

Chapter 13

Motivation Crowding and Ecological Risks in Vineyards – The Case of the Austrian Agri-environmental Scheme ÖPUL

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MOTIVATION CROWDING AND ECOLOGICAL RISKS IN VINEYARDS – THE CASE OF THE AUSTRIAN AGRICULTURAL ENVIRONMENTAL SCHEME ÖPUL

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Introduction

Agriculture has an impact on a wide range of ecosystem services and climate change, while it is also considered as the economic sector most affected by climate change and natural disasters (Environment Agency Austria, s.a.; Longbottom and Petrie, 2015; Riegler and Hinterberger, 2010; Soja et al., 2010). This also holds true for viticulture, which is affected by risks and disadvantages arising from late frosts in spring; extreme weather events such as storms, heavy or few rainfalls, hail, higher temperatures (Bonada and Sadras, 2015), and, in general, a wider climate variability resulting in loss of quality, erosion (Prosdocimi et al., 2016; Vršič et al., 2011), grape rot, or other crop failures (Environment Agency Austria, s.a.). Vines depend on comparatively high rates of fertiliser, plant protection application, and intensive management activities such as tillage or pruning. These interventions, in turn, can affect environmental quality and vulnerability to natural disasters (e.g. Coulouma et al., 2006; Guidoni et al., 2012; Kieninger and Winter, 2014; Longbottom and Petrie, 2015; Riegler and Hinterberger, 2010; Sharley et al., 2008; Soja et al., 2010; Viers et al., 2013).

Since the late 1980s (European Commission, s.a.), conditional payments such as agri-environmental schemes (AES) and other payments for ecosystem services have been providing monetary incentives for land users to adopt more environment-friendly practices to improve the quality of the environment and to combat ecological risks in the European Union (EU). Complementing legal restrictions, education and awareness raising, zoning, and other policies constitute an important component of a bundle of diverse risk governance strategies. The Austrian variant of AES called ÖPUL (Austrian programme for an environment-friendly agriculture – Österreichische Programm für umweltgerechte Landwirtschaft) has been implemented since 1995. It is one example of a European AES covering objectives such as the promotion of land use and farming practices that improve the quality of the environment, reduce greenhouse gas emissions, maintain landscape quality, and implement environmental and nature conservation policies at the national and provincial levels (BMLFUW, 2016). Viticulture has also been targeted by ÖPUL as response to increased carbon emissions (e.g. Longbottom and Petrie, 2015; Soja et al., 2010), dropping ecosystem services (Riegler and Hinterberger, 2010), carbon sinks (Brunori et al., 2016), increased use of pesticides (Renaud-Gentié et al., 2014) and fertilisers, soil degradation (Bazzoffi et al., 2006), and erosion, as well as an increasing vulnerability to natural disasters (Coulouma et al., 2006; Guidoni et al., 2012; Riegler and Hinterberger, 2010; Sharley et al., 2008; Viers et al., 2013).

Numerous initiatives across the world illustrate the importance of enhancing environmental quality in vineyards. Vintners in Champagne, France, experiment with pheromone traps to reduce the amount of insecticides. In the Bottwarttal valley in Germany, the pilot study W.E.I.N for sustainable viticulture dates back to 2000 and, inter alia, experiments with replacing chemical pesticides, improving soil fertility, and reducing erosion through greening and using alternative cultivation methods. The Biodiversity and Wine Initiative in South Africa, in cooperation with the World Wildlife Fund, has, since 2004, been supporting the improvement of biodiversity (plants and species) through the implementation of voluntary environmental management plans (Riegler and Hinterberger, 2010). Other examples include Sustainable Winegrowing New Zealand (NZWINE, s.a.), Sustainable Winegrowing Program of California (CSWA, s.a.) or Forum per la Sostenibilità del Vino in Italy (2014, s.a.). The Austrian ÖPUL programme 2007–2013 provided (in the field of viticulture) compensation for erosion control through greening, organic farming, integrated production, and areas with high nature value (see also Section 5).

As external motivations, however, financial incentives interact with other motivational drivers such as values, norms, worldviews, informal institutions, or social expectations. Thus, we can see motivation crowding (crowding in of farmers not intrinsically motivated to contribute to conservation, crowding out of farmers' intrinsic motivations for



conservation) within the spectrum of intrinsic (e.g. values, social expectations) and extrinsic (e.g. cash incentives, auctions) motivations (Deci, 1971; Deci et al., 1999). A lively academic debate is emerging around the question of to which degree external incentives are crowding out intrinsic motivations for pro-environmental behaviour (Evans et al., 2012; Steg et al., 2014; Vatn, 2010; Wunder, 2013). Associated long-term effects on vintners' values, behaviour, and practices, however, are paramount with regards to environmental quality and the design of environmental policies (Ferguson and Bargh, 2004; Marques et al., 2015; Orderud and Vogt, 2016).

