 | 64% |
| **Australian State of Residence** | | | | |
| **NSW** | 343 | 33% | 343 | 23% |
| **VIC** | 267 | 26% | 402 | 27% |
| **QLD** | 205 | 20% | 205 | 14% |
| **SA** | 86 | 8% | 295 | 20% |
| **WA** | 89 | 9% | 220 | 15% |
| **ACT** | 15 | 1% | 15 | 1% |
| **TAS** | 26 | 3% | 26 | 2% |
| **NT** | 5 | 0.5% | 5 | 0.3% |
| **Born in Australia** | 789 | 76% | 1156 | 77% |
| **Household composition** | | | | |
| **One-person household** | 198 | 19% | 285 | 19% |
| **Live with a partner** | 632 | 61% | 938 | 62% |
| **Children < 18y in the household** | 340 | 33% | 500 | 33% |

## 3.3 Information about the Consumers

### 3.3.1 Personal beliefs and preferences related to local food production

Consumers were asked about their preferences and personal beliefs regarding aspects of food production and environmental values. Using a response scale from strongly disagree (-3) to strongly agree (+3), results showed a large range in personal preferences across the nationally representative sample. Respondents indicated they were generally in agreement with nearly all the statements raised in Figure 1, though there was no strong agreement with any statements on average. Respondents held most favourable preferences for local or Australian produce, while choosing products based on production being carbon neutral was less preferred . Respondents were moderately satisfied with the food quality and safety of food produced in Australia and held modest beliefs on average about their concern for the environment.

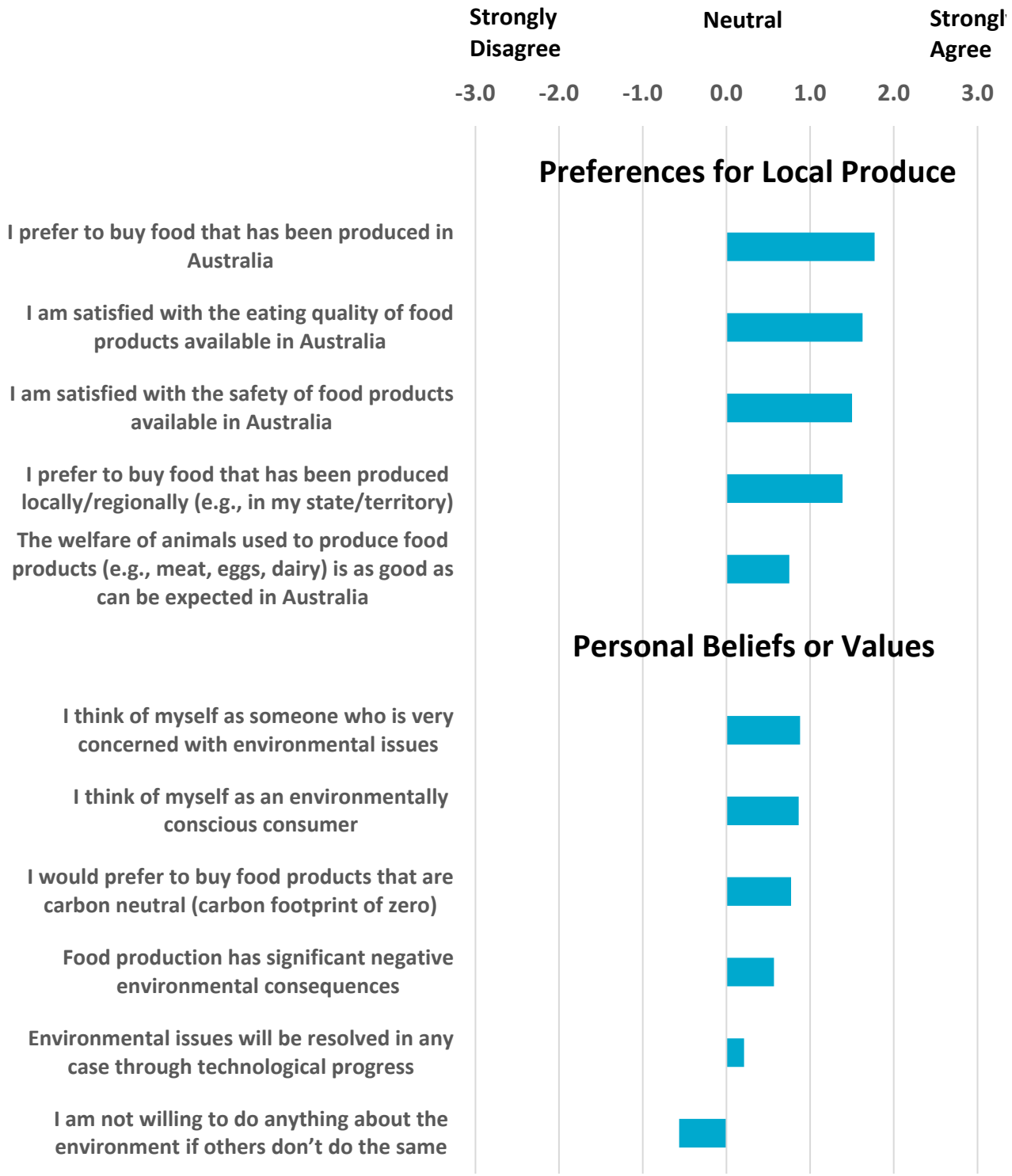



Figure 1 Mean agreement with statements related to different aspects of food production for a representative national sample of respondents (n=1036).

### 3.3.2 Concerns about food production

More than half of the respondents indicated some level of concern with each of the issues shown in Figure 2. The top six issues were all related to food safety, particularly any form of contamination within the food. Ethical concerns (e.g. place of production, welfare, GMOs) were generally ranked after these. Concerns about other industries operating within food producing regions generally ranked with lower levels of concern (e.g. mining 13$^{th}$, gas 14$^{th}$, renewable energy 16$^{th}$). However, very few consumers said they were unconcerned about any of the issues. The issue of renewable energy industries received the least level of concern though 52% of respondents still indicated they were concerned to some extent on this issue.

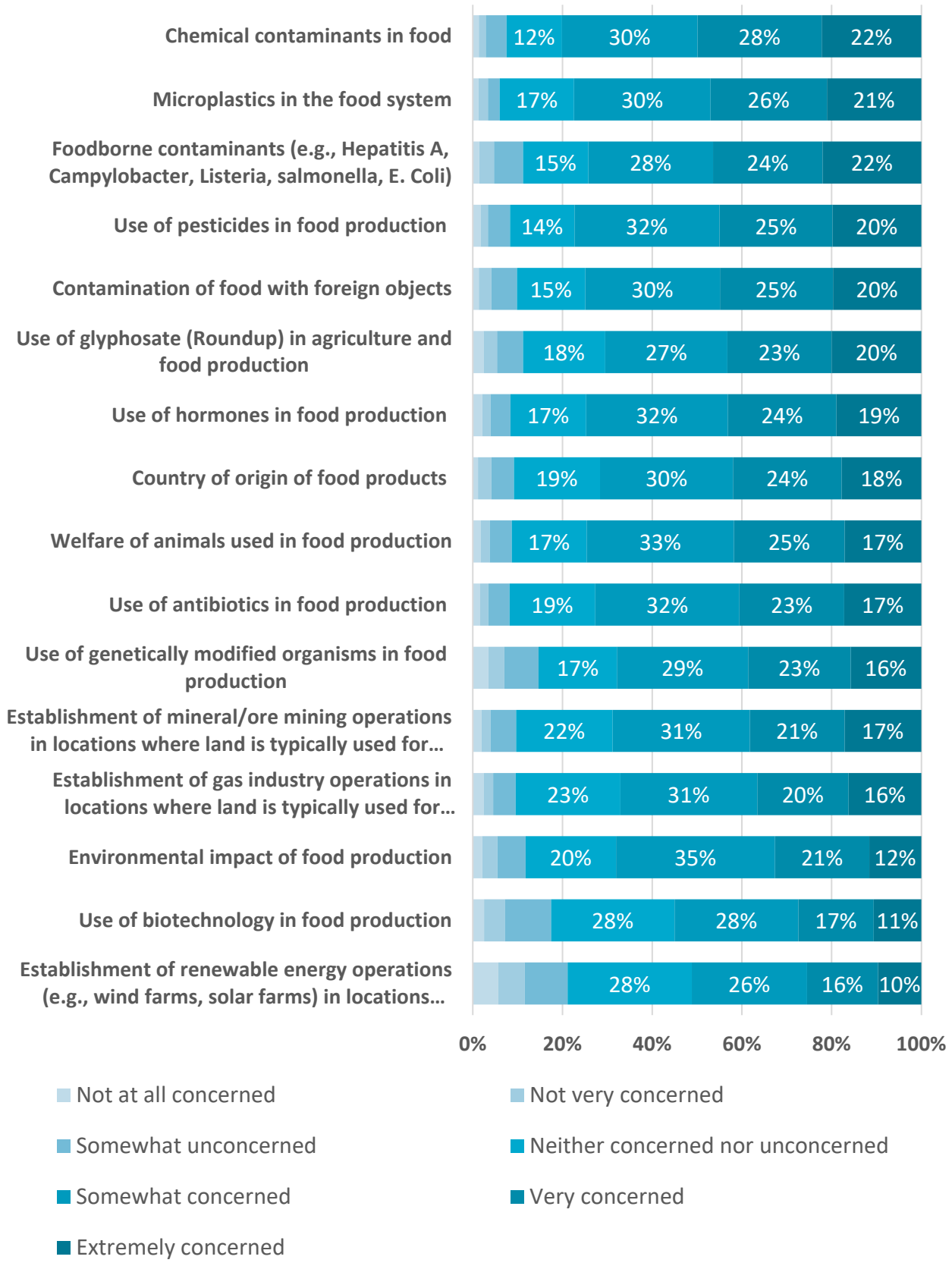



**Figure 2 Level of concern with statements related to different aspects of food production among the nationally representative sample of respondents (n=1036).**

### 3.3.3 Important factors when shopping for food

Consumers were asked to identify their top three most important factors when grocery shopping for food (Figure 3). Price was ranked as the most important factor, followed by three factors involving product quality (taste, health and nutrition, and food safety) and then country of origin. Issues involving how food is produced (e.g. production method, impact on animals, environmental impact) were chosen approximately half as often as price or food quality.

