



Public attitudes and decision making in environmental resource planning — a perception gap

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ABSTRACT

Recent research has suggested that decision makers may misunderstand public attitudes regarding natural resource use. Using research on Integrated Multi-trophic Aquaculture (IMTA) in six European countries, we illustrate one case in which this is true. We describe two studies: one revealing stakeholders' beliefs about the environmental sustainability of IMTA in addition to their beliefs regarding public perceptions of the same; and a second investigating perceptions held by the public. In comparing the studies, we identified a gap between what decision-makers believe the public perceives and what the public actually perceives. There is reason to believe that this phenomenon is not sector-specific because policy and planning mechanisms for incorporating the views of stakeholders and the larger public tend to be the similar, regardless of sector. This may cause a dilemma for developing natural-resource based industries, as well as public policy. For this reason, we suggest, as an alternative to over-reliance on citizens' initiative, making greater use of mechanisms that actively elicit opinions, such as deliberative consultation/engagement models that both inform and elicit preferences

1. Introduction

Countries around the world view the harnessing of natural resources as a great opportunity for increased wealth by serving as a foundation for economic production and consumption. However, conflicts regarding whether and how to exploit natural resources are common and can delay developments, halt them permanently and even lead to unsustainable practices (e.g. Anderson, 2013; Noakes et al., 2003). It has been suggested that the development of natural resource-based industries is being constrained by public criticism based on suspected environmental impact (Firestone and Kempton, 2007; Kaiser and Stead, 2002). Indeed, a commonly held view within industry, government, academia and other key stakeholder groups appears to be that the general public is opposed to unsustainable development of natural resources (e.g. wind energy, mining and aquaculture).

It is easy to understand why this perception might have arisen given numerous public campaigns highlighting risks and adverse environmental impacts of natural resource extraction (e.g. as described in Low and Shaw, 2011; Rosencranz and Scott, 1990). Over the last 50 years, there have been many public stakeholder conflicts relating to energy (Jessup, 2010; Martin, 2009), mining (Muradian et al., 2003) and

fisheries and aquaculture (Freitas et al. 2017; Liu et al., 2011). In many cases, the arguments surrounding these conflicts emphasise the perceived unequal distribution of benefits from development as well as the perceived associated environmental risks and burdens (Ertör and Ortega-Cerdà, 2015).

It is also understandable why anti-development perceptions held by the general public would be of concern to stakeholders. Around the world, conflict with resource-based industries has led to litigation (Buck, 2012; Ridler and Hishamunda, 2001; Ziza, 2007) and, on occasion, violence (Downey et al., 2010; Hilson, 2002; Stonich and Vandergeest, 2001). Conflicts of this type can be costly (financial and reputational) and time-consuming for the industry, and politically problematic for decision-makers. They may also foster mistrust within the public for the industries and the decision-making processes (Smith and Marquez, 2000).

Recent research suggests that concerns about the environmental sustainability of resource-using industries are held by particular stakeholder groups who can (and do) influence the policy, planning and development process (Rudd et al., 2011). Moreover, decision makers, especially those in policy and industry, may misunderstand the attitudes of the larger public, who do not necessarily share these views.

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Here, we use research into the development of Integrated Multi-Trophic Aquaculture (IMTA) in Europe as a case study through which to investigate this claim. IMTA is a practice whereby commercially valuable seaweeds, shellfish or other biota are grown near farmed finfish in a manner whereby the lower-trophic level organisms feed on waste products from the finfish, thereby enhancing the sustainability of fish farming. In this paper, we present key results from two separate studies, the first interviews with European aquaculture stakeholders (qualitative) and the second a survey of the European general public (quantitative), into perceptions of IMTA (Alexander et al., 2016a,b). The objective was to compare results of the two studies, and identify whether the concerns held by stakeholders were shared with the larger public. The results of the comparison were examined with reference to the criteria that public policy should be widely representative of, and consistent with, the needs of the public.

2. Methods

The results of two studies, one on stakeholder perceptions and one on perceptions of the general public were compared in order to determine

- 1 the extent to which they are similar or different; and
- 2 the extent to which stakeholders, especially decision makers understand the perceptions and attitudes of the general public.

Both studies were conducted as part of the ‘Increasing industrial resource efficiency in European Mariculture’ (IDREEM) project (www.idreem.eu). IDREEM was an EU FP7 project investigating the feasibility of IMTA in six European countries through pilot commercial-scale testing, field research and modelling. The aim of the project was to examine the obstacles and risks to the use of IMTA systems and to develop tools to overcome these constraints, be they economic, environmental, technical, social or regulatory. We briefly describe the methods of the stakeholder and public perception research below. Full details are available in (Alexander et al., 2016a) and (Alexander et al., 2016b).

2.1. Stakeholder study

The study into stakeholder perceptions of IMTA used in-depth interviews, based upon a semi-structured topic guide (Supplementary materials S1). We undertook interviews in six European countries: Cyprus, Ireland, Israel, Italy, Norway and the UK among stakeholders from ten groups: the aquaculture industry (including suppliers, producers, processors and retailers), non-industry decision-makers (including planners and regulators), academics, and ‘other’ groups (including community groups, fishers, and tourism organisations). Each country surveyed hosted an IDREEM project partner. Informed consent was obtained from participants and interviews were recorded using an audio recorder and then transcribed. The data from the stakeholder study was analysed using QSR International’s NVivo10 software: a computer aided analysis software which allows for coding (a form of analysis which sorts, focuses and organises data, allowing large amounts of qualitative data to be reduced to smaller ‘packages’) (Supplementary materials S2). Where qualitative interview data has been quantified, this is based on the percentage of respondents that raised the theme code.

2.2. Public perceptions study

To investigate the perceptions of the European public, we used an internet-based survey questionnaire (Supplementary materials S3). The sample was randomly stratified (a random sample from each stratum was taken in proportion to the stratum’s size when compared to the population meaning it is a representative sample according to these

stratum) in each country according to age, sex and region. A sample of 500 adults from each country allowed 95% confidence of $\pm 4.4\%$ accuracy in the survey results. The sample comprised adults (18+) drawn from the public in Ireland, the UK, Norway, Italy and Israel; unfortunately, because online sampling infrastructure was not available in Cyprus, only five countries could be surveyed.

The questionnaire focused particularly on participants’ knowledge of IMTA (using yes/no/don’t know questions); and perceptions of the benefits of IMTA (using yes/no/don’t know questions). During the survey, participants were shown a diagram of an IMTA system (after being asked if they had heard of the term) to ensure an understanding of what the practice involved and its potential environmental benefits compared to monoculture. The survey questionnaire was not informed by the findings of the stakeholder interviews. The results of the public survey were analysed using descriptive statistics. Univariate analysis was used to examine the frequency distribution (the frequency of individual values or ranges of values for each variable) where the distributions are displayed as percentages.

A previous study showed that region of origin was a key factor influencing public perceptions of IMTA, with those in Mediterranean countries likely to be more positive about the benefits or impacts of this production method (Alexander et al., 2016a,b). For this reason, the results presented here are aggregated and disaggregated by country.

2.3. Comparison of studies

A descriptive analysis was undertaken to compare the two studies. The use of different data collection tools influenced the subject matter covered by each of the two studies and the level of detail of the information provided. The closed form of the public survey questionnaire produced data on a set number of topics and provided basic scaling or ranking in the answers. The semi-structured interview format set out topic areas but also allowed interviewees to the freedom to discuss issues they felt were important. Similarly, within topic areas, interviewees were free to provide examples and details. Given that public perception data was not available in Cyprus, the stakeholder interview data has not been included in the comparison.

3. Results

A total of 37 interviews were taken across five countries (Ireland, Israel, Italy, Norway and Scotland). The spread of interviews amongst the stakeholder groups were not equal, between group or between country. Regulators and researchers were interviewed the most (6 and 5 interviews respectively); four interviews were undertaken with environmental organisations, fishing organisations, retailers and suppliers each; three interviews were undertaken with producer organisations; and the remaining groups participated in only one or two interviews each (community organisations, industry representatives, planners, processors and tourism organisations).

For the public survey, a total of 2520 questionnaires were collated across the five countries, with approximately 500 responses from each country. The entire sample was comprised of 47% male and 53% female, with slightly lower numbers in the age bracket of 18–24 years old but largely equal across all others. Half of respondents were below the average income bracket whilst the remainder were of average salary and above.

3.1. Comparison of stakeholder and the public perceptions of IMTA

3.1.1. Level of knowledge

Stakeholders were more knowledgeable about IMTA (59% (22/37) familiar with concept) than was the public (14% (358/2520) familiar with concept). Within both groups, individuals with direct exposure to aquaculture (e.g. in a professional capacity or living in coastal communities) were more knowledgeable than those without. The basic

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