OPERAs Wine Exemplar Summary

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Photo credit: Laura Siepmann

Ecosystem Science for Policy & Practice

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement number 308393.

BACKGROUND

The OPERAs Wine Exemplar is one of twelve exemplar case studies chosen to represent different geographies, ecosystems, scales, sectors and stakeholders in the European ecosystem services project, OPERAs (Operational Potential of Ecosystem Research Applications). OPERAs brings together academic, civil society, business, and policy partners to explore how to apply ecosystem services tools and approaches to decision-making processes in support of sustainable ecosystem management. The Wine Exemplar includes five research partner institutions (Table 1) and is a first-time collaboration between the researchers involved.

Table 1. The five research partner organizations and associated researchers involved in the Wine Exemplar.

Organization	Location	Wine Exemplar Researchers
Lund University Centre for Sustainability Studies (Exemplar Lead)	Lund, Sweden	Kimberly Nicholas, Heather Schoonover, Klara Winkler, Ellen Redford and Laura Siepmann
UN Environment - World Conservation and Monitoring Center (WCMC)	Cambridge, England	Sarah Ivory and Lisa Ingwall-King
European Forest Institute (EFI)	Joensuu, Finland and Vienna, Austria	Diana Tuomasjukka, Marcus Lindner, Patrick Huber, and Bernhard Wolfslehner
denkstatt	Sofia, Bulgaria	Dariya Hadshiyska, Denitza Pavlova, Peter Seizov, and Martin Ivanov
University of Edinburgh	Edinburgh, Scotland	Marc Metzger

GOALS AND APPROACH

The ultimate goal of the OPERAs Wine Exemplar is to increase ecosystem services provided by vineyard ecosystems. To do so, the Wine Exemplar researchers seek to understand how different stakeholders in the wine value chain, including growers, wineries, distributors, retailers, and consumers (Figure 1), influence wine production and thus the ecosystem services provided by vineyards.

Our approach is unique because most scientific work on ecosystem services focuses only on the production stage of the value chain. Although ecosystem services are supplied at the grower level, many other stakeholders can and do influence wine production. In addition, since wine is a consumer product, ecosystem services may be more likely to be incorporated into vineyard management and decision-making if they are something consumers, retailers, and distributors value and demand.

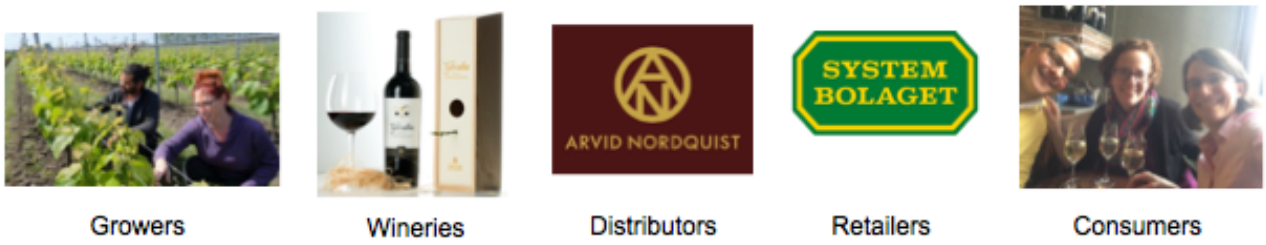

Figure 1. Key stakeholders in the wine value chain.

Each of the stakeholders in the wine value chain has their own values and motivations, and each faces different opportunities and barriers when making decisions about how to grow, produce, source, sell, or purchase wine (Table 2). Thus, to preserve and increase ecosystem services from wine, it is important to understand not only how each stakeholder influences wine production, but also what drives their decision-making. This context is particularly important since one of the hallmarks of the overall OPERAs project is to develop and test tools that can help identify, measure, and monitor ecosystem services and thus guide decision-making toward practices that result in greater ecosystem services provision.

Table 2. Key decisions affecting ecosystem services faced by different stakeholders in the wine value chain.

Stakeholder	Growers	Wineries	Distributors	Retailers	Consumers
Decision	How to **grow** grapes	How to **produce** wine	Which wines to **source**	Which wines to **sell**	Which wines to **purchase**

To understand these different aspects, the Wine Exemplar has engaged in a number of different projects. Some employ the tools developed by the research partners to understand the impacts of wine production on ecosystem services and recommend areas for improvement, while others seek to understand the values, motivations, opportunities, and barriers of particular stakeholders in switching to more sustainable practices (Figure 2).