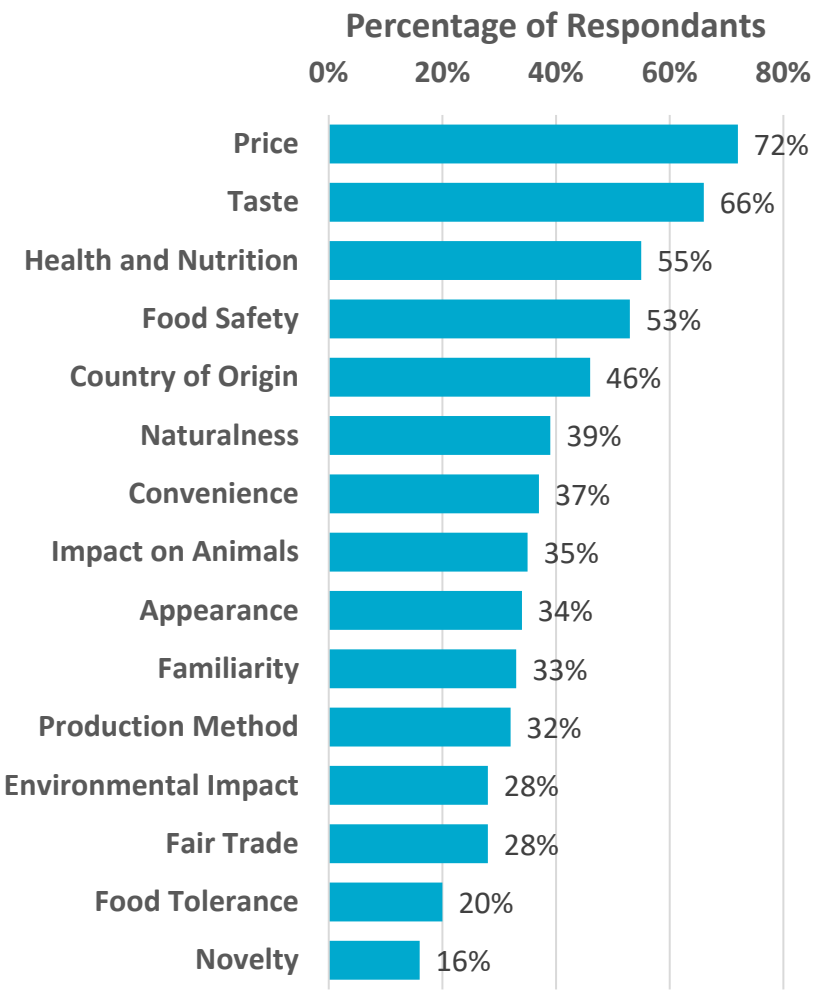



**Figure 3 Proportion of respondents from a nationally representative sample who identified each factor among their top three most important factors when grocery shopping for food (n=1036).**

## 3.4 Consumers and Regional Brands

### 3.4.1 Awareness of regional brands and purchasing of regional products

Respondents were asked about their awareness of Australian food producing regions, including any experience in visiting these regions.

Many of the regions have high levels of recognition with domestic customers, with four regions (Tasmania, Hunter Valley, Kangaroo Island, and Yarra Valley) recognised by more than 80% of respondents. Generally, the percentage of respondents that had visited a region was considerably lower than awareness of the region and this applied to all the regions. There was a tendency for those regions that were more familiar to respondents to have higher percentages of respondents visiting that region in the last five years, though 22% of respondents reported that they had visited none of the regions listed. In some cases, familiarity may be enhanced when the regional name corresponds to that of an urban centre (e.g. Rockhampton, Bundaberg) or Australian state (e.g. Tasmania).

Trends also appear to exist between awareness of regional brands and purchasing decisions of food and drink products. Regions with greater awareness by consumers rank highly in terms of purchasing behaviour. Nine out of top ten regions listed by consumers as regions of origin for food purchases in the last five years (Figure 5) were also within the top ten regions recognised by consumers (Figure 4). Similarly, seven out of ten regions listed by consumers as a region of origin for drink purchases in the last five years (Figure 6) were within the top ten regions recognised by consumers. Whilst this does not necessarily indicate that familiarity influences purchase, it may suggest at the very least a link between familiarity and awareness by consumers of regional brands within their purchasing decisions.

It is also worth noting that the data provide examples where smaller areas of production have greater recognition than the larger region in which they are located. For example, 11% of consumers reported purchase of drink products from the Coonawarra and only 4% from the Limestone Coast. The same was found for food with 5% of consumers reporting purchase of food from Coffin Bay, but only 2% for the Eyre Peninsula. These examples suggest the locations or boundaries of given regions are not always clear in the minds of national consumers.

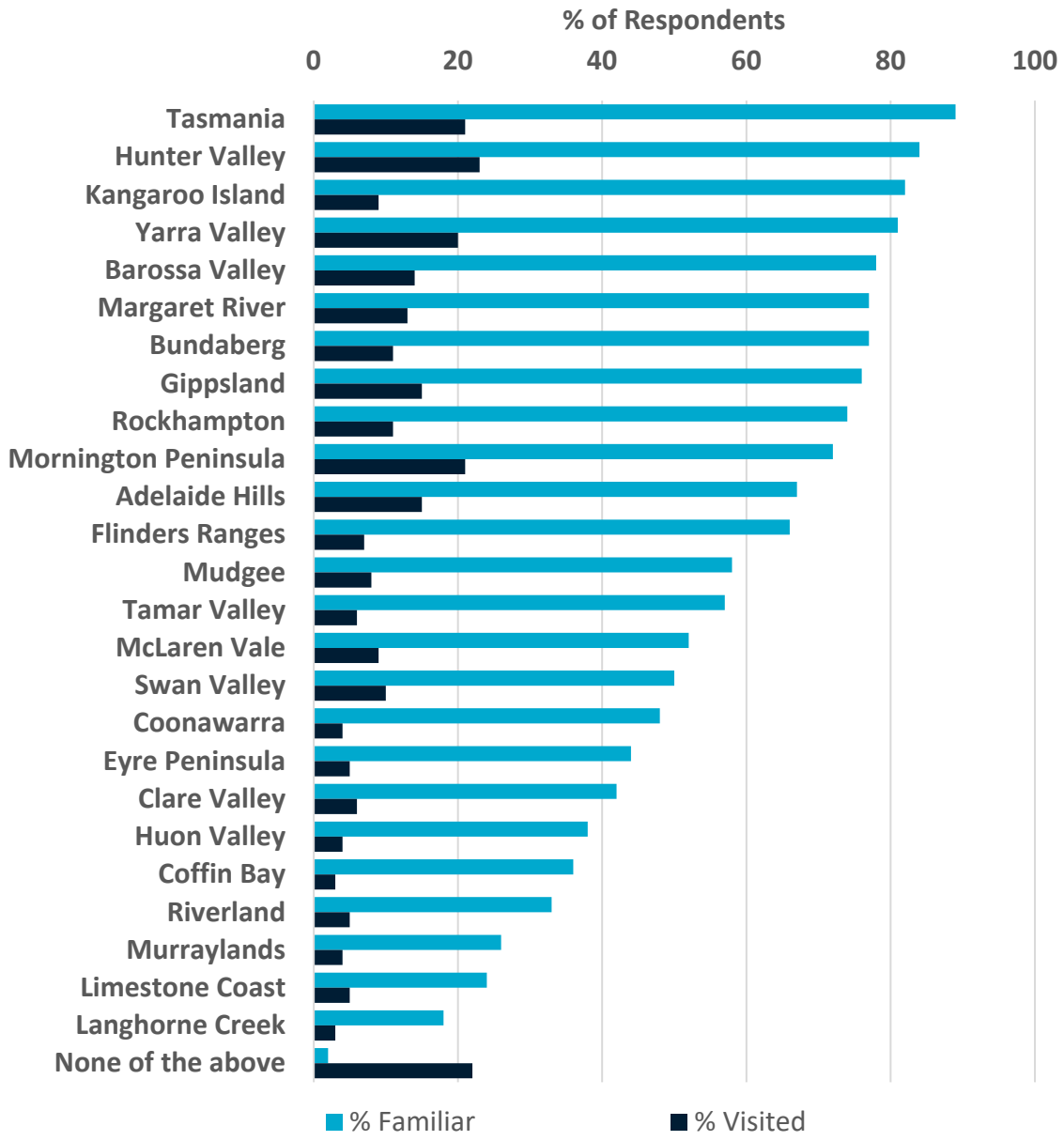



**Figure 4 Fraction of a nationally representative sample of respondents (n=1036) had awareness or have visited selected Australian regions in the last five years (n=1036).**

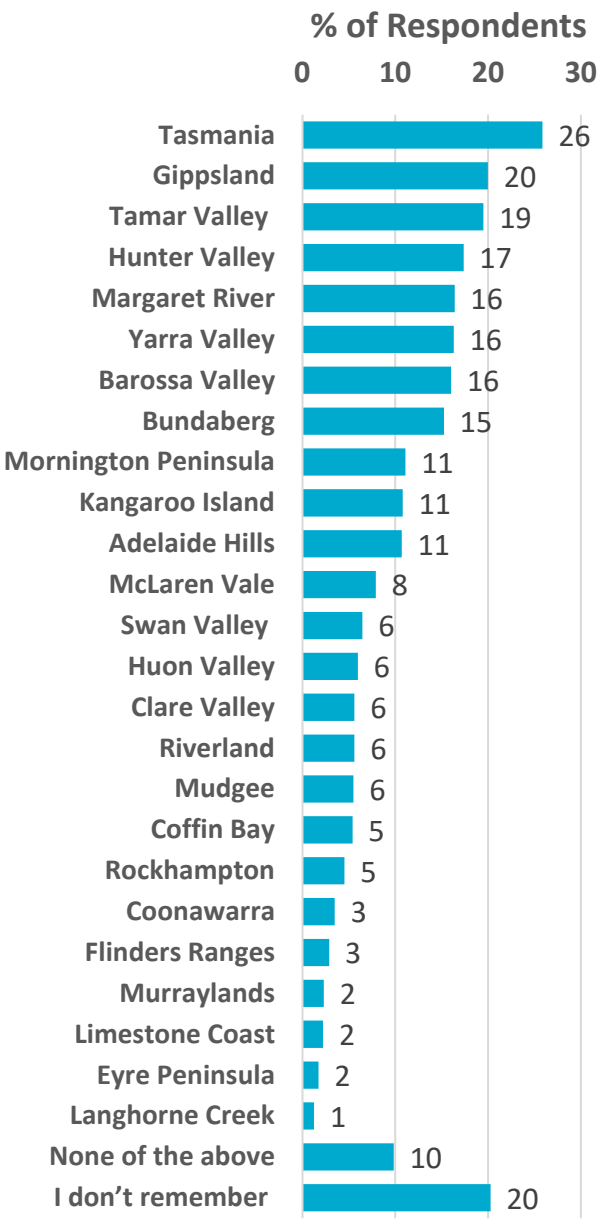



Figure 5 . Percentage of respondents who had purchased food products from specific regions in the last five years (n=1036).

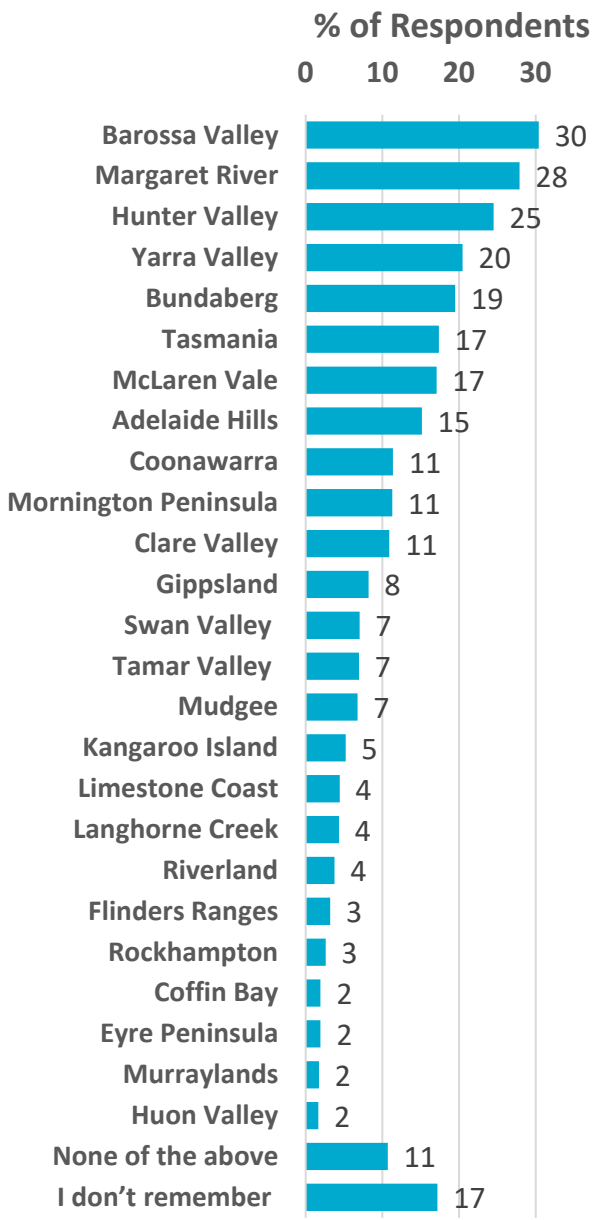



Figure 6 Percentage of respondents who had purchased drink products from specific regions in the last five years (n=1036).

### 3.4.2 Perceptions of regional production

Respondents were asked to attribute various food/beverage items with select regions (Limestone Coast, Margaret River, Tasmania, Riverland, Hunter Valley, Barossa Valley, Eyre Peninsula, and Adelaide Hills). Table 3 shows the percent deviation from the mean number of times a particular item was attributed to any region. This deviation, and the positive or negative sign of the variation, indicates which regions have above or below average association with various products by consumers. For example, as shown in Table 3, Limestone Coast, Tasmania and the Eyre Peninsula have above-average levels of association with seafood and lobster products (Green text, values >5), whereas inland or rural areas all have strong negative values indicating below-average association with seafood (Red text, values <5).

Of the 22 food/beverage categories listed in Table 3, eight categories had no significant deviation from average levels of association with any region. Six categories had a below-average association with a single region (beef, lamb, chicken, pork, mild, eggs, vegetables, honey, and spirits). Wine was the only commodity, apart from seafood, for which the level of association was significantly different to the average across all regions. This is perhaps not surprising given the importance of regional branding to the wine industry and its use in labelling and describing the wines for consumers. However, closer inspection demonstrates the complexity involved in exploring associations of regions with products by respondents.

For example, Limestone Coast did not receive above-average association with wine production (Table 3), even though its contribution to the domestic wine market is the second highest within the regions listed (Figure 7). One explanation is that the emerging brand of "Limestone Coast" is still under development, even though there are several large and well-established wine areas within this region and so it is perhaps not surprising that this new brand was not strongly associated with this commodity. As noted above, more consumers reported purchasing drinks from areas within the Limestone Coast (e.g., the Coonawarra) than from the Limestone Coast region *per se*. The below-average association of the Limestone Coast with wine, rather than near-average, suggests that some consumers may associate this region with coastal locations rather than the inland wine production areas in this region. This explanation is further supported by the Limestone Coast region having above-average association with seafood and lobster, as shown in Table 3.

Three other regions (Tasmania, Eyre Peninsula, Riverland) also received below-average association with wine production. This is understandable for Eyre Peninsula where there are only a few very small wineries with a local focus. However, the Riverland region is by far the largest domestic wine producing region within the list, yet association with wine production was well below average, perhaps due to wine from this region commonly developed as a bulk commodity rather than under its own regional branding. Most surprising was Tasmania, which received the lowest association with wine production, even though production is nearly three times higher than that from the Hunter Valley region, a region with a strong above-average association with wine (Table 3).

Finally, four regions received a strong above-average association with wine production (Margaret River, Hunter Valley, Barossa Valley, and Adelaide Hills). The strength of association was not reflected in the production volumes of domestic wine from the region, further demonstrating the value of wine region marketing and brand awareness at the national consumer scale. However,

other results from the survey (not shown) showed that South Australian respondents had a greater awareness of local Riverland and Limestone Coast wines than respondents from the other states.

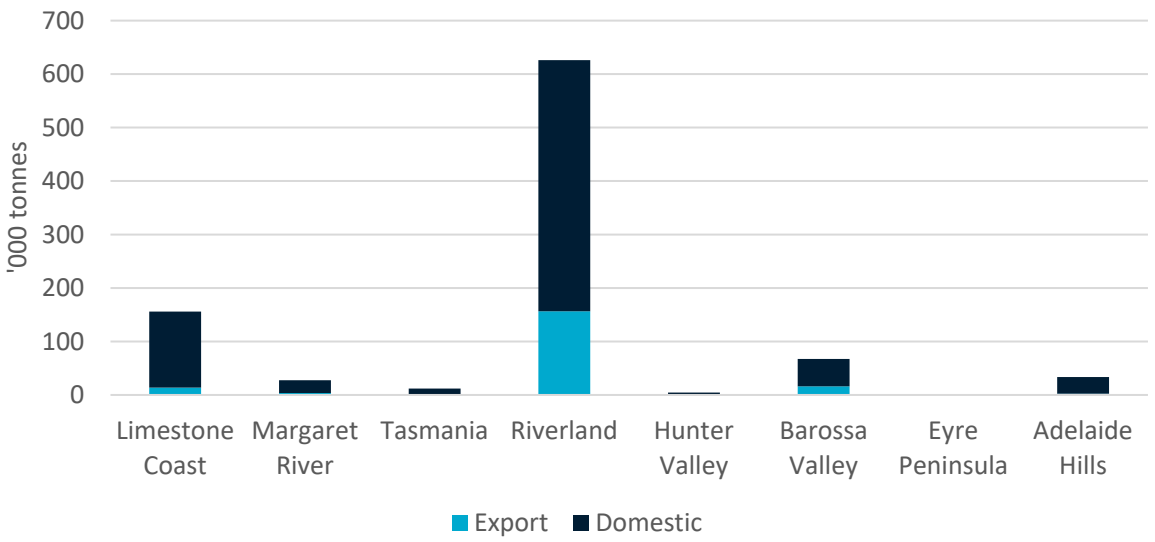



**Figure 7 Estimated tonnes of wine grapes crushed in 2021 for export or domestic markets for each region (Wine Australia, 2022).**

Similar trends were obtained in associations by respondents for other attributes of regions, such as industries and regional qualities. For example, association of attributes with coastal regions followed similarly with association of seafood production, with coastal regions generally receiving above-average association with beaches, and inland regions below-average association (Table 4). No other attribute received above- or below-average association by consumers across all regions. Respondents were generally unable to differentiate between regions based on single attributes.

Similarly, consumers were generally unable to provide clear association of any particular region with a range of land uses or regional attributes. The only exception being for Tasmania. Consumers provided significantly different associations for Tasmania with half of the commodities listed in Table 3 and over half of the attributes for land use or industry in Table 4. Tasmania is the most well-recognised region, possibly due to its role as an Australian state, and this awareness appears to provide greater understanding of local attributes.

Table 5 shows the deviation in associations of various food/beverage attributes with regions by respondents. Attributes can be broadly categorised as reflecting the products from the region, or the environment of the region from which they were produced. Of the 256 possible associations between region and attribute within this table (8 regions x 32 attributes), only 22 associations were significant. Of these, 18 associations were about the products themselves. Only 4 significant associations were between the product and the environment in which it was produced. Two of the environmental associations showed an above-average association of Tasmanian products with a clean environment. Products from the Barossa valley received a below-average association with a threatened environment (a positive outcome) but there was a below-average

association between the Hunter Valley and clean water. The reasons for these responses are unclear, but it is possible that the below-average association between the Hunter Valley and clean water is a reflection of some concern about the impact of other non-food/drink related industries operating in that region given that the Hunter Valley was associated with mining by respondents in this study (Table 4).

**Table 3 Percentage deviation from the average number of times a food/beverage is selected for a region (n=1036). Above-average (green, ≥ 5%) and below-average (red, ≤-5%) deviations are highlighted.**

| | Limestone Coast | Margaret River | Tasmania | Riverland | Hunter Valley | Barossa Valley | Eyre Peninsula | Adelaide Hills |
|---|---|---|---|---|---|---|---|---|
| Beef | -1% | -2% | 1% | 4% | 0% | -4% | 4% | -2% |
| Lamb | 0% | -2% | 1% | 1% | 0% | -2% | 2% | 0% |
| Chicken | 1% | -2% | -2% | 4% | 0% | -3% | 2% | 1% |
| Pork | 0% | -4% | -2% | 4% | 0% | -2% | 2% | 2% |
| Seafood | **13%** | 1% | 22% | -6% | -13% | -13% | 10% | -13% |
| Lobster | **13%** | 0% | 15% | -5% | -12% | -11% | 11% | -10% |
| Milk | -2% | -3% | 4% | 4% | 2% | -4% | 0% | 0% |
| Cheese | -5% | 2% | 11% | -2% | 2% | -2% | -5% | -2% |
| Yogurt | -1% | 0% | 6% | 1% | 0% | -3% | -1% | -3% |
| Eggs | 0% | -2% | -2% | 4% | 1% | -2% | 2% | 0% |
| Nuts | 1% | -2% | -6% | 4% | -1% | -1% | 1% | 3% |
| Oats | 2% | -2% | -6% | 5% | -1% | -3% | 4% | 1% |
| Legumes | 3% | -3% | -5% | 6% | -2% | -3% | 4% | 0% |
| Fruit | -4% | -2% | 0% | 7% | -1% | 1% | -4% | 2% |
| Vegetables | 1% | -1% | -3% | 5% | -1% | -3% | 1% | 2% |
| Olives | -2% | 0% | -9% | 0% | 1% | 5% | 0% | 4% |
| Olive oil | -1% | 2% | -9% | -2% | 3% | 5% | -3% | 4% |
| Honey | -2% | -1% | 4% | -1% | 0% | 1% | -2% | 1% |
| Wine | -11% | 18% | -23% | -18% | 16% | 29% | -19% | 7% |
| Spirits | -1% | 1% | -3% | -4% | 3% | 6% | -3% | 1% |
| Beer | -1% | 1% | 6% | -5% | 0% | 1% | -2% | 1% |
| Cider | -2% | 1% | 0% | -5% | 3% | 7% | -5% | 1% |

**Table 4 Percentage deviation from the average number of times a regional attribute is selected for a region. Above-average (green, ≥ 5%) and below-average (red, ≤-5%) deviations are highlighted.**

| | Limestone Coast | Margaret River | Tasmania | Riverland | Hunter Valley | Barossa Valley | Eyre Peninsula | Adelaide Hills |
|---|---|---|---|---|---|---|---|---|
| Nature | 0% | 3% | -5% | 0% | -1% | 2% | 1% | 2% |
| Native forests | -5% | -1% | 15% | 0% | -3% | -3% | -6% | 2% |
| Beaches | 18% | 8% | 4% | -7% | -13% | -13% | 14% | -11% |
| A rich cultural history | -7% | 2% | 0% | -3% | 0% | 9% | -4% | 2% |
| Traditional agricultural and farming practices | -2% | 1% | -5% | 4% | 0% | 4% | 0% | -1% |
| Sustainable farming practices | -3% | 1% | -5% | 2% | 0% | 6% | -1% | 0% |
| Industrial activity | 2% | -3% | -4% | 2% | 4% | -2% | 1% | 0% |
| Heavy industry | 1% | -4% | -6% | 3% | 4% | 0% | 1% | 0% |
| Mining industry | 3% | -4% | -3% | -1% | 9% | -3% | 1% | -3% |
| Gas industry | 4% | -2% | -5% | 1% | 3% | -2% | 2% | 0% |
| Forestry | -5% | -2% | 14% | -1% | -1% | -2% | -5% | 2% |
| Renewable energy industry (e.g., wind, solar) | 1% | -3% | 2% | 1% | -1% | -2% | 2% | 1% |
| Farmers' markets | -8% | 4% | -1% | -1% | 1% | 6% | -6% | 6% |

**Table 5 Percentage deviation from the average number of times food/beverage-related attributes are selected for a region. Above-average (green, ≥ 5%) and below-average (red, ≤-5%) deviations are highlighted.**

| | Limestone Coast | Margaret River | Tasmania | Riverland | Hunter Valley | Barossa Valley | Eyre Peninsula | Adelaide Hills |
|---|---|---|---|---|---|---|---|---|
| Freshness | 1% | -1% | 2% | 0% | -2% | -1% | 2% | -1% |
| High nutritional quality | 0% | -2% | 0% | 3% | -1% | -3% | 3% | 0% |
| High quality | -4% | 3% | -1% | -2% | 2% | 4% | -3% | 0% |
| Safe | 4% | -1% | -5% | 1% | -1% | -2% | 4% | 1% |
| Healthy | 3% | -1% | 2% | 2% | -4% | -3% | 3% | -1% |
| Free from contaminants | 1% | 0% | 3% | 1% | -3% | -3% | 2% | 0% |
| Affordable | -1% | -4% | -1% | 5% | 0% | -3% | 1% | 3% |
| Expensive | 0% | 7% | -7% | -5% | 1% | 5% | -2% | 1% |
| Good value for money | 0% | -4% | 1% | 3% | 1% | -3% | 0% | 1% |
| Desirable | -4% | 3% | 1% | -4% | 2% | 4% | -3% | 0% |
| Innovative | 1% | 1% | -3% | -1% | 1% | 0% | 0% | 0% |
| Trendy | -1% | 7% | -3% | -7% | 1% | 4% | -2% | 0% |
| Premium products | -3% | 4% | 1% | -4% | 3% | 6% | -4% | -3% |
| Good reputation | -6% | 5% | 1% | -5% | 4% | 7% | -5% | 0% |
| Provides a true regional flavour | 0% | 1% | -2% | 0% | 0% | 3% | -1% | -1% |
| Family friendly | 1% | -1% | 1% | 2% | 0% | -5% | 2% | 0% |
| Celebration/special occasion | -2% | 4% | -3% | -5% | 4% | 6% | -3% | 0% |
| Readily available | -3% | 0% | -1% | 0% | 1% | 3% | -3% | 2% |
| Easily identifiable | -5% | 2% | 3% | -4% | 3% | 7% | -5% | 0% |
| Unique | 2% | 1% | 0% | -2% | -1% | 0% | 2% | -2% |
| From a scenic region | 2% | 1% | -1% | -4% | 0% | -1% | 1% | 1% |
| Clean and green environment | 0% | -2% | 6% | 0% | -3% | -1% | 1% | 0% |
| From a threatened environment | 4% | -2% | 2% | 3% | -1% | -5% | 2% | -2% |
| Clean fresh water | 3% | -1% | 9% | 0% | -5% | -5% | 2% | -3% |
| Natural farming landscapes | -1% | -3% | 0% | 3% | 0% | -3% | 2% | 3% |
| From a diverse agricultural region | 0% | -2% | 1% | 3% | 0% | -3% | 1% | 1% |
| Locally grown | 2% | -3% | -5% | 3% | 1% | -1% | 1% | 2% |

| | Limestone Coast | Margaret River | Tasmania | Riverland | Hunter Valley | Barossa Valley | Eyre Peninsula | Adelaide Hills |
|---|---|---|---|---|---|---|---|---|
| Supporting local farmers | 2% | -4% | -3% | 4% | 0% | -2% | 1% | 1% |
| Industrial-scale agriculture | 0% | -3% | -3% | 4% | 1% | 0% | 2% | 0% |
| Environmentally friendly food production | 1% | -2% | 3% | 1% | -1% | -1% | -1% | 0% |
| Animal welfare friendly food production | 1% | -2% | 0% | 4% | -1% | -3% | 1% | -1% |
| Conserving cultural values, beliefs, knowledge, and practices | 1% | -1% | 2% | 1% | -1% | -1% | 0% | 0% |

(Table 5 cont.)

Results from the correspondence analysis (Figure 8) shows the associations between regions and products for a nationally representative sample of consumers. Similar to Table 3, associations for well-known regions for seafood and wine are shown as well as related markets for alcoholic beverages and olive products. The Riverland was associated with more general agricultural products. Whilst the overall analysis captured nearly 90% of the variation in respondents' associations (F1 and F2 axes combined), the majority of data was described by dimension F1 (ie x-axis) which captures the difference between coastal areas known for seafood, and rural areas known for wine, with other regions/products located between.

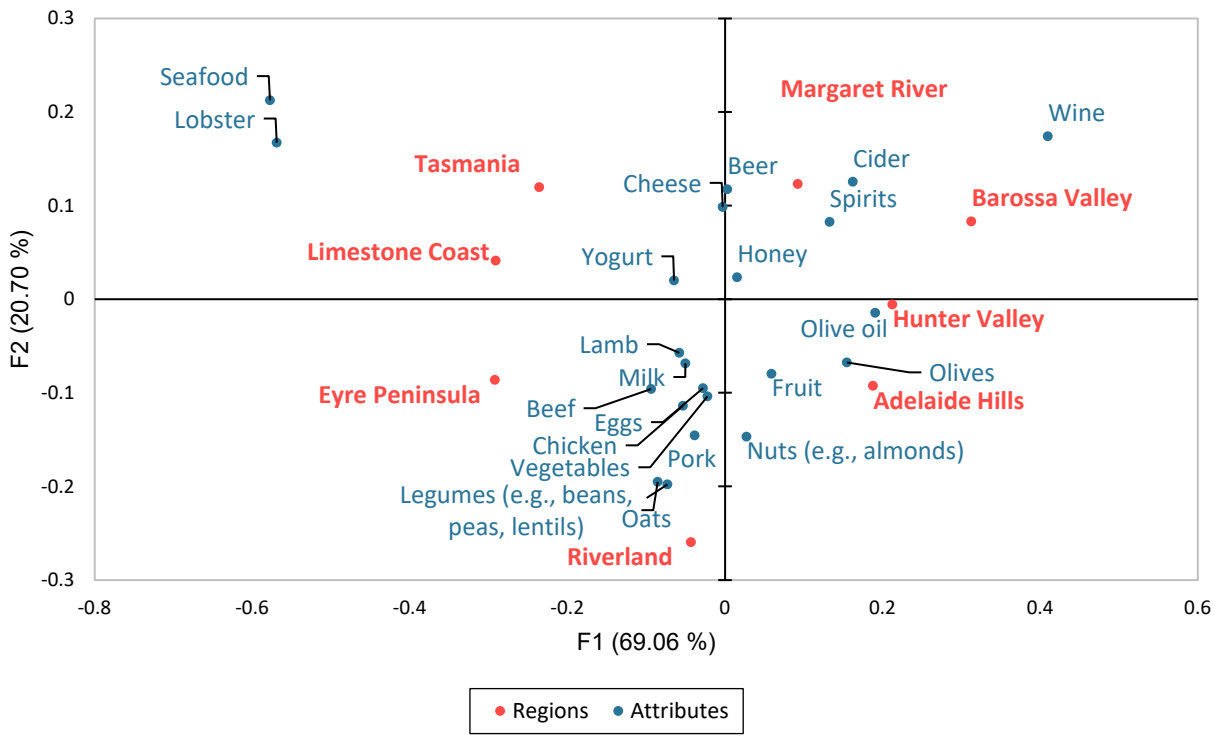



**Figure 8 Map of associations between regions and foods and beverages for a nationally representative sample of respondents (n=1036). Axes F1 and F2 explain 89.76% of variation in responses.**

### 3.4.3 Geographical Awareness of Consumers

Oversampling of various regions with the survey does allow for some comparison of perceptions of respondents from different geographical groups. Table 6 compares perceptions of the Limestone Coast for a range of regional attributes for respondents who come from the Limestone Coast, or those from the state of South Australia (of which Limestone Coast is a part), or the nationally representative sample of consumers.

Increased proximity to, or experience of, the Limestone coast appears to affect perceptions of attributes and products of the region by consumers. For example, the region includes a large plantation forestry industry, but this was not clearly recognised by respondents from the rest of the state or the nation (Table 6). Limestone Coast residents were less likely to associate the region with mining and more likely to associate their region with the renewable energy industry than the general population. Like the general population, Limestone Coast residents did not associate the region with the gas industry. Most notable, consumers from the Limestone coast were more likely to attribute various products with their local region (Table 7) with 17 of the 22 products having significantly different levels of association with the region by local respondents, relative to the other regions included in this study. This compares with 5 products for South Australian respondents (not including those from the Limestone Coast) and 3 products for respondents from the nationally representative sample.

**Table 6 Changes in perception of attributes of the Limestone Coast region for different groups of respondents including those from Limestone Coast (n=32), South Australia (not including those from Limestone coast, n = 263) and a nationally representative sample (n=1036). Data shows the percentage deviation from the average number of times a land use is selected for a region. Above-average (green, ≥ 5% deviation) and below-average (red, ≤-5% deviation) deviations are highlighted.**

| | Limestone Coast Sample | South Australian Sample | National Sample |
|---|---|---|---|
| Nature | -27% | -3% | 0% |
| Native forests | 2% | -8% | -5% |
| Beaches | 17% | 26% | 18% |
| A rich cultural history | -3% | -6% | -7% |
| Traditional agricultural and farming practices | -2% | -1% | -2% |
| Sustainable farming practices | -4% | -8% | -3% |
| Industrial activity | -1% | 1% | 2% |
| Heavy industry | 1% | 4% | 1% |
| Mining industry | -13% | 7% | 3% |
| Gas industry | 3% | 4% | 4% |
| Forestry | 38% | -4% | -5% |
| Renewable energy industry (e.g., wind, solar) | 9% | 4% | 1% |
| Farmers markets | -18% | -16% | -8% |

**Table 7 Changes in perception of food/beverage production of the Limestone Coast region for different groups of consumers including those from Limestone Coast (n=32), South Australia (not including those from Limestone coast, n = 263) and a nationally representative sample (n=1036). Data shows the percentage deviation from the average number of times a land use is selected for a region. Above-average (green, ≥ 5% deviation) and below-average (red, ≤-5% deviation) deviations are highlighted.**

| | Limestone Coast Sample | South Australian Sample | National Sample |
|---|---|---|---|
| Beef | 18% | 5% | -1% |
| Lamb | 24% | 1% | 0% |
| Chicken | 3% | 0% | 1% |
| Pork | -1% | -3% | 0% |
| Seafood | **25%** | 21% | **13%** |
| Lobster | **32%** | 21% | **13%** |
| Milk | 14% | -4% | -2% |
| Cheese | -7% | -7% | -5% |
| Yogurt | -3% | -6% | -1% |
| Eggs | 5% | -1% | 0% |
| Nuts (e.g., almonds) | -12% | -2% | 1% |
| Oats | -7% | 3% | 2% |
| Legumes (e.g., beans, peas, lentils) | -6% | 2% | 3% |
| Fruit | -12% | -8% | -4% |
| Vegetables | 3% | -1% | 1% |
| Olives | -21% | -3% | -2% |
| Olive oil | -17% | -4% | -1% |
| Honey | 10% | -4% | -2% |
| Wine | -10% | -1% | -11% |
| Spirits | -12% | -4% | -1% |
| Beer | -15% | 0% | -1% |
| Cider | -12% | -4% | -2% |

### 3.4.4 Desirability of Regional Brands

Survey respondents were asked how much more or less desirable they would consider food and/or drink products if they knew they were produced in the following regions (Figure 9). There are several notable trends.

Firstly, the trends in regional brand familiarity or awareness (Figure 4), previous purchasing (Figure 5 and Figure 6) and brand associations (Table 3) are apparent also in regional brand desirability. The well-known brand of Tasmania, and the highly valued brands of Barossa Valley, Margaret River, Hunter Valley and Adelaide Hills all rate highly. The lesser-known, or new and emerging brands of Limestone coast and Eyre Peninsula rated lower.

Second, very few consumers saw any of the Australian regional brands as undesirable. This aligns with the preferencing observed elsewhere in the survey for Australian or local brands in purchasing decisions (Figure 1).

Following on from the previous point, differences in overall brand desirability between regions is dominated by the changes in the level of neutrality rather than any negative desirability. A neutral response to desirability was the most common response for all regions. However, there was almost a two-fold difference in neutrality between the top (31%) and bottom-ranked (59%) regions (Figure 9).

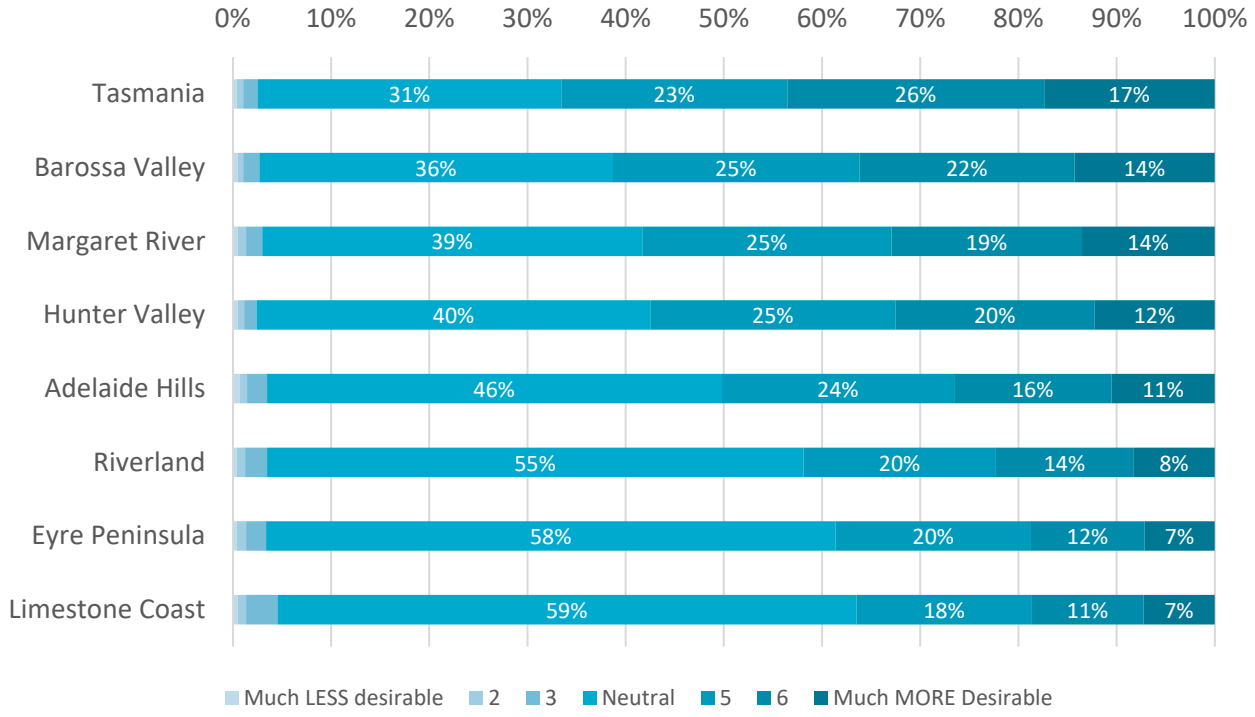



**Figure 9 Distribution of responses for a nationally representative sample of respondents (n=1036) on how much MORE or LESS DESIRABLE would they consider food and/or drink products if they knew they were PRODUCED in the following regions.**

## 3.5 Agricultural and extractive resource regions

### 3.5.1 Impact of consumer concerns about gas/mining operations

Correspondence analysis was undertaken on responses for consumers differing in their level of concern about gas/mining operations undertaken in agricultural areas.

Very similar association of regions with various foods or beverages were found for consumers that stated that they were less concerned about gas/mining activities on agricultural areas (Figure 10a) and those who indicated high levels of concern (Figure 10b). Associations for both groups were similar to those indicated above for the overall nationally representative sample of consumers (Figure 8) in that a single dimension capturing the differences between coastal and rural regions captured most variation in association.

Given the similarity in association of regions with foods/beverages by both groups (ie those concerned or not concerned with gas/mining activities), we can therefore more easily compare perceptions of both groups regarding products from different regions to explore any possible perspectives arising from concerns about gas/mining in any of these regions. Again, very similar association of attributes of foods/beverages from different regions were found for consumers that were less concerned about gas/mining activities on agricultural areas (Figure 11a) and those who indicated high levels of concern (Figure 11b). The Limestone Coast region contains a conventional gas industry and lies within the correspondence map with product attributes such as “free from contaminants”, “clean and green” and “environmentally friendly” for consumers with low or high levels of concern about gas/mining development in agricultural regions. The Hunter Valley has a long-established mining industry and lies within the correspondence map with product attributes such as “high quality”, “good reputation”, “provides a true regional flavour” and “Innovative”, irrespective of level of concern of the consumer sample group.

The similarity of association of Limestone Coast and Hunter Valley with other regions, in terms of regional products or attributes of those products, was not affected by any of concern about gas/mining activities within these agricultural regions. Associations with Limestone Coast more closely resembled those from other coastal production regions (e.g. Tasmania, Eyre Peninsula), and the Hunter Valley more closely resembled those from other higher value crop and wine growing regions (e.g. Barossa Valley, Margaret River), irrespective of level of concern about gas/mining activities. However, the below-average association of Limestone Coast with gas development by respondents, low percentage of direct visitation to regions by respondents, and differences in geographical of respondents should be noted.

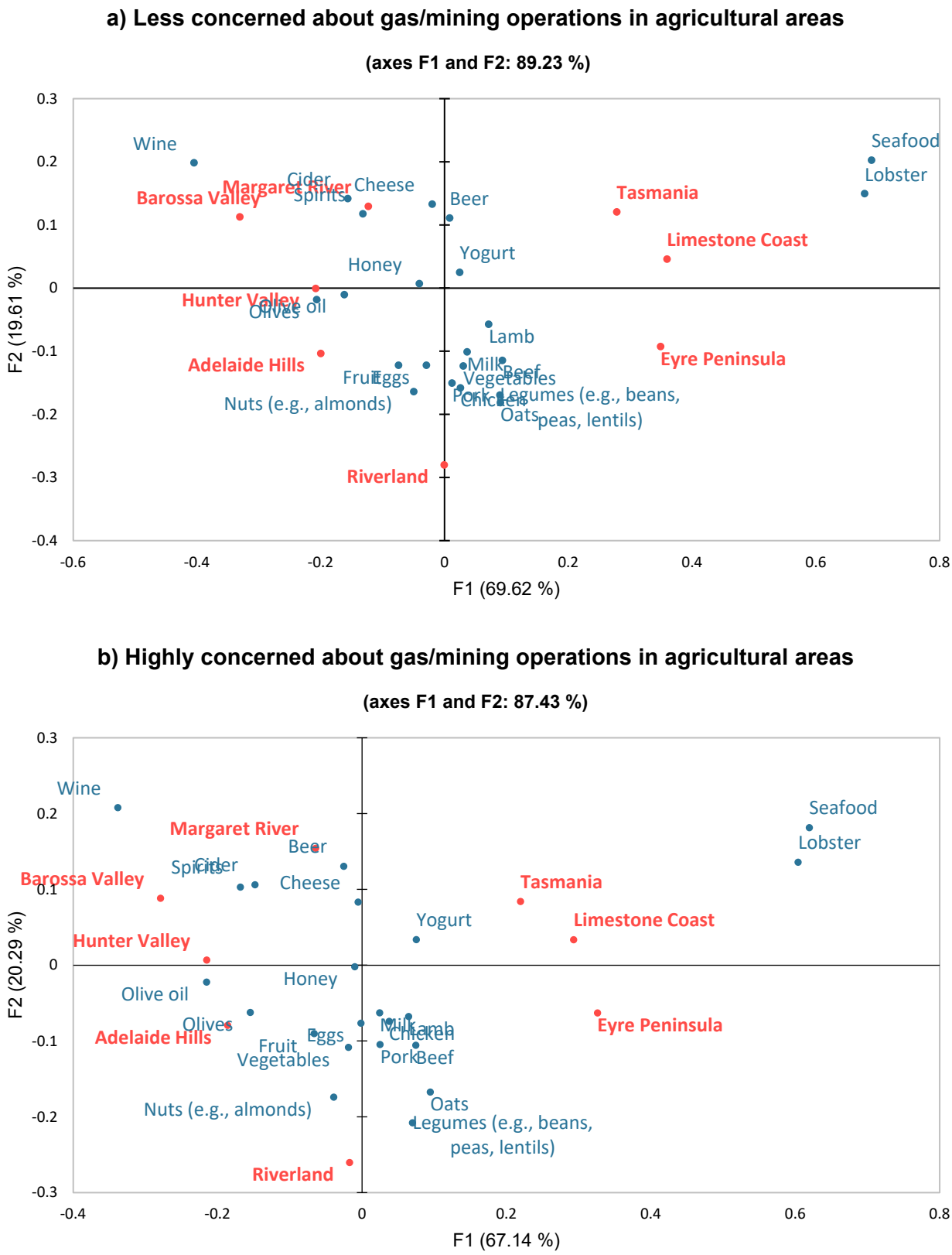
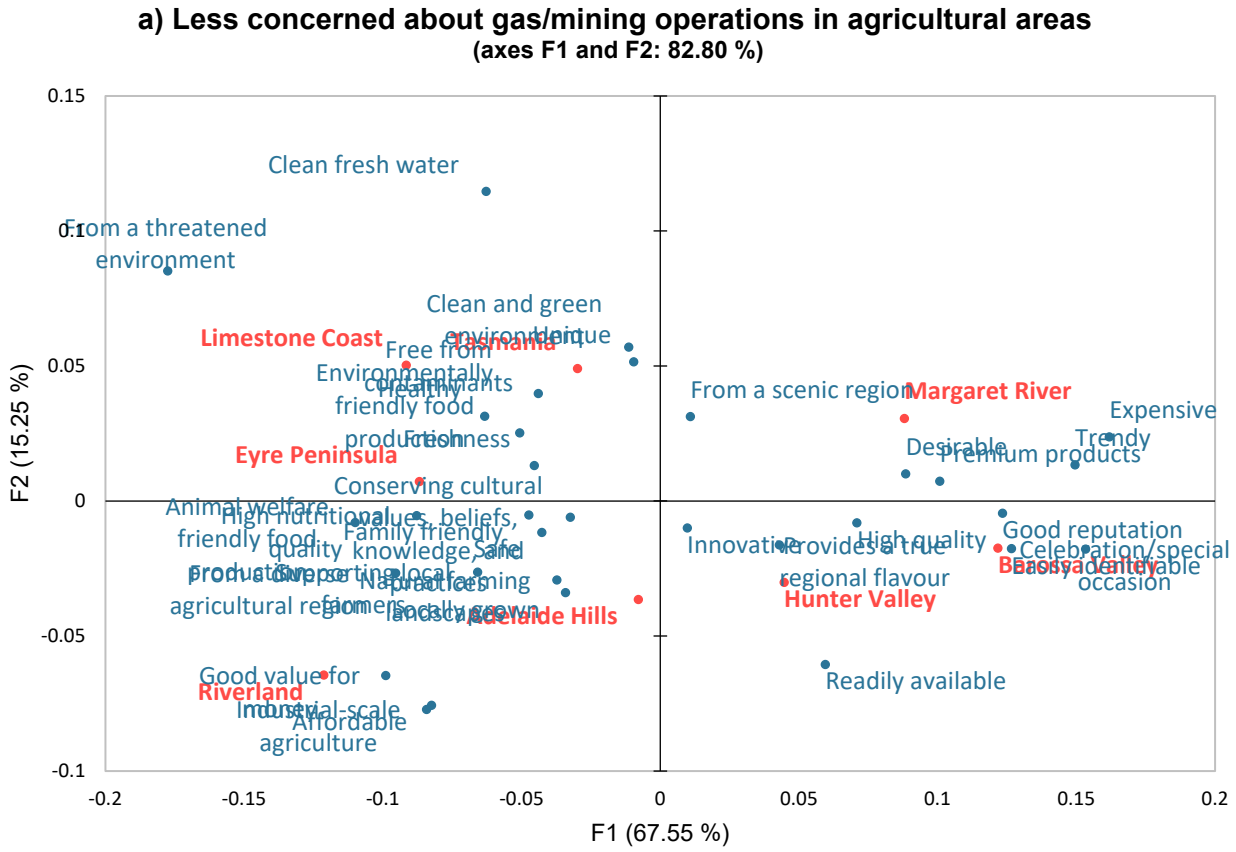



**Figure 10 Map of associations between regions and foods and beverages for respondents who were a) less concerned (n=801) or b) highly concerned (n=710) about gas/mining operations in agricultural areas (n=1036).**



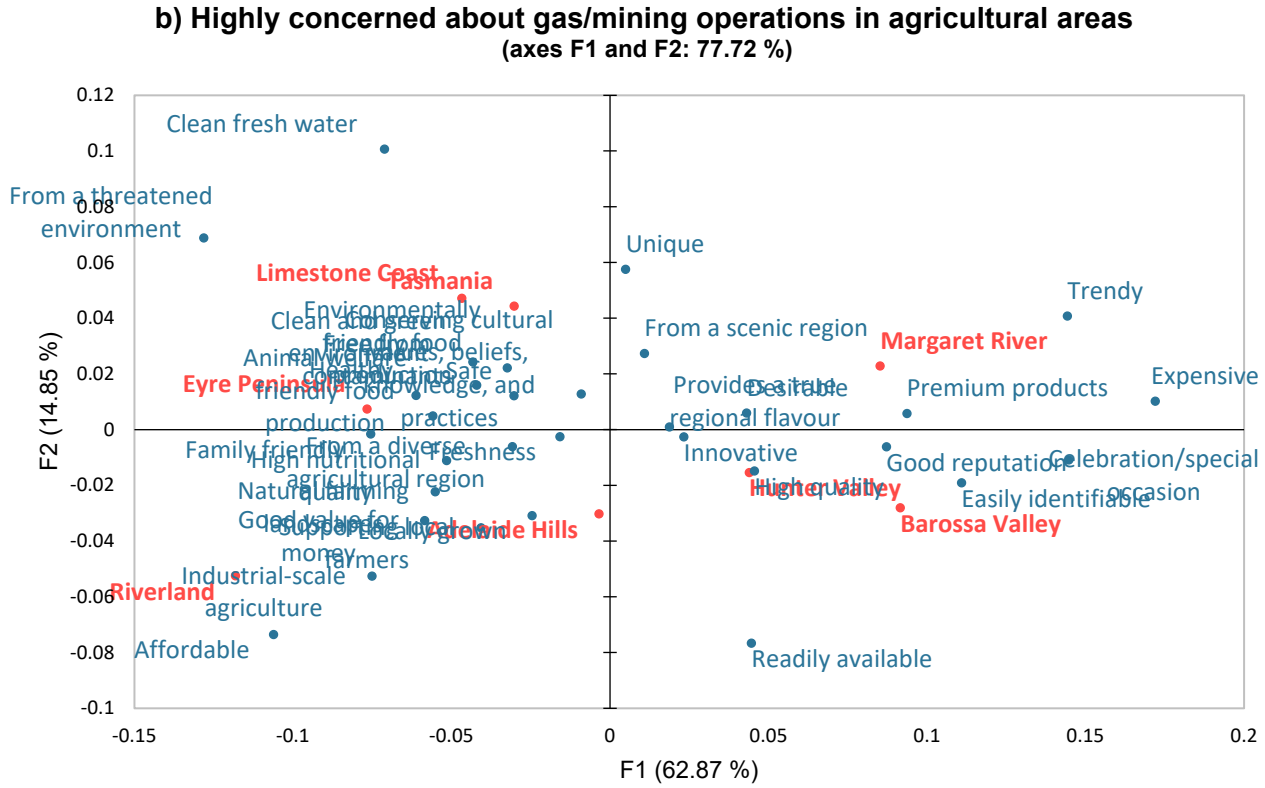




**Figure 11 Map of attributes associated with foods and beverages from various regions by respondents who were a) less concerned (n=801) or b) highly concerned (n=710) about gas/mining operations in agricultural areas (n=1036).**

### 3.5.2 Impact of energy or resource developments on consumers

Several observations regarding the impact of energy or resource developments on consumer associations and behaviours can be gleaned from the results above.

Environmental or ethical issues do not rank as highly as price or food quality in food concerns (Figure 2) or purchasing decisions (Figure 3) of consumers despite consumers generally seeing themselves as ethical and environmentally conscious in nature (Figure 1).

Perceptions about products or attributes of a region can be strongly affected by geographical awareness or proximity. Most consumers will have little to no firsthand experience from travel to regions from which their food or beverages originate (Figure 4). Furthermore, the ability of consumers to associate products (Table 7) or regional attributes (Table 6) to particular a region varies with level of experience or proximity to that region. Whilst consumers may share some concerns regarding environmental or gas/mining activities (Figure 1, Figure 2), it is not clear from this study how much consumers associate products with regions, or regions with energy or resource development (Table 4).

An established regional brand can be maintained whilst resource development is undertaken in that region. Survey results highlighted the high value of a regional brands such as Hunter Valley (Figure 4, Figure 5, Figure 6), resulting in high desirability of products from this region (Figure 9) notwithstanding the association with the mining industry (Table 5) and some association with water quality issues (Table 5).

Notwithstanding the above, regional brands can have great value and food/drink quality concerns could provide a risk to producers. Food and Beverage quality and safety rated highly in terms of grocery and food purchasing decisions, and in concerns of consumers about their food. Customers are more likely to hold strong associations of regions with product attributes than with environmental attributes (Table 5). Therefore, risks to consumer purchasing from industries such as energy or resource development are perhaps more likely to arise more from effects on perceptions about product quality from a region.

# 4 Discussion

## 4.1 Intrinsic vs extrinsic attributes of food or beverages

The attributes of foods and beverages can be generally broken into two categories (Ardeshiri and Rose, 2018):

1) intrinsic attributes: Attributes are specific to the product, disappear as the product is consumed, and cannot be altered without changing the nature of the product (e.g. taste, nutritional value), and

2) extrinsic attributes: Attributes related to the product but are not physically part of it and can be altered without changing the nature of the product (e.g. brand, price).

Whilst extrinsic food attributes have become popular in brand evaluation, previous research has found that traditional intrinsic food attributes continue to rank highest with consumers (Malek and Umberger, 2021). This present study is consistent with such findings. Moreover, ranking of intrinsic attributes over extrinsic attributes appears to be influenced by strong consumer preferences for food safety and quality, and lower awareness of production regions or production methods.

This finding is supported by previous studies both in Australia and internationally. A recent study of Australian consumer preferences (Zhang and Jakku, 2021) has shown a higher importance for attributes such as safety and freshness, followed by price, and finally attributes such as production method (e.g. organic or GM-free). A similar trend was found for US consumer preferences for natural and regionally produced beef products (Umberger et al, 2009). That same US study showed that trends in willingness to pay were motivated by prioritisation of 1) personal benefits (nutrition, quality, safety), 2) social health concerns (potential antibiotic resistance, unknown hormonal effects), 3) Societal benefits (supporting local agriculture, environmental benefits) and 4) other beliefs.

## 4.2 “Local” or “Australian-made” as a quality indicator

The preferencing of Australian, regionally or locally produced products would appear, at first, to be an exception to a preferencing for intrinsic properties such as food quality or safety. However, previous research has indicated that country or region of origin is often used as an important tool for consumers for assessing food quality (Wu et al, 2021). For example, a study into preferences of Western Australian consumers for locally produced products demonstrated that high preference is not because the product is locally produced *per se* but because of the association of the region with high-quality products (Mugera et al, 2017). A study of Australian consumers of seafood also found that extrinsic food properties, such as “Australian Grown” were used as surrogate indicators for food quality (Lawley et al, 2012). Similarly, in a study of Australian beef

consumers, origin was found to be a key factor in purchasing decisions with a positive willingness to pay for beef from Tasmania compared to a negative value for a similar cut from China (Ardeshiri and Rose, 2018). A study of consumers in Queensland found trust in domestic vegetable growers for producing safer vegetables and that consumers were willing to pay a price premium because of this (Ariyawardana et al 2017). This same study found that levels of trust by consumers varied for different actors within the production chain. Whilst levels of trust for retailers, processors and importers differed, trust was higher for actors and systems within the food supply chain when they were perceived to play a key role in ensuring food quality (e.g., local food producers, food inspectors and food standards).

## 4.3 Factors driving consumer trust in regional products

Consumer preferences for local or Australian foods and beverages implies consumer trust in local production systems to provide safe and high-quality products. A conceptual trust framework (Wu et al, 2021) summarising factors that influence consumer trust in food and food systems is shown in Figure 12. The framework shows consumer trust in food and food systems is developed via elements of product assurance and via various actors involved within and outside of the food system. Internal actors such as producers, processors and retailers provide consumers with assurances regarding food safety and quality. Other actors, such as government agencies, third-party institutions, advocacy groups and the mass media affect trust by modifying how labelling information and various food operators are perceived by consumers (Wu et al, 2021).

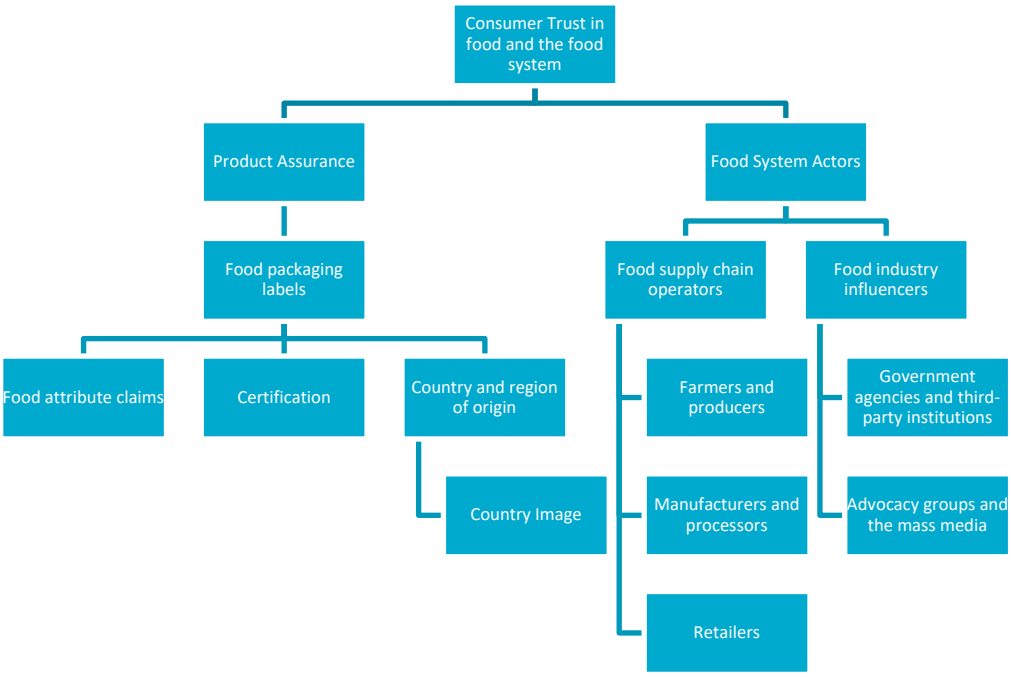



**Figure 12 A trust framework summarising factors that influence consumer trust in food and the food systems based on Wu et al (2021).**

The above-mentioned study of Queensland vegetable consumers (Ariyawardana et al 2017) found that levels of trust by consumers varied for different actors and components within the food

supply chain and was highest for those who were perceived to play a key role in safeguarding the quality and safety of food products. This finding suggests that Australian consumers generally trust local production and quality and safety assurance processes using country or region of origin labelling to place this trust during purchasing decisions. The responses of consumers in this study (Figure 1) support this premise by demonstrating strong preferences to purchase local or Australian products and strong beliefs regarding the safety and quality of these products.

## 4.4 The role of influencers

A previous GISERA project (Gas Impacts and Opportunities on Primary Industries) highlighted the concerns of regional producers regarding damage to regional brands and related regional products by outside influencers. This included concerns that even efforts to help protect a regional image could do damage by bringing wider public attention to issues of unknown importance. These concerns extended to the actions of external influencers and interest groups seeking to influence regional developments by continually raising potential risks. Regional producers worried that even in the absence of any real threat or risk event, the mere presence of resource development in the region may bring ongoing impact to regional brands through continuing adverse media, controversy, or lobbying.

The trust framework shown above (Figure 12) includes actors that lie outside both the food supply chain and the product assurance processes used to develop trust in the supply chain. These actors include government departments, third-party institutions, advocacy groups and mass media; and potentially affect consumer trust through changing consumer perceptions of either the supply chain or assurance processes.

For example, this present study and others have demonstrated that consumers are sensitive to food safety concerns and therefore may respond to information regarding food safety issues from external sources. Previous studies have examined the impact on consumer behaviour from information about food safety reported in the media and demonstrated mixed results (Wang and de Beville, 2013). For example, media headlines were found to have a statistically significant effect on consumer preferences in the USA for shrimp (Ortega et al, 2014), and reports of avian outbreaks were found to reduce poultry demand in the US and increase substitution with other meats when news was reported negatively in the media (Wang and de Beville, 2013).

## 4.5 Pathways for brand risk

Possible pathways for impact on regional branding by external influencers or environmental incidents during resource development can be deduced from the trust framework presented above. Results from this study show the importance of intrinsic attributes of food safety and quality and the use of region or country as a tool for consumers to assess food quality. We can explore this using several Australian examples.

The Hunter Valley region is home to a diverse range of primary and service industries including resource extraction (open cut mining and CSG), thoroughbred breeding, power generation,

viticulture and associated tourism sectors. Concerns about the impacts of resource development on other industries within the region has been documented (McManus, 2008, 2013). The mechanisms for possible impacts arising from mining or gas developments on regional image have been highlighted for the Hunter Valley region by Schweinsberg and Wearing (2013). They suggested that the media plays a significant role in shaping the message that is read by tourists and their study demonstrated the predominance of negative issues in reporting of CSG in the Sydney press. However, this current study has demonstrated high consumer awareness of the regional brand of the Hunter Valley (Figure 4), a knowledge of industry and mining within this region by consumers(Table 4), concerns about water quality within the region (Table 5), but high purchasing preferences based on this brand (Figure 9).

Perceived risks to the safety of agricultural products from resource development often arises from potential impacts on surface or ground water quality. Concerns for ground water impacts from gas development, including impacts on both water quality and quantity, have been raised by stakeholders in studies in Australia (Huth et al., 2018; Walton and McCrea, 2018) and overseas (Andersen and Theodori, 2009; Theodori, 2009; Crowe, 2019). Studies from the Gloucester region of New South Wales (Sherval and Hardiman, 2014) examined media articles over a 12-month period and found 33 mentions of “environmental risk” with risks to water relating to the majority of concerns. Those authors also describe results from local council surveys suggesting that 78.8% of respondents ranked threats to water security as “very high”. Stakeholders from the previous project (Gas Impacts and Opportunities on Primary Industries) investigating risks from gas development in South Australia suggested that risks to ground water and reputation were most important.

The importance of brand or reputation is highlighted in a submission on behalf of the Australian wine industry to the select Committee on Unconventional Gas Mining (SAWIA, 2016) which raised concerns of threats to the brand and reputation of the internationally recognised wine brands of specific regions and Australia more generally, and potential impacts on visual amenity that is inconsistent with tourism values of wine-growing regions. In 2011 the Western Australian Government rejected mining applications in the Margaret River wine regions for reasons including perceived impacts on regional image.

Elements of the trust framework described as follows suggest a possible pathway for brand risk that could be considered in future research.

- Real or perceived threats to water quality may undermine trust in regional production systems as providers of safe and quality product
- Loss of trust in local products undermines trust in government and industry assurance processes
- Loss of trust in assurance processes undermines the value of country or region of origin as a tool for quality assurance to consumers

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**For further information**

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