



Public multi-criteria assessment for societal concerns and gradual labelling



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ABSTRACT

We present a multicriteria product assessment framework that can be used to rank existing products against hypothetical product scenarios. Products are ranked for Environmental Impact, Healthfulness, Naturalness and Fairness. Assessment criteria and relative importance weights are sourced from the public. The framework has been demonstrated for fresh tomato production scenarios. Results are *valid* because they correspond to public concerns, *gradient* to reward small production improvements, and *relative* to available product alternatives. Their interpretation can be *normative* with reference to existing production averages: without agreement on absolute acceptability thresholds. Data improvement agrees with rational stakeholder behaviour. Results identify technological applications of higher and lower public acceptability potential, for production and research agenda optimisation. Other producer uses include labelling and brand name protection. Civil society uses include the critical assessment of production. Public uses include labelling in consumer-driven markets, and smooth production sector re-structuring by incentivizing a *race-to-the-top* for production externalities of public concern, like the environmental sustainability or the fairness of production.

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Introduction

Two shortcomings limit the effectiveness of certification schemes, such as values-based product labels and codes of ethical conduct, to achieve the management of innovative technologies and the regulation of externalities of food production according to ethical concerns of the public.¹

The first shortcoming is that when they are used as production optimisation instruments, certification schemes face a problem of validity. The content of the ethical claims stated, namely the ethical issues that are considered and the risk levels that are accepted, do not always match public concerns. The communication of ethical claims that do not match public concerns can be perceived by the public as “at best, irrelevant [...] and at worst may have seemed to be an attempt by the information source to hide from the public what the public perceived to be the ‘real’ risks of the

technology”, damaging trust in brand names and certification schemes (Frewer, 2003).²

The second shortcoming has to do with their effectiveness as a means to enable public involvement in production optimisation through ethical consumption in consumer-driven markets, and to motivate subsequent adjustment of production practices and technology use to revealed consumer preferences. This problem relates to the number of grades used to score certified products. As a rule, certification schemes are communicated to consumers in the form of two-grade ‘binary’ labels. This means that products are usually either fully certified or not certified at all (e.g. either ‘organic’ or ‘conventional’). Conversion to full certification for conventional producers however usually implies high costs, which lead to higher product prices. Higher prices, in their turn, lower consumer demand for labelled products, which consequently demotivates the certification of more conventional producers, and eventually the restructuring of the food supply sector according to relevant public preferences. In particular, the lower the number of available certification grades around which rational production aggregates, the more ethically distorted is the market: While the distribution of consumer preferences for ethical product characteristics is expectedly continuous, producers offer only a small number of discrete

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¹ We use the term ‘public’ to collectively refer to ‘citizens’ and ‘consumers’ (this issue is clarified at section Potential Uses, under Discussion). We refer to citizen and consumer concerns about food healthfulness and naturalness, and also about production externalities like environmental and socioeconomic impact as ‘ethical’ concerns (Andersen and Philipsen, 1998; Brom, 2000). Ethical concerns increasingly affect consumption patterns of concerned consumers, transcending the traditional ‘consumer vs. citizen’ dichotomy (Korthals, 2001a,b).

² Slovic (1999), Frewer (2003), Korthals (2004), Wynne (2006) discuss different production stakeholders’ attitude to public and consumer concerns.

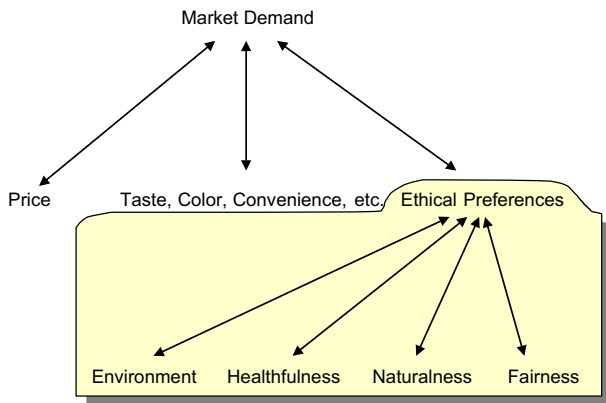


Fig. 1. Scope of the present assessment application.

product choices (like 'conventional', 'organic', etc.). Therefore there is a discrepancy between ethical preferences of consumers and supply of products that satisfy these preferences, and, consequently, the distribution of production practices does not match the distribution of the corresponding ethical preferences among consumers.³

In this paper we demonstrate a simplified application of the 'ECHO' assessment framework (Michalopoulos et al., 2008) meant to address these shortcomings. Substitutable product alternatives, in this case fresh tomatoes, are ranked according to their performance for public concerns and in terms of public perceptions. We use a public-sourced, inclusive list of assessment criteria identified from recent public food debates, which were subsequently completed and structured using qualitative interviews with disciplinary experts. These criteria are meant to represent 'what matters' among the ethical issues involved in food production. The criteria are weighted using stated consumer perceptions about their relative importance. These weights were obtained using written questionnaires and are meant to represent 'how much' the corresponding ethical issues matter.

Four existing and seven hypothetical fresh tomato options are assessed for 21 product and production attributes. The existing products are taken from the Dutch market. The hypothetical products were defined using expert judgment and are meant to represent scenarios of technologically reasonable product conjectures. Simplifications and expert assumptions were used to complete unavailable data on products' performance for the assessment criteria. The hypothetical tomato options include plant-genomics-enabled applications that have been developed using techniques such as marker-assisted-breeding (MAB), and also genetic modification (GM) techniques like cisgenesis and transgenesis (see e.g. Mahalakshmi and Ortiz, 2001; Nap et al., 2002; Buckler IV and Thornsberry, 2002; Crusak and Cakmak, 2005; Gremmen, 2005; Brookes and Barfoot, 2005; Rommens et al., 2007; Lammerts Van Bueren, et al., 2007). This enables us to discuss producer uses for the optimisation of the public

³ Studies show consumer willingness to pay higher prices for improved environmental, animal welfare, or fairness impact, but not the full 'organic' or 'fairtrade' price premiums. For instance, a poll commissioned by Milieudefensie (Netherlands-based NGO), indicated that only 2% of the meat sold in the Netherlands is organic due to high prices, while about 75% of the Dutch population responds that animal husbandry must be more animal and environmental friendly. To increase ethical meat consumption and consumer impact on animal welfare and the environment, The Netherlands debated the introduction of a pragmatic middle road in meat production: the so-called 'compromise animal' or 'compromise meat', meant to "fill the yawning gap between the ideal of organic animal husbandry and the existing practice of the meat industry. [translation ours, the term 'comfort' has also been used instead of 'compromise']" (NRC, 2007). See also de Pelsmacker (2005) for the case of FairTrade coffee.

acceptability of technologically innovative products during the phases of product design and research agenda setting, and also to demonstrate the relevance of this approach to socially optimal technological innovation in production. The tomato options are assessed for four categories of consumer concerns: Ecological Impact, Healthfulness, Naturalness, and Fairness (Fig. 1). This allows us to discuss producer uses for product promotion and also state policy uses for research agenda setting and for food production optimisation in consumer-driven markets.

In the remaining of this paper, the Methodology section starts with a brief introduction of the ECHO product assessment framework, and then describes the selection of the assessment criteria, indicators and relative importance weights. Next, the rationale behind the assessed tomato options is explained, and the empirical model used for the assessment is presented. In Results section the results are interpreted and analysed. The Discussion section identifies potential stakeholder uses, and also suggests methodological improvements and possible extensions of the presented product assessment approach.

Materials and methods

The ECHO product assessment framework

The ECHO⁴ product assessment framework (Michalopoulos et al., 2008) is an integrated approach for product characterisation on the basis of public concerns (criteria) and in terms of public perceptions (weights). Depending on the purpose of the application, this input may be derived either from 'citizens' (stated preferences), or from 'consumers' (revealed preferences). The framework essentially identifies conditions for input validity, and subsequently ranks substitutable products using a multiple criteria indexing model by Diaz-Balteiro and Romero (2004), based on the established Lancaster consumer demand model (Lancaster, 1966).

Among the characteristics of the ECHO framework are:

- The terms of product assessment are deliberated public concerns and perceptions, supporting justification of results and policies within a liberal-democratic political context. The incommensurability of values-based public concerns can be taken into account for the interpretation of results, helping to identify products with high likelihood for public controversy.
- The generated results are gradient (i.e. non-binary) product rankings. Gradient assessments can be used to incentivize and reward relatively modest production improvements, and can consequently facilitate and catalyse the re-allocation of production resources. This is especially relevant to periods of (e.g. environmental) restructuring of the production sector.
- The results can be interpreted to support normative claims that refer to dynamic production averages as thresholds. Reference to fixed and controversial values-based, e.g. fair trade or organic, thresholds can be avoided. The dynamic nature of these thresholds means that the generated normative claims can incentivize a 'race to the top' for production externalities of public concern.
- The implementation of the framework can generally rely on existing statistical data (national or sector production averages) and data improvement goes with the grain of market actor behaviour (rational producer motivations, consumer organizations and NGO mission statements).

These are discussed in more detail in the remaining sections.

⁴ The 'E.C.H.O.' acronym stands for 'Ethical CHaracterisation and Optimization'

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