Despite a growing body of studies on motivation crowding in different fields of AES and payments for ecosystem services (PES), e.g. Chan et al. (2017), Fisher (2012), Kerschhofer (2013), Linder (2016), Van Hecken et al. (2017), and Wegner (2016), inquiries for agricultural speciality crops such as grapes are yet missing. Therefore, the focus of this paper is twofold: we compare the motivation and actual practices of vintners who are participating in the ÖPUL scheme with non-participants, and we investigate indications for crowding in and crowding out effects amongst a group of vintners participating in the ÖPUL programme between 2007 and 2013. Specifically, we want to use and test the applicability of the framework by Rode et al. (2015) to better understand crowding-out and crowding-in effects of payments for AES in vineyards.

Theoretical Background on Motivation Crowding

Motivations for Scheme Participation and the Contested Role of Financial Incentives for Service Delivery

Budgets, some say, are policies in figures. In this sense, rising public payments for environmental services demonstrate the increasing importance of environmental concerns in the agricultural policy of the EU (Ingram et al., 2013; OECD, 2016). In agricultural contexts, conditional, direct payments are generally considered efficient and effective (Wunder, 2015). Different conditions and motivations for farmers' willingness to participate in AES have been discussed, for example, by Baur et al., (2016), Chan et al. (2017), Engel (2016), Engel and Muller (2016), Gneezy et al. (2011), Ingram et al. (2013), Ma et al. (2012), Rode et al. (2015), Van Hecken and Bastiaensen (2010), Vatn (2010), and Wunder (2015).

Engel (2016) provided a comprehensive discussion of different AES and payments for ecosystem services policy designs, building on the criticism that there is mixed evidence of which conditions are financial payments successful in terms of service delivery and that they are no panacea, and that many studies do not find any motivation crowding

effects and in general lack rigour (Rode et al., 2015). Financial incentives for the delivery of environmental services are usually not based on results, i.e. the provision of the environmental service itself (e.g. decrease in erosion). They are rather based on the delivery of particular practices, which are considered beneficial (e.g. greening of vineyards at certain periods of the year, which is considered helpful in reducing erosion), usually with limited evidence on the effectiveness of these practices (Engel, 2016).

Contract types have been discussed from different perspectives: farmers consider longer contract durations as risky because these lower their flexibility to adapt to future market fluctuations and other changes and are therefore expecting higher payments (Ruto and Garrod, 2009). Baur et al. (2016) questioned if even 'sufficient' payments would provide incentives for prompt land use changes due to farmers' rather conservative cultural values resulting in deferred reaction to new incentives. As a more promising strategy, the authors propose to modify existing schemes rather than introduce new ones. Low or too low payments might even be counterproductive and result in higher risk for crowding out, thus the proposal to scratch too low funding due to potential adverse effects ('pay enough or do not pay at all') (Gneezy et al., 2011; Kerr et al., 2012; Vatn, 2010). However, other cases illustrate that lower levels of payments combined with triggers of intrinsic motivation might work under certain conditions (McKenzie et al., 2013).

Crowding-out Mechanisms

Rode et al. (2015) identified different mechanisms triggering crowding-out effects: reduced intrinsic motivation through the introduction of financial incentives, and aversion to change and control as well as frustration (see Table 1). The introduction of financial incentives might lower intrinsic motivation for service delivery, self-esteem, and the feel-good effect of delivering a value that has previously been recognised by the peer group or by society with non-monetary rewards. The presence of payment scheme makes it more difficult to distinguish if ecological services are delivered voluntarily (e.g. on moral grounds) or for economic reasons. Goodin (1994) described that actors who started following the principles and ethics of the market are characterised by fading moral obligations or responsibility which may result in frame shifting and/or changes in values and mindsets towards financial incentives. While 'frame shifting' is considered a temporal shift in focus (Bowles and Polanía-Reyes, 2012; Van Hecken and Bastiaensen, 2010), financial incentives and ongoing familiarisation with those payment schemes might also trigger long-term shifts in mindsets and values (Fisher, 2012; Frey, 1992; Rico García-Amado et al., 2013). These changes in socio-psychological patterns may result in lower degrees of service delivery after the end of the scheme compared to the situation before its implementation in case it is cancelled (Gneezy et al., 2011; Guerrero et al., 2013;

Steg and Groot, 2010; Van Hecken and Bastiaensen, 2010). If ‘leading’ farmers flexibly adopt more materialistic mindsets (Muradian et al., 2013; Vatn, 2010), this might not only be an issue at the individual level but might well interact with the perception of acceptable practices and norms or/and recognition conditions within peer groups.

Table 1: Crowding-out Mechanisms

Crowding-out mechanism	Explanation
1. Control aversion	Individuals with sense of autonomy and self-determination dislike the feeling of being controlled.
2. Frustration	Individuals are frustrated when they perceive regulations as a sign of distrust.
3. Reduced internal satisfaction (reduced ‘warm glow’)	Individuals no longer feel good about themselves for acting morally on a voluntary basis.
4. Reduced image motivation	Incentives undermine the individual’s desire to present oneself as a ‘good person’ (‘signalling’) since others can no longer distinguish if one undertakes a social activity voluntarily or due to external incentives.
5. Release from moral responsibility	Compensating for environmental harm via monetary payments releases people from feelings of responsibility and guilt.
6. Frame shifting	An individual’s attention is shifted towards a focus on economic reasoning (short term).
7. Changes in values of mindsets	The focus on economic reasoning affects attitudes and mindsets regarding conservation (long term).

Source: Rode et al., 2015.

Research also shows that farmers, compared to other groups, are quite consistent in their perceptions and routines, less open to changes (Baur et al., 2016), and strongly attached to their business and management styles (Beharry-Borg et al., 2013). Apart from the intrinsic motivation and general willingness to perform environmental services, their actual capacity to do bureaucratic and technological tasks (particularly for small or part-time farmers) and available labour, technological capacity is crucial as PES and AES require administrative efforts (e.g. writing applications, completing forms, documentation and monitoring). Frustration that might trigger crowding out also roots in standards that do not correspond with actual practices, contradict or conflict with values (Gneezy et al., 2011), or restrict the individual action space (Sommerville et al., 2010) and are of perception of being controlled by an external entity (Bowles and Polanía-Reyes, 2012).

Crowding-in Mechanisms

The current debate on motivation crowding builds on concepts such as self-determination (e.g. Ezzine-de-Blas et al., 2015) or the theory of planned behaviour linked to human–nature relationships (Braito et al., 2017; Van Dijk et al., 2016). The willingness to perform an environmental service is a consequence of a person’s intention

to accomplish it based on the conviction of ecological values and resulting ecological benefits (e.g. improved soil structure), respect for nature and environment (Rico García-Amado et al., 2013), and perceived beauty of nature or moral duty to protect nature and environment (Fisher, 2012; Kieninger et al., 2011, 2013). Those intentions are conditioned by a person's and/or group's attitude towards the performing behaviour, subjective norms and values, worldviews or beliefs (Daube and Ulph, 2016; Evans et al., 2012; Steg et al., 2014). Van Dijk et al. (2016) emphasised the role of identity in the intent to participate in activities that are more labour and time-consuming than regular activity. Inter-subjective recognition is crucial in the successful formation of self-identity and group recognition (Fraser and Honneth, 2003; Honneth, 1992; Mead, 1973). Thus, to understand farmers' attitude towards nature or pro-environment practices, it is important to comprehend the more general norms and values that are conditioning their integration into and social recognition of the particular peer group (Fraser and Honneth, 2003; Honneth, 1992). Agricultural production and delivery of ecological services are directly linked to norms, which define favourable or at least acceptable practices. Monetary recognition systems such as AES and PES are also redistributing resources for delivery of such services. The positive reinforcement of socially valued services and social recognition results in increased self-esteem, which is discussed as an important driver for crowding in. Various scholars, however, also stress the importance of peer and social groups in delivery of ecological services or group-based payment schemes (Van Hecken and Bastiaensen, 2010; Van Hecken et al., 2017). PES and AES are also signals that delivering environmental services is valued by outsiders and society (Frey, 1992) and they are expected to improve the general attitude towards ecological quality, environmentally friendly management practices, and the regulating institutional design (Sommerville et al., 2010). Overall, the academic debate on intrinsic motivation and crowding-in is diverse, sometimes inconclusive, and less researched than crowding out (Rode et al., 2015). However, there is considerable agreement amongst researchers that financial incentives always interact with intrinsic motivations (e.g. Engel, 2016; Van Hecken et al., 2017).

Table 2: Crowding-in Mechanisms

Crowding-out mechanism	Explanation
1. Enhanced internal satisfaction (self-esteem or 'warm glow') through social recognition	Individuals feel better about their behaviour when they perceive rewards as supporting and acknowledging their behaviour.
2. Reinforced positive attitudes or trust	Rewards can enhance people's general attitudes towards conservation and trust in regulating institutions.
3. Prescriptive effect	Individuals receive a 'message' indicating what constitutes desirable societal action, potentially in the longer-term changing perceptions, values, and norms.
4. Reinforcement achieved by compelling non-intrinsically motivated individuals to comply	Intrinsically motivated individuals can more easily act upon their motivation when they do not face a bad example or even exploitation of individuals who are not intrinsically motivated.

Source: Rode et al., 2015.



ÖPUL Measures and the Environmental Quality of Vineyards

In 2014 (the year of our survey), 7,177 or 84% of all vintners participated in at least one ÖPUL measure. In this section, we present these ÖPUL measures, which are also object of our empirical analysis.

Erosion Control

Through vegetation cover or the application of grass, bark mulch, or straw in vine rows, erosion control should help protect the soil against wind and water erosion and reduce the loss of nutrients into surface water (BMLFUW, 2013). With an inclination of $\geq 25\%$, vegetation cover has to be yearlong and is subsidised at €300–€800/ha, depending on the slope gradient. On slopes with $< 25\%$ inclination, it can also be kept just from 1 November until 30 April (€125/ha). Terraces are regarded per se as erosion control and can be kept open (BMLFUW, 2013). Spontaneous vegetation ('natural greening' in contrast to 'seeding') was only allowed as erosion control in ÖPUL 2007–2013.

Organic Farming

The goal of organic management is the promotion of sustainable management practices and this includes a ban on synthetic pesticides and mineral fertilisers to protect biodiversity and natural resources (BMLFUW, 2013). Eligibility criteria for the subsidy (€750/ha) include, inter alia, official certification from an organic auditing body and maintenance of landscape elements (BMLFUW, 2013).

Integrated Production

Integrated production in viticulture was subsidised with €400/ha (2007–2013) and in the ÖPUL transitional year (2014), with €350/ha (BMLFUW, 2013). In the 2015 ÖPUL programme, integrated production was replaced by herbicide and insecticide abstinence (each at €250/ha). The goal of this integrated production measure was the sensitisation of the participants in the field of fertilisation, plant protection, and soil health by restricting pesticides and fertilisation beyond legal requirements. The use of chemical-synthetic pesticides was only allowed on the basis of a positive list; regular inspections or indications of plant protection warnings; and the documentation of frequency and amount of pesticides, fertiliser, weeding, harvest, etc. (BMLFUW, 2013).

Areas of High Nature Value

This measure should help maintain areas and structures that are of high value for nature conservation (BMLFUW, 2013). In viticulture, it is mainly relevant for the management of grasslands (i.e. mowing of the slopes) between wine rows. The requirement for participation is the confirmation of the project plan by a nature conservation department of a federal state (BMLFUW, 2013). Management has to follow exact protocol for each plot. Payment is individually determined for each area (BMLFUW, 2013).

ÖPUL measures such as mitigation of soil erosion, herbicide and insecticide abstinence, organic farming, or high nature-value areas help to increase the environmental quality of vineyards and climate. Herbicides have negative impacts on plants, arthropods (Sanguaneko and Leon, 2011), earthworms (Gaupp-Berghausen et al., 2015), and arbuscular mycorrhiza fungi (Zaller et al., 2014), which are important for nutrient uptake from soil. In addition, herbicides may cause environmental risks such as surface and groundwater pollution (Louchart et al., 2001) or residues in grape juice and wines (Ying and Williams, 1999). The removal of vegetation by herbicides or tillage reduces soil carbon content and consequently results in carbon sequestration (Zehetner et al., 2015), which also decreases atmospheric carbon dioxide regulation (Montanaro et al., 2017). Furthermore, due to periodic soil tillage and herbicide application (i.e. open soil), erosion has become a widespread problem in viticulture (e.g. Novara et al., 2011; Ruíz-Colmenero et al., 2011), threatening biodiversity (Montanarella, 2005) and the provision of multiple ecosystem services (Novara et al., 2013). The mitigation of soil erosion is mainly due to mechanical protection by vegetation cover. It is, therefore, of utmost importance to establish a fully developed vegetation cover during summer when heaviest rainfall events could cause huge erosion (Lieskovský and Kenderessy, 2014). The current ÖPUL erosion mitigation measure is frequently criticised for not being adequate enough in reducing soil erosion at the earliest date for soil tillage (1 May). In many cases, re-establishing vegetation cover in vineyard inter-rows comes too late with the advent of heavy summer rains. The effects of organic farming on plant diversity are unclear, as some studies showed positive effects (Gaigher and Samways 2014; Nascimbene et al., 2012), while others could not detect differences between conventional and organic vineyards (Bruggisser et al. 2010; Kehinde and Samways, 2014). However, as mentioned, the ban on pesticides in organic farming is beneficial for a range of taxa.

Material and Methods

Case Study Sites

The study took place in three Austrian wine-growing districts: Wachau, Wagram, and Leithaberg-Neusiedlersee (and mainly in the municipalities of Purbach am Neusiedlersee, Grossriedenthal, and Dürnstein). They were selected based on two criteria: representation of the two largest wine-producing provinces (Lower Austria, Burgenland) and existing contacts and established relationships with local representatives of the wine-growing communities, different actors, and stakeholders, so that trust was already built up for interviews and focus groups.

Wachau (Wu) is a 35-km long valley on both sides of the river Danube, located around 80 km northwest from Vienna, between the cities of Melk and Krems. It is one of the most renowned Austrian wine-growing regions. The six municipalities of Wachau hold a viticulture area of around 1.350 ha (ÖWM, s.a.a), managed by about 600 vintners (Feigl and Peyerl, 2011). Mainly due to its unique and highly aesthetical dry-stone walls, Wachau was awarded the European Diploma for Protected Areas in 1994 and was designated as UNESCO World Heritage Site in 2000 (AK, s.a.). Over a quarter of the vineyards are situated on terraces (AK, 2007).

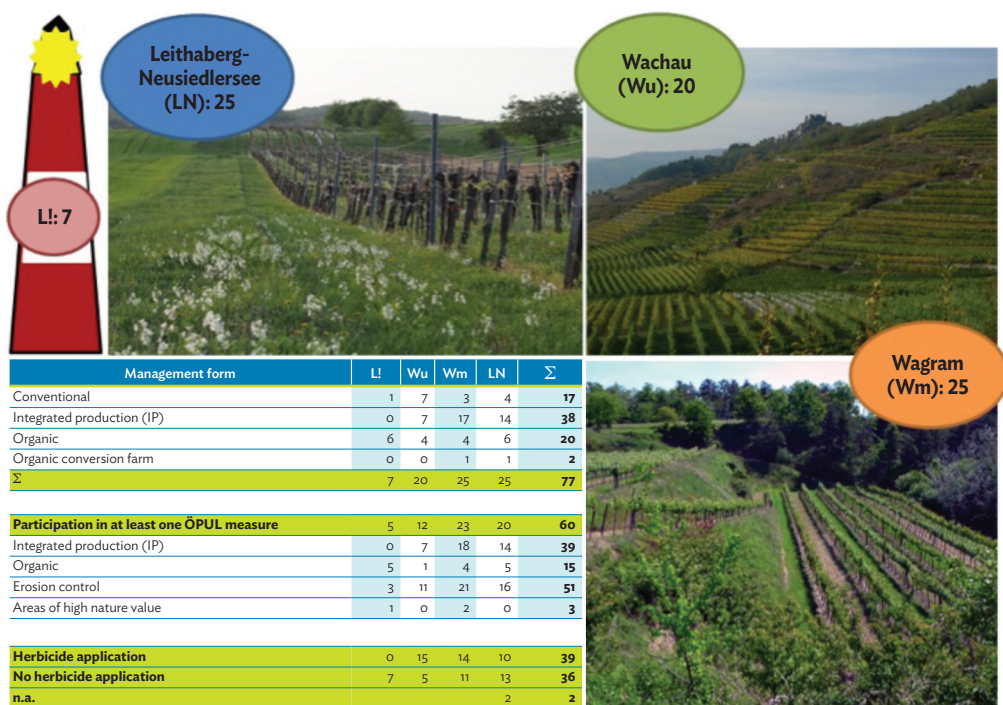
The wine-growing region of Wagram (Wm) is a hilly mountain range along the north side of the Danube, located around 60 km northwest of Vienna. The nine municipalities in the region comprise vineyards of approximately 2,480 ha (Bauer et al., 2013) in the plains and on terraces, managed by more than 300 vintners (ÖWM, s.a.b). Grossriedenthal, one of the eight wine-growing municipalities of Wagram, was awarded the Lower Austrian Environment Prize for nature-friendly viticulture in 1990 (interviews I 3, IP, Wm and I 12, IP, Wm).

Leithaberg-Neusiedlersee (3,576 ha, see Bauer et al., 2013) is located around 60 km from Vienna and situated on the west side of the lake Neusiedlersee. It stretches from a quite plain terrain to the rolling hills of Leithagebirge. The region, which partly belongs to Ferto/Neusiedlersee Cultural Landscape, a UNESCO World Heritage site, also includes Natura 2000 areas and nature parks. In contrast to the other two study sites, there are no terraces in this region.

Data and Methods

The research is based on a mixed-method approach, linking qualitative social science with ecological research to investigate the socio-ecological effects of ÖPUL (see Kieninger and Winter, 2014) on the ecological quality of vineyards. In this paper, we present the results on crowding-in and crowding-out effects from the qualitative social science part focusing on the vintners' perception and motivation of (non-)participation in the ÖPUL programme. Literature-based semi-structured interview guidelines were developed and fine-tuned after the first set of test interviews. The sample also included a group of seven lighthouse vintners (L!), i.e. vintners with outstanding biodiversity-supporting vineyard management. They were selected by the ecological specialists in our research team who had accompanied them in their ecological efforts for years. Overall, 78 persons were interviewed (20 Wu, 25 LN, 25 Wm, 7 L!, and one wine cooperative representative who, however, is not included in Figure 1. Interviews (consecutively numbered from I 1 to I 78) were coded and tape recorded. The parts relevant for the research questions were transcribed, coded, inserted in a database, and analysed (Flick, 2009). Quotations in this paper are cited with reference to the relevant study site (Wu, Wm, or LN) and the management style (organic, conventional, IP).

Figure 1: Vintners Interviewed, their Management Style, ÖPUL Participation, and Herbicide Use



Note: L! refers to lighthouse vintners of outstanding ecological performance.

Source: Authors.

After the interviews, 26 vintners, and representatives from wine cooperatives and the Federal Ministry for Agriculture, Forestry, Environment and Water Management met in a follow-up workshop to discuss the results of the study.

Results and Discussion

Based on semi-structured interviews and focus group discussions with vintners from three Austrian wine regions, we analysed crowding-in and crowding-out mechanisms of the agri-environmental measures of erosion control, organic farming, integrated production, and high-value areas. We tried to reduce response biases by asking neutral questions on motivations, attitudes, and behaviour without referring to crowding-out or crowding-in mechanisms. We also employed experienced interviewers to ensure a comfortable and open atmosphere for the interviewees who had been told that there were no right or wrong answers. We agreed that the sample of 78 qualitative interviews should be large and hopefully diverse enough to gain insights needed in answering the research questions and testing the framework. Looking at the framework by Rode et al. (2015), we identified all crowding-out (see Table 1) and crowding-in mechanisms (see Table 2) to also hold true for the Austrian ÖPUL implementation in vineyards. In addition, we identified some specific challenges for smaller and less specialised or part-time farmers regarding the administrative burden of ÖPUL participation.

Crowding-out Mechanisms in the Wine Regions Analysed

One of the main criticisms on ÖPUL expressed by about one-third of the interviewees is the perceived administrative burden linked to control aversion and frustration. Office work in general (e.g. the obligation to exactly follow protocols) is perceived as undesirable, tedious work, deterring them from what they actually want to do: *'I want to decide by myself what I do. I prefer being in the vineyard instead of in front of the computer'* (I 67, conventional, Non-ÖPUL, Wu). Smaller and part-time farms particularly struggle with the administrative burden. *'ÖPUL is impractical for a small family-owned farm because it is not so easy to conform to the directive all the time insofar as plant protection and keeping up the greening so long in the year are concerned. ÖPUL is a pompous system with too much bureaucracy'* (I 69, IP, Wu). *'This system promotes only the large ones. For small vineries, it is not worth the trouble. I have decided not to participate in this nonsense, with the absurdity of pseudo-examinations and training, queuing up for hours in front of some authorities for €1,500 a year. This was actually the reason why this system makes me angry because it only promotes large structures'* (L! 48, Demeter, Non-ÖPUL, LN).

These results are in line with Rode et al. (2015), showing that administrative burden and economy of scale as an important dimension in the groups' control aversion and frustration is especially important for special crops and/or smallholder agriculture. Several vintners perceive a gap between their actual practices and the required measures (however, no one questioned the aim of the measures). Referring to this policy–practice gap, there is a desire for more practicable and effective measures. A topic lively discussed in this context was the earliest ploughing date (1 May) for the erosion control measure: *'The supporting scheme is not good. Working on date [predefined schedule] is not possible; you have to follow nature. These guidelines have been invented by somebody that has never worked before in a garden [in a vineyard]. We participated in ÖPUL in the first programme period. Many vintners have opted out'* (I 70, conventional, Non-ÖPUL, Wu); or *'It doesn't work like it's designed on paper. Those sitting at the desks believe they know how we are doing it. They have no idea. They just went to school once and now they are prescribing to us what to do. They need to learn in practice, too'* (I 70, conventional, Wu), *'We have many steep locations. With an earlier ploughing date, the area would already be green until the severe storms come.'* (I 8, IP, Wm) or *'In view of the climate conditions, we were not able to keep up with the regulations for erosion control'* (I 71, conventional, Non-ÖPUL, Wu). Even the digitalisation of the area, as calculation basis for the ÖPUL payments, was criticised not only as highly time-consuming but also far distanced from the practice: *'Digitalisation is a high effort. Depending on the time of day, you have different land boundaries due to the shadow'* (I 78!, organic, LN).

The confrontation between policy measures and regulations on one hand and actual practices on the other is also paired with an ambivalent relation to Agrarmarkt Austria (AMA), the executive agency monitoring the programme's implementation: *'AMA behaves like the former major, large-scale land owners – with an arrogant behaviour'*. (I 7, organic, Wm) or *'AMA behaves in a top-down fashion'* (I 38, IP, LN). Controls and the pending risk of mistakes being identified and funding being reclaimed were also mentioned as a crowding-out factor: *'Another somewhat disadvantage with ÖPUL is the constantly hanging sword [of Damocles] above you. If you commit a mistake, you have to pay back the funding of 5 years. I am uncertain if that is helpful. I think this is one reason why so many are dropping out, because their argument is: why pay back when I do not get a lot of money anyway. I don't care at all then. This makes the scheme less attractive'* (I 26, IP, Wm). Reduced autonomy and responsibility in land management, mistrust, and administrative burden which disproportionally affects smaller farmers result in much frustration, despite the awareness that several measures (e.g. erosion control, especially in terraced vineyards or integrated production) do not require much extra efforts or loss in income: *'The measures that are required are things that I would do anyway, except that now I'm getting money for it'* (I 10, conventional, Wm), *'I am taking three quarters of all subsidies'* (I 7, organic, Wm), *'Anyway, I don't have to do anything for erosion protection in the terraces. I only have to green*

two plots since there are no terraces. But I would do it anyway, because in organic agriculture, I need to get nitrogen' (I 76, organic, Wu).

Several interviewees even questioned the conservation impact of single measures, particularly integrated production where abstinence from herbicides is allowed, but also erosion control via greening that most of the vintners would do anyway because a closed vegetation cover is practicable when entering the vineyards for harvesting with machines even after rain, etc. The criticisms on integrated production are mainly expressed by organic farmers: *'In reality, the integrated production programme, has nothing included for nature. You are allowed to use herbicides twice a time, and if you don't green your soil, it's really your own fault if the soil is washed down [by heavy rain]. I would do it anyway. And on the market, you can only find ÖPUL-treatments anyway'* (I 17, organic, Wm). *'At present, ÖPUL has too few benefits for the environment. Useful measures would have an effect, but chemical companies are too strong'* (I 23, IP, Wm). *'Integrated production actually has nothing for nature'* (I 17, organic, Wm). The interviewees' scepticism on ÖPUL's effectiveness is in line with how the Austrian Court of Audit criticised the faulty evidence on ÖPUL's effectiveness (RH, 2013, 2016). Transparency on effects could also help to crowd in more farmers willing to contribute to conservation and who still do/or no more see the sense in specific rules: *'No herbicides in ÖPUL when you get money! Currently, ÖPUL latently promotes herbicide use'* (I 49, conventional, Non-ÖPUL, LN). *'ÖPUL and the integrated production programme have a green label, but they are everything else but green. That's why I want to drop out'* (I 41, organic, LN).

The case study also found ambiguous connections between some farmers' relationship with the monitoring executive agency and reduced internal satisfaction and image motivation. Some vintners expressed regret that the high workload of small-scale farmers or farming in difficult locations (e.g. vineyard terraces) are not being appreciated and recognised, which is crucial in developing intrinsic internal satisfaction for the accomplished work and services: *'High work load should be honoured. I work just as much as someone in 30-ha vineyard business that can work with machines and chemicals and is much more efficient. A small winery should be able to survive'* (I 23, IP, Wm). Organic vintners seem more sensitive if services do not deliver actual environmental benefits: *'Environmental and conservation funding should be beneficial for nature, not for window-dressing schemes'* (I 75, organic, part-time farmer, Wu). However, intrinsic motivation also animates conventional farmers or integrated production vintners to avoid environmentally harmful practices: *'[The programme] herbicide 'abstinence' was cancelled and that is the reason why they [i.e. the other vintners around] are now spraying on a large scale. I myself do the weeding manually, that's why it looks nicer. All are thrown together'* (I 18, IP, Wm). The interviews indicate that lack of recognition is often addressed as hindrance to gaining sufficient satisfaction and image motivation from the work.

For some vintners, ÖPUL represents a release from moral responsibility. They use participation in ÖPUL as an excuse not to do more from an ecological point of view: *'We already do more than what is required anyway'* (I 51, IP, LN). If they follow all ÖPUL requirements, e.g. use the 'right' pesticides from the 'ÖPUL list', they cannot commit anything that is 'against' nature: *'The [allowed] plant protection products are listed on an equivalent list and are tested for environmental compatibility'* (I 28, IP, LN). *'There is pre-sorting [through the equivalent list]. The aggressive sprays are sorted out so the beneficial organisms will not be completely destroyed'* (I 2, IP, Wm). In some cases, participation in integrated production was used to legitimise herbicide application. Some farmers (mainly organic but also conventional vintners) were very eager in using species-rich seed mixes, while others perceived that they were conscientiously fulfilling their 'duty' by using at least one hardy species as has been required for erosion control since 2014. As well, since terraces per se count as erosion control, vintners with terraces have no qualms removing vegetation cover during hot/dry season or greening just every second row.

Some vintners directly addressed frame shifting as well as the general change of values in mindsets, which could be triggered by financial incentives: *'Money persuades them all. Every farmer who gets something as a gift will take the money and do what they ask him to do, even if it's dull'* (I 10, conventional, Wm). They even pointed out that shifted mindset might be a problem in the long-term fulfilment of ecological measures in case ÖPUL is terminated: *'The disadvantage of subsidies is that you get used to them and it will become hard to do it without them'* (I 14, organic, Wm). Unfortunately, the data do not provide enough insights to understand long changes in social-psychological patterns. It is to be hoped that longitudinal research covering several decades of ÖPUL implementation will be more insightful in the future. However, some vintners seriously doubt that financial incentives are a promising way for delivering ecological services in the long run: *'The financial incentive is not the right way in a long-term perspective'* (I 73, organic, Wm).

In summary, one can say that ÖPUL, in combination with several other policies and adjacent funding schemes, contributes to farmers' income and thus to viable farms that are needed for maintaining important agro-ecosystems such as small-scale and/or terraced vineyards. The interviewees questioned the sufficiency of the provided environmental service based on the huge administrative burden than on the compensation for extra work or forgone profit. Due to economies of scale, smaller farmers or farmers with less administrative capacity are particularly affected by these mostly fixed transaction costs. While none of the interviewees questioned the ecological goals, several of them questioned the effectiveness and practicability of the interventions prescribed to pursue these goals. Payments decrease vintners' vulnerabilities to variable quantity and quality of harvests or changes in consumer demand. However, as pointed out by Anderberg (this volume), this additional 'income' for organic farmers in developing countries might

create new dependencies and might have unintended risk-related side effects such as psychological pressure of being controlled for mistakes in documentation or timing of management operations as well as lost autonomy and flexibility. Thus, short-term risk reduction can create new medium- or long-term risks. Farmers questioning the effectiveness of the measures but generally agreeing with the conservation objectives are in line with the warning by van Hecken et al. (2017) against centrally administered policies that reflect an overly simplistic notion of human–nature relationships as manageable systems which can be altered in predictable ways.

Crowding-in Mechanisms in the Wine Regions Analysed

The research illustrates that about one-third of participating and non-participating vintners endorse the importance and value of the ÖPUL programme for its contribution to environmental quality and impulse as an initial learning process. The positive perception of the value and beauty of nature and quality of the environment are mentioned in the interviews as important stimuli to develop an enhanced internal satisfaction: *‘I also want a beautiful vineyard for myself. This includes plants in between [the vine rows] that visually please me. Because I am convinced that everything that you like, no matter if visual or acoustic – for example, bumblebees or other animals – gives me pleasure and this also impacts my other crