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D4.2. Comparison of policy instruments to reduce the environmental impact of food production and their effectiveness in terms of consumer acceptance

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1. Executive Summary

There is a growing need to establish more sustainable food production systems and consumption patterns which reflect the principles of a circular economy, which includes increased recyclability of resources and minimization of waste, including food waste. In this regard, understanding consumer behaviour for both organic food consumption and reducing food waste has a significant role to play in developing targeted policies, thereby enhancing effectiveness.

Within the Farm to Fork policy, the European Commission has set an ambitious goal of increasing the area under organic cultivation to 25% by 2030, thereby increasing the supply of organic food. However, for this policy to be effective, an understanding of the determinants of consumer purchasing habits of organic food across member states is crucial in order to increase demand.

Approximately 8-10% of all global greenhouse gas emissions come from food waste alone. The resources used to produce our food also cannot be recouped if it goes to waste and contributes to increasing greenhouse gas emissions. Therefore, one of the key targets of the UN's Sustainable Development Goals is to reduce food waste globally by 50% by 2030. In line with this, the EU Farm to Fork strategy has proposed to set a legally binging target to reduce food waste by 2023.

Within the circular agronomic project, a 5-country consumer survey was undertaken in 5000 consumers. Outcomes from this research has generated evidence to underpin and inform these policies pertaining to food waste and organic food purchases and ultimately enhance the likelihood of success.

The research showed that certain behavioural constructs of the theory of planned behaviour influence European consumers to purchase and consume organic food and minimise the generation of food waste. The current evidence demonstrates that attitude, subjective norms and perceived behavioural control have a significant influence on organic food consumption decisions. Personal attitudes are key to consumer intentions to reduce or recycle food waste. Understanding these behavioural constructs can be used in the development of information, education and intervention campaigns to enhance the effectiveness of policy instruments.

2. Introduction

In order to effectively address the issues surrounding food production, food consumption, human and planetary health while also responding to the challenge of feeding the growing world population, it is important to reconsider modern diets and the conventional system of food production in favour of establishing more sustainable production and consumption patterns which reflect the principles of a circular economy. These principles broadly include the increased recyclability of resources and minimization of waste, including food waste (European Commission 2015).

Organic food production has long been considered an alternative to conventional production methods as its production relies on the use of organic (non-mineral) fertilizers and compliance with stricter animal welfare rules. This reliance on organic fertilizers contributes to recyclability of resources as organic farms apply animal manure to fertilize land (Government of Ireland 2019). To further support the development of organic food production, the European Commission has set an ambitious goal of increasing the area under organic cultivation to 25% by 2030 (European Commission 2020). While the objective of such a move is to increase the supply of organic food, it remains to be seen if this can be matched with a comparable increase in consumer demand. Consumer demand may reflect consumer expectations or preferences for various characteristics of food, including its environmental profile, price, as well as its origin and availability in the market etc. These preferences may also vary across different countries since the organic food market has developed at different rates across Europe.

The increased consumption of sustainably produced food is not sufficient without addressing the critical problem of household food waste. Recent estimates indicate that more than 20% of produced food is wasted in the EU and more than half of that amount comes directly from households (Stenmarck et al. 2016). The production of food requires the use of valuable and often limited resources, such as land, water, and energy. However, the true social cost of food

waste may considerably exceed the direct or internal cost of its production since more negative external effects may typically emerge, such as environmental degradation or hunger (Katare et al. 2017).

Therefore, to formulate and refine policy instruments that are acceptable to consumers we first need to understand the behavioural motives behind the intentions among European consumers to purchase or consume organic food. Similarly, to prevent food waste from happening, new policy measures and interventions aiming to correct such profligate consumption habits might be necessary, which requires a thorough understanding of factors inducing food waste behaviour. Both of these behaviours can be primarily conceptualized in the form of personal attitudes, subjective (social) norms, behavioural controls, and moral considerations of the as outlined in the Theory of Planned Behaviour and the Norm Activation Model (Ajzen 1991; Schwarz 1977).

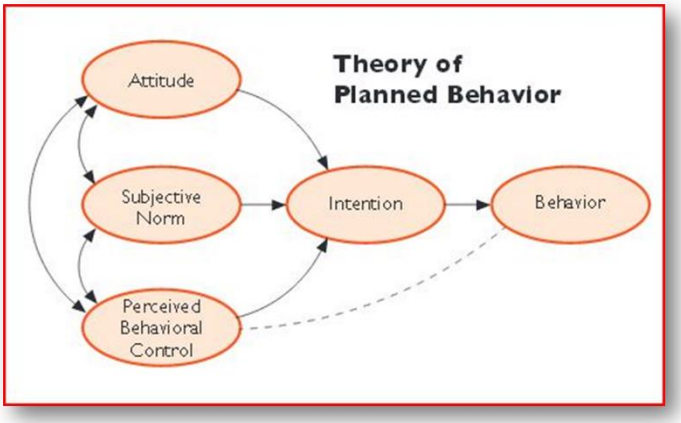


Figure 1. Theory of Planned Behaviour (Azjen 1991)

Many types of policy instruments are proposed to address sustainable consumption and to direct consumers in a desirable and sustainable trajectory. These instruments include regulatory, economic, communication and procedural policies (Wolff & Schönherr, 2011). Regulatory policies include those that often ban or limit use of products, while economic policies tend to focus on incentives or subsidies to positively encourage a particular behaviour. Communication policies have a focus on consumer education and information campaigns and labelling while procedural policies are very diverse and include instruments such as corporate social responsibly and infrastructure provision for sustainable activities (Wolff & Schönherr, 2011). These policies should be developed with evidence acquired from consumer behaviour and acceptance studies to increase successful outcomes of the proposed policies.

Overall, the main objective of this research report is to provide evidence from the EU 5 country survey conducted within WP4 of the Circular agronomics project on the potential application of the research findings of relevance to existing or new policy instruments pertaining to food waste or increasing organic consumption or enhancing update of sustainable produced foods;

3. 5-Country Survey Methodology

Using the theory of planned behaviour as the basis for the research design, the purpose of the study was to examine behavioural determinants, such as attitudes, subjective norm and behavioural control on sustainable behaviours such as organic food purchase and food waste across five EU countries. A structured survey specifically designed to measure these behaviours was administered online to 5000 respondents from Germany, Netherlands, Spain, Italy, and Czech Republic, in late winter of 2021/22 using the Qualtrics platform. The questionnaire was authorized by the Ethics Committee of the Center for Agri-Food Economics and Development (CREDA) in Spain and was conducted following the ethical norms of social science research.

4. Survey Findings and potential impact for policy instruments

1) Food Waste

The UN Environmental Programme Food Waste Report estimates that, globally,8-10% of all greenhouse gas emissions come from food waste alone. The resources used to produce our food also cannot be recouped if it goes to waste and contributes to greenhouse gas emissions.

It is not unsurprising, therefore, that one of the key targets of the UN's Sustainable Development Goals is to reduce food waste globally by 50% by 2030. In line with this, the EU Farm to Fork strategy has proposed to set a legally binging target to reduce food waste by 2023.

The EU is committed to reducing food waste and meet the Sustainable Development Goal regarding food waste. The ambitious aim is to halve per capita food waste at the retail and consumer level by 2030 and will propose legally binding targets to reduce food waste across member states by the end of 2023. This policy to reduce food waste has been set out in the recent Green Deal to enable a transition to a more sustainable EU food system.

Findings from the 5-country survey has shown nearly 15% of European of consumers agreed with the statements that they wasted food on a daily basis as shown in figure 2 below. Fruit and vegetables were the most frequently wasted foods across all countries with the highest in Italy and Spain. Bread was the next most wasted food. Meat was least likely to be wasted with less than 10% reporting that they throw away meat. These trends mirror that of what is frequently reported by the FAO in their food waste statistics.

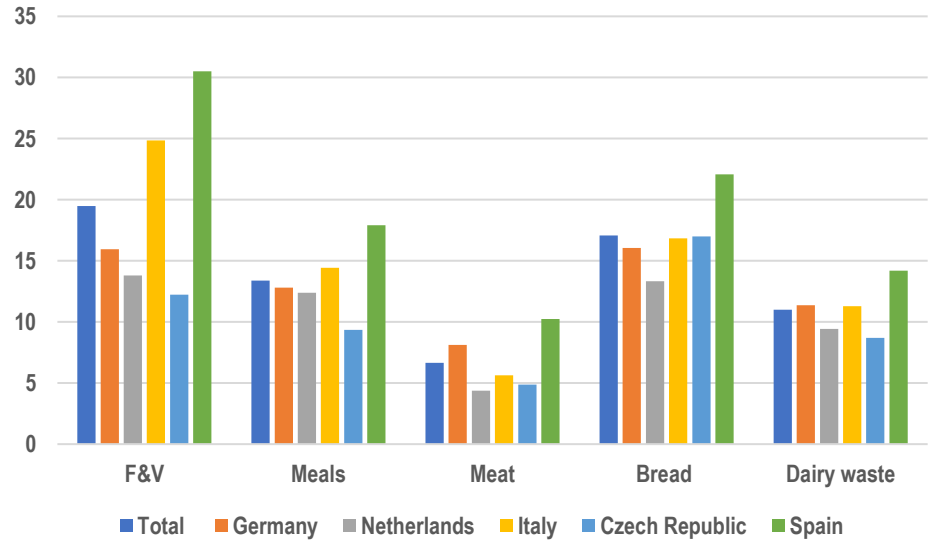


Figure 2. Type of foods wasted across countries in the EU

Respondents were segmented based on the types of foods that they wasted and three distinct groups were identified as show in Figure 3 below. Those who wasted very little, those who wasted only fruit and veg and those who wasted some of all their foods. Attitudes and behaviours were examined across these three groups and it was shown that positive attitudes in conjunction with perceived behavioural control were highly significant in those who wasted nothing. This group were also less likely to purchase and/or serve food in excess and food planning was integral to their shopping activities. As the food waste categories increases consumers engage less in these behaviours

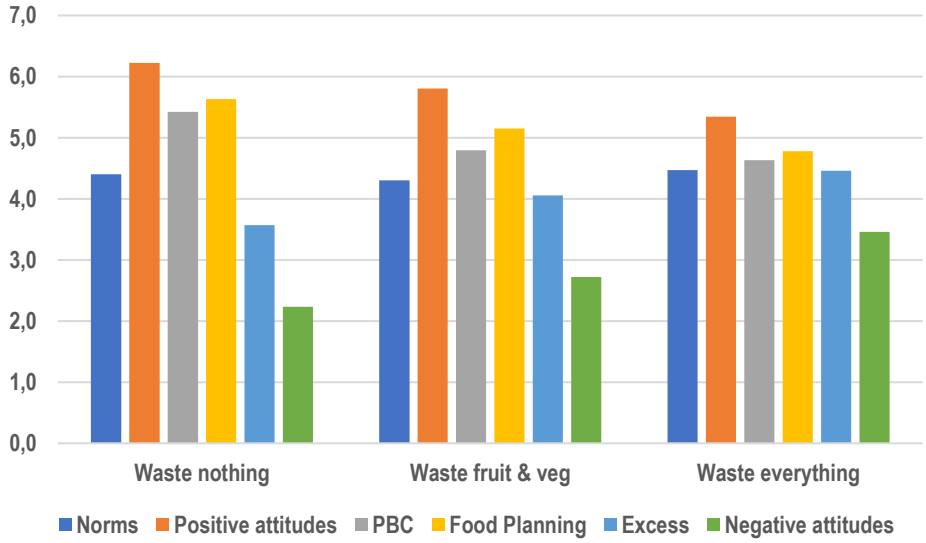


Figure 3. Consumer categories of food waste and associated attitudes and behaviours

Evidently, these finding from the CA survey have applicability for EU policies regarding food waste. In order to reduce food waste across member states in the EU, success is more likely if, development evidence-based policies targeted to the different ways in which consumers waste food, to more effectively reduce its prevalence. Education, and implementation of simple measures like meal planning and shopping lists, along with positive behaviours among our peer groups and knowing how to control and minimise our food waste, can be used to nudge consumers in a positive direction of food waste behaviour. Policies should be accompanied with simple aids in the format of planning sheets or food planning/shopping phone apps with recipes and shopping lists to meet the size of the household consuming the products. Including these behavioural change measures with the policies can assist in facilitating the required behaviour to reduce food waste.