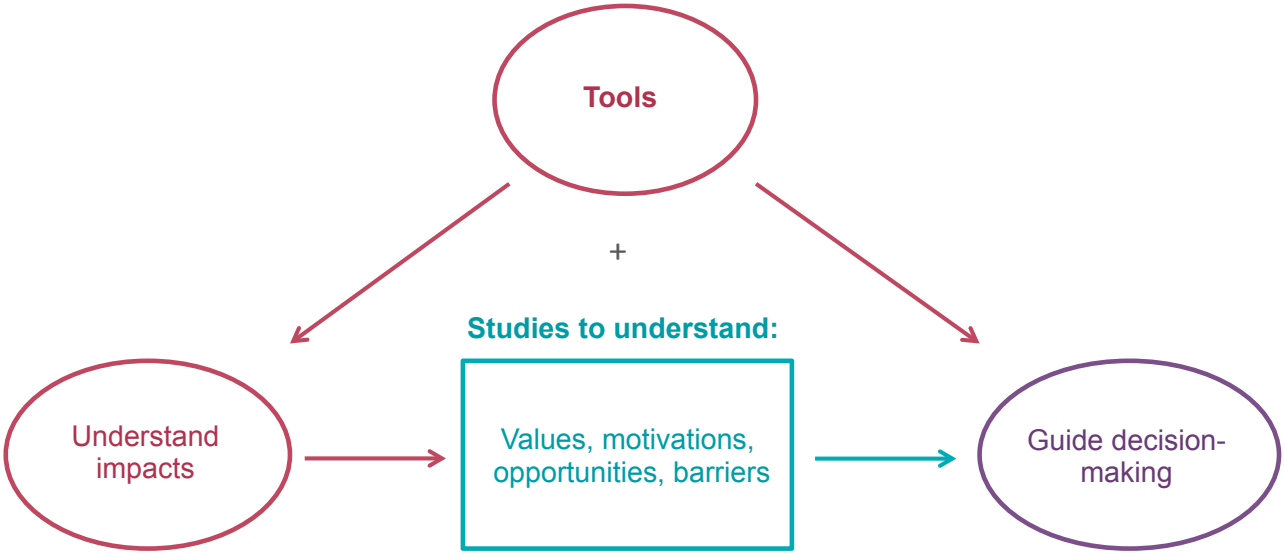

Figure 2. The Wine Exemplar combines the development and use of tools (red) with studies aimed at understanding motivations and barriers to change (blue) in order to guide decision-making by stakeholders in the wine value chain (purple). Descriptions of each of the tools and studies can be found below.

STAKEHOLDERS

Many of the stakeholders that have been engaged by the Wine Exemplar were ultimately selected based on proximity to and existing relationships with the research partners. This stemmed from the fact that our original plan to work with stakeholders in a new wine-growing region was hindered by a lack of presence and relationships in the region. Thus, rather than focusing on one particular case, we built on the strengths of each of the research partners by engaging known stakeholders most related to the researchers' areas of expertise, with a goal of ensuring representation from at least one stakeholder from each stage in the wine value chain (Table 3).

Table 3. Stakeholders engaged by the Wine Exemplar.

Stakeholder	Growers	Wineries	Distributors	Retailers	Consumers
Location(s)	Pfalz and Rheinhessen, Germany; Southeast England; Montado, Portugal; California, USA	Samora Correia, Portugal	Stockholm and Lund, Sweden	Stockholm, Sweden	Southeast England; California, USA

TOOLS

The Wine Exemplar has developed and employed five tools to both understand the impacts of different stakeholders and production processes on ecosystem services, and help guide decisions made by these stakeholders (Table 4). Some of these tools were developed specifically by and for the Wine Exemplar, while others are existing tools that Wine Exemplar researchers have adapted to the wine industry.

*Table 4. Tools developed and adapted by the Wine Exemplar. "**X**" indicates current use in the Wine Exemplar. However, each of the tools could potentially be used by any of the stakeholders in the future. Each of the tools is explained further below.*

Tools	Developer	Growers	Wineries	Distributors	Retailers	Consumers
Ecosystem Services Indicator Guidance	WCMC	X				
WeLCa	denkstatt	X	X	X		
Ecolabel Review	EFI	X	X	X	X	X
ToSIA	EFI	X	X			
MCA	EFI	X	X			

The **Ecosystem Services Indicator Guidance** provides guidance on the process of developing meaningful indicators of ecosystem services. It is applicable to any system and is being used in the Wine Exemplar to develop indicators for ecosystem services that are both impacted by wine production and on which wine production depends. These indicators could in turn be fed into other tools to help guide decisions by other stakeholders or used as a monitoring tool for wine growers, wineries and/or distributors interested in ensuring healthy ecosystem services.

WeLCa (Wine Ecosystem Life-Cycle Assessment) is a life cycle thinking-based tool that provides both a qualitative and quantitative assessment of the impacts of different wine production and management practices and identifies areas for improvement, with a particular focus on biodiversity. WeLCa was developed specifically for the Wine Exemplar and is primarily aimed at grape growers and wineries to help guide their production and distribution decisions, but may also be of interest to distributors, retailers and others interested in assessing and comparing the environmental performance of different wine producers.

The **Ecolabel Review** helps compare the many wine ecolabels by rating them in terms of six criteria (transparency, democracy, rigor, comprehensiveness of environmental and social criteria, separation of powers, and level of redundancy). By offering insight into what specific ecolabels contain, it could be used by consumers to guide purchasing decisions, by distributors and retailers to guide sourcing and selling decisions, and by producers to determine which label(s) to pursue for certification.

ToSIA (Tool for Sustainability Impact Assessment) uses scenarios to quantitatively compare economic, environmental and social impacts of different process chains. Originally developed for the forestry sector, it is being adapted by the Wine Exemplar, including mapping out the wine production process and associated material flows, to allow wine growers and wineries to understand potential environmental impacts due to different management options. In the future it could be further developed to include changes in practices and resulting impacts by distributors, retailers and consumers.

MCA (Multi-Criteria Analysis) builds on scenarios and integrates stakeholder values and preferences to help determine the most desirable alternative. In the Wine Exemplar, the MCA was tailored towards the support of an application with ToSIA in order to identify possible pathways for a desired future. It aims to support stakeholders along the entire value chain and is relevant to policymakers as well.

STUDIES

In addition to developing, testing and implementing tools, the Wine Exemplar has undertaken a number of studies to understand both interactions between wine production and ecosystem services, and the values, motivations, opportunities, and barriers that influence the decisions made by different wine value chain stakeholders. These studies have resulted in a wide range of outputs, including academic publications, conference posters, and public outreach activities (Table 5).

Table 5. Study outputs by the wine exemplar and the wine value chain stakeholders to whom they apply.

Study output	Reference	Key findings	Growers	Wineries	Distributors	Retailers	Consumers
Assessing Ecosystem Services and Multifunctionality for Vineyard Systems	Winkler, K.J., Viers, J.H., and Nicholas, K.A. (2017). Frontiers in Environmental Science, 5:15.	Through a literature review of over 4,000 academic publications, identifies the most commonly researched ecosystem services in vineyards (harvested crops, nutrient storage, pest and disease control, heritage/cultural, and scientific) and finds that they are rarely studied in synergy.	X				
Ecosystem services uncorked: how do vineyards fit into nature's scheme?	Winkler, K. OPERAs blog post, 24 April 2017.						
Vinecology: pairing wine with nature	Viers, J.H., Williams, J.N., Nicholas, K.A., Barbosa, O., Kotzé, I., Spence, L., Webb, L.B., Merenlends, A., Reynolds, M. (2013.) Conservation Letters 6(5): 287-299.	Presents a survey of the footprint of New World vineyards and opportunities for using ecological principles to manage vineyards as a model of sustainable agriculture.	X				
Winegrowers' motives and barriers to convert to organic farming in Pfalz and Rheinhessen, Germany	Siepmann, L. (2016.) Uppsala University masters thesis.	In-depth interviews with German winegrowers reveal their motivations for organic winegrowing (including strengthening the soil, receiving support from social networks, and their own beliefs about the value of organic growing) as well as barriers to doing so (including limitations in pest control and financial risks).	X				
Organic farming through winegrowers' eyes	Siepmann, L. OPERAs blog post, 8 June 2016.						
Wine, almond blossoms, & earthworms	Siepmann, L. OPERAs blog post, 16 March 2016.						
A taste of the future: Wine in a changing climate	Nicholas, K.A. Slides from a public talk on the science of wine and climate change, 23 November 2016.	Shares recent research highlights on the effects of climate change on wine and how growers are adapting, emphasizing the need for reduced greenhouse gas emissions to continue winegrowing traditions.	X				
Illustrating human-nature interactions in ecosystem services: the case of terroir in wine	Nicholas, K.A. Poster presentation at American Geophysical Union, San Francisco, California, USA, 2014.	Illustrates how terroir, the "taste of place" prized by wine lovers, can represent the value of nature in human lives, and how people and nature work together to create vineyard landscapes and wine.	X	X			

Study output	Reference	Key findings	Growers	Wineries	Distributors	Retailers	Consumers
Rosé tinted glasses?: How a new wine region can adopt existing low carbon practices	Redford, E. Lund University International Masters' Programme in Environmental Studies and Sustainability Science (LUMES) masters thesis.	Identifies the most impactful steps of wine production (winegrowing in the vineyard, and bottling), as well as best practices to lighten the footprint (such as smarter packaging rather than heavy glass bottles, and more ecologically farmed wines).	X	X			
The Sussex wine industry's opportunity to become UK climate change pioneers)	Redford, E. OPERAs blog post, 7 February 2017.						
Will We Still Enjoy Pinot Noir?	Nicholas, K.A. Scientific American, 312(1): 60-67.	Discusses how winegrowers are facing the threat of climate change and their opportunities and limitations to adapt.	X	X			
More than wine: Cultural ecosystem services in vineyard landscapes in England and California	Winkler, K.J. and Nicholas, K.A. (2016). Ecological Economics, 124: 86-98.	Identifies eight different perspectives from residents and wine producers on the cultural benefits of vineyard landscapes—ranging from scientific to tradition—highlighting how personal experience and use of landscapes shapes perspectives and can inform better land use decisions.	X				X
More than wine: cultural ecosystem services in vineyard landscapes	Winkler, K. (2014.) Lund University International Masters' Programme in Environmental Studies and Sustainability Science (LUMES) masters thesis.						
More than wine: Perspectives on local values and vineyard landscapes	Winkler, K. OPERAs blog post, 15 March 2016.						
Changing Climate, Changing Wine	Nicholas, K.A. Interview with Roger Harrabin on BBC Radio 4, 16 November 2015.	A conversation over a glass of wine in Paris on how climate change is changing the taste of wine, and what the wine industry is doing to adapt.	X				X
Meetings with two wine distributors	(Confidential)	Discussed opportunities and barriers for sourcing sustainably produced wine.			X		
Meeting with major wine retailer	(Confidential)	Discussed opportunities and barriers for selling sustainably produced wine.				X	
Background market research on sustainability in the wine industry	(Unpublished)	Illustrates growing demand for sustainably produced wine by both retailers and consumers.				X	X

CONCLUSION

Overall, the Wine Exemplar has successfully brought together researchers who have not previously collaborated to explore how to apply ecosystem services tools and approaches to decision-making processes in the wine industry. More broadly, we have gained a better understanding of how different stakeholders in the wine industry can influence ecosystem services, as well as some of the factors that influence the decisions that each of these stakeholders make. For example, retailers can indirectly influence wine production – and hence ecosystem services – through their "requests for tender", which outline the specific types of wine they would like to carry and invite wineries, often via distributors, to present their wines for consideration. The retailers and distributors with whom we spoke were eager to better understand the landscape of sustainably produced wine, including the many different wine eco-labels and the criteria behind them, and researchers can help them do so.

At the same time, we learned the importance of ensuring that the data required by researchers' tools aligns with those maintained by or readily available to practitioners. For example, adapting the ToSIA tool for the wine value chain turned out to require some data that were not broadly available. Thus, we narrowed our focus with ToSIA to first working with a specific winery before trying to adapt it for the industry as a whole. In addition, despite an interest in increasing the sustainability of their practices, there may be factors beyond the scope of ecosystem services tools and approaches that limit the extent to which practitioners are able or willing to do so. For example, some of the growers and wineries with whom we spoke were interested in production practices that can increase ecosystem services but cited barriers including limited pest control options for organic wine and quality perceptions related to low-carbon bottling alternatives as reasons they were hesitant to shift their practices. These insights are critical to continuing collaborations between researchers and wine industry stakeholders in pursuit of increasing ecosystem services provision.

Thank you OPERAs Wine Exemplar research partners!