2) <u>Organic food consumption</u>

The aim of Axis 1 of the action plan for organic production in the EU is to stimulate demand and ensure consumer trust, thereby boosting consumer demand for organic foods.

Findings from the 5-country survey has shown that there is potential to increase organic consumption across the EU and has also highlighted the factors underpinning this organic purchasing behaviour which can also serve to stimulate an increase in demand for organic foods.

For the most part EU consumers are familiar and use the organic label on packages with an average score of sometimes (4) when it comes to using organic labels. The highest scores were observed for Germany, Italy and Spain. In terms of specific foods, fruits and vegetables are the most commonly purchased foods, followed by yogurt, meat, cheese and milk as outlined in Figure 4 below.

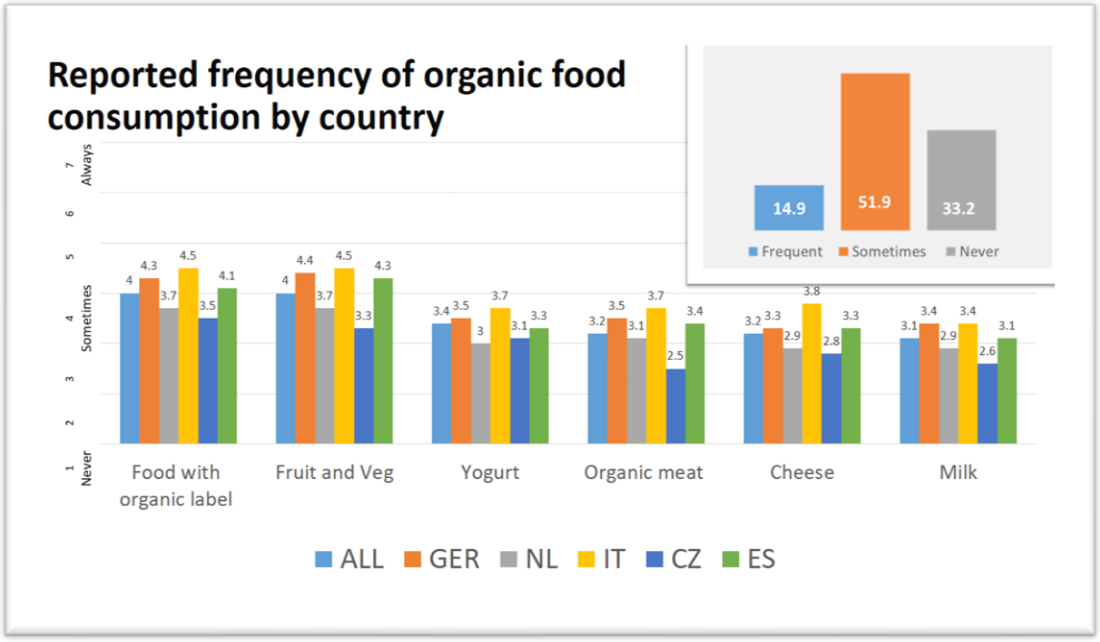


Figure 4. Reported frequency of organic food purchasing habits across 5 member states

When frequent purchasers of organic were compared to the less frequent purchasers, it was shown that social norms, attitudes and perceived behavioural control played a very significant role in this group (see Figure 5). These frequent consumers belong to a peer group whereby organic purchasing would be the norm and also encouraged. These consumers also hold strong attitudes regarding the benefit and merits or organic foods. In addition, behavioural control such as recognising the benefits of organic foods and knowing where and how to purchase them played an important role too.

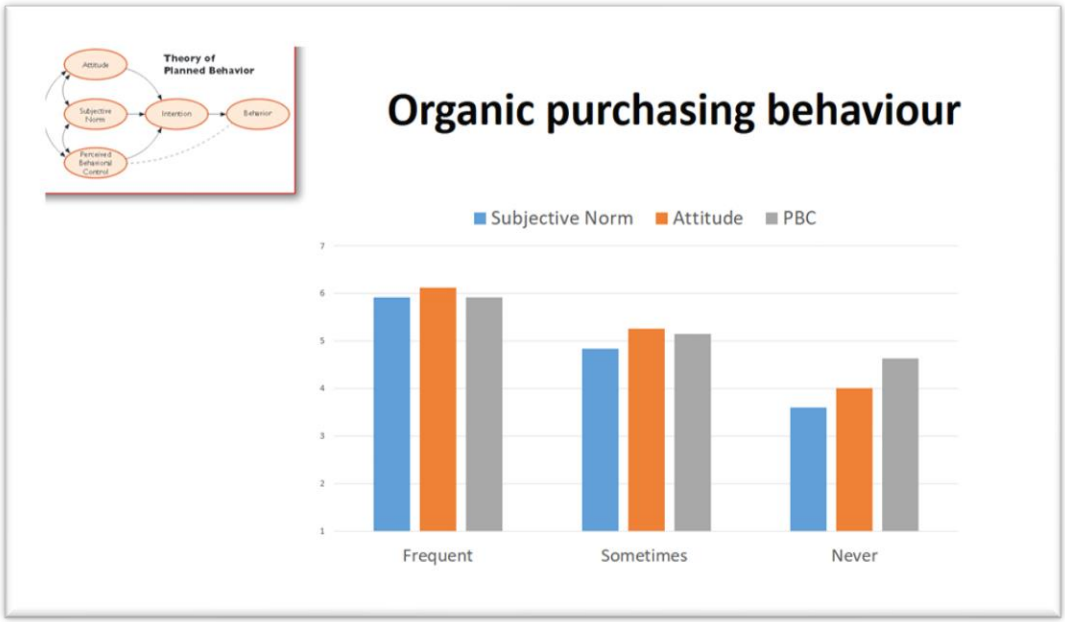


Figure 5. TPB characteristics across categories of organic purchasing frequency

The evidence from this research can be used to enhance the potential for success and to realise the ambition of axis 1 to increase demand for organic consumption by firstly addressing and changing norms using opinion leaders, role models, and community social marketing to assist in establishing new social and cultural norms. These changes can potentially have the biggest impact on changing organic food purchase behaviour. Secondly, attitudes could be targeted via advertising campaigns promoting the availability of organic products and education-oriented interventions in schools and other workplaces. By increasing the availability of organic foods in the marketplace, it positively impacts perceived behaviour control and thereby increase organic food purchase. This evidence has been summarised in Figure 6 below show the impact of different policy measurements and how they can be adapted across policy type along with consumer and research inputs.

5. Circular and sustainable consumers

As part of the survey, a construct to determine sustainable attitudes and preferences in consumers was included. This comprised four statements and were aggregated to form one composite construct on general sustainability as shown in figure 6 below.

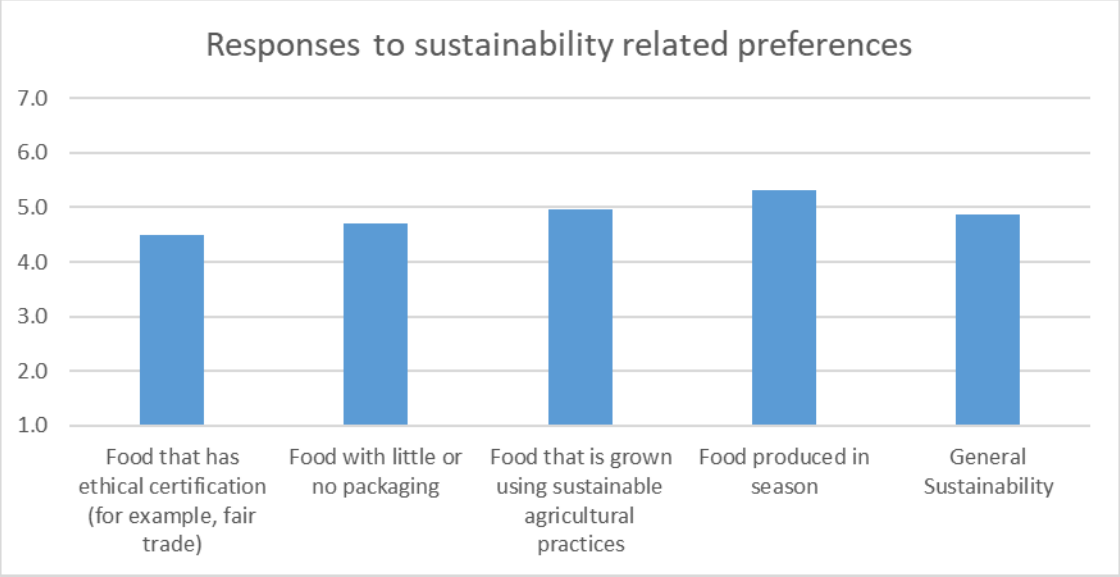


Figure 6. Sustainability practices and preferences among consumers

Purchasing of food produced in season was the most preferred practice of consumers followed by purchasing food grown using sustainable agricultural practices. In general, consumers have positive preferences for engaging in a number of sustainable behaviours. Given these positive preferences, it would suggest that foods produced using some of the sustainable practices proposed in the Circular Agronomics case studies would be acceptable to consumers.

This was further supported in the willingness to pay study within the consumer survey. Consumers stated their preferences for a range of beefsteaks depending on the certification: organic, circular or conventional at a range of price points. As shown in figure 7 below consumers were willing to pay more for circular produced beef compared to convention beef across all countries. The willingness to pay for organic beef was highest across all countries. When these analyses were further broken down, it was also shown that with sustainable preferences and environmental attitudes also increased the preference for organic beef in Germany, Netherlands, and Spain. Additionally, as shown previously for organic and food waste behaviours, consumer preferences were influenced by social norms and were positively associated with circular and organic beef preference in countries like Italy and Netherlands.

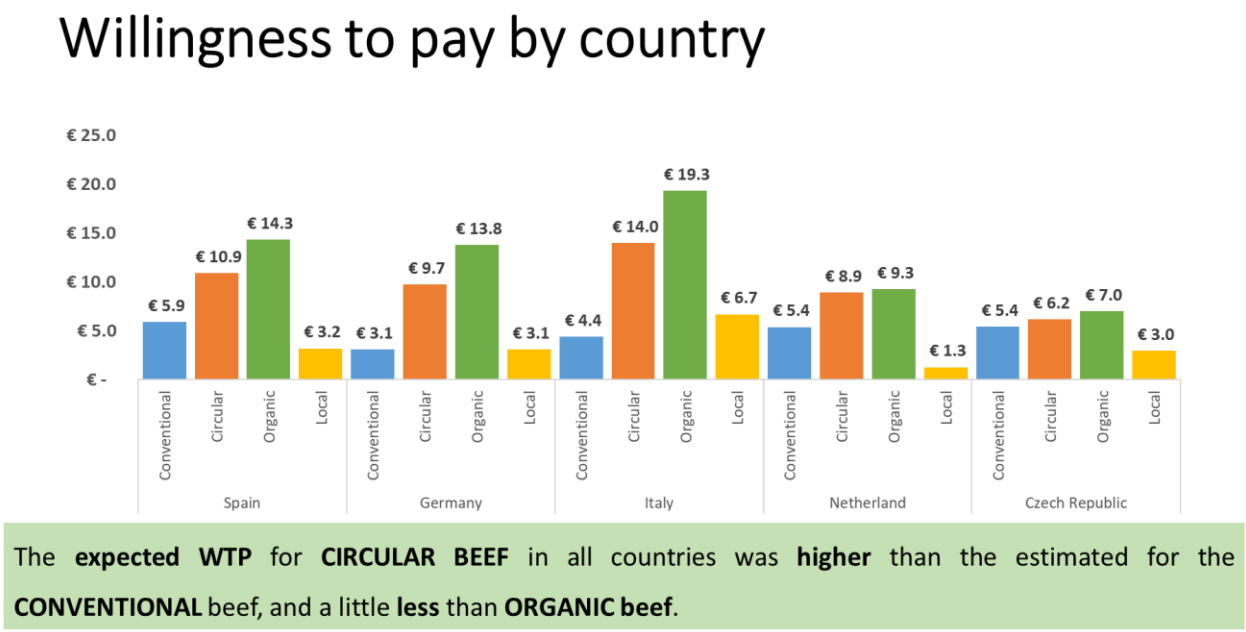


Figure 7. Consumer willingness to pay for beef produced by different systems across 5 EU countries

6. General implications for policy instruments and conclusion

Drawing on the results of organic consumption studies in addition to the 5-country survey conducted in Circular Agronomics, it is worth emphasizing the important role of information campaigns to promote the outstanding qualities of organic food and specify its availability among many competing food options in the market. The most suitable policy instrument in this situation is communication. The objective of such communication campaigns would be to form stronger positive attitudes towards purchasing and consuming organic foods and make the choice of organic food more conventional rather than spontaneous. This is supported the finding of a positive role played by personal attitudes in the formation of organic purchasing intentions. In addition, economic instruments can also be applied whereby consumers are willing to pay more for organically or sustainably produced meat. Examples of how the different policy instruments can be applied in the context of increasing organic food consumption and based on empirical research are outlined in Figure 6.

In the case of food waste, the provision of information via communication policy, can be used to form and develop attitudes towards to negate the generation food waste thus reducing the intention to waste. Regulatory or economic policy instruments also have a role to reduce the occurrence of food waste via additional tax on food waste generated both in domestic and commercial settings. The procedural policy instrument is also an appropriate one for the role of corporate responsibility within the restaurants and retailer's domain to make commitments to minimise, reduce and recycle food waste.

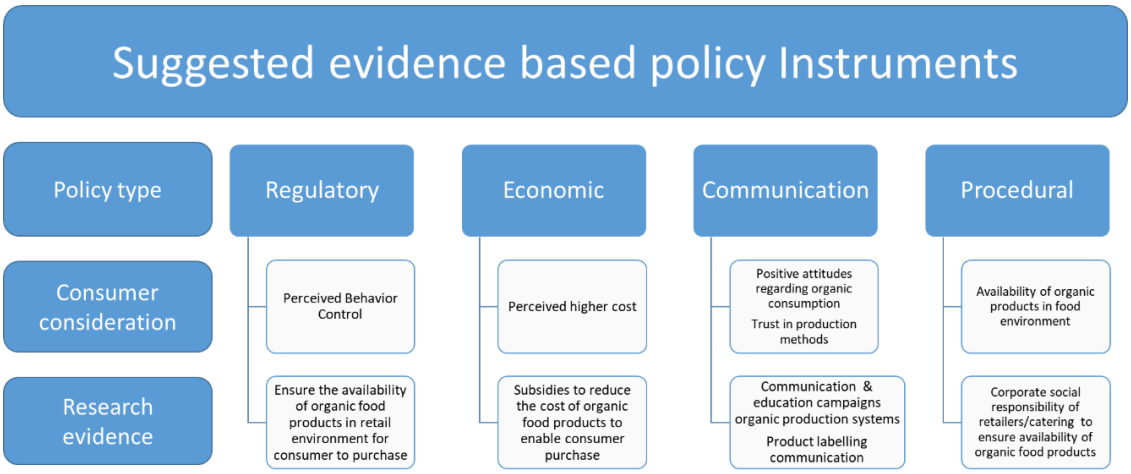


Figure 8. Potential for policy instruments such as Axis 1 to increase demand for organic foods underpinned by evidence-based research from the CA 5 country survey

7. Conclusion

This research review showed that certain behavioural constructs of the theory of planned behaviour and the norm activation model often affect the intentions of European consumers to purchase and consume organic food and generate food waste. The current evidence demonstrates that attitude, subjective norms, and to a lesser extent perceived behavioural control have a significant influence on organic food consumption decisions. Apart from the purely rational motives, other considerations like moral norm and self-identity may be also influential predictors of such decisions. Similarly, to the extent of the available limited evidence, personal attitudes may predict well consumer intentions to reduce or recycle food waste. Understanding these behavioural constructs can enhance the development of policy instruments that will be acceptable to consumers to increase organic consumption and to reduce food waste.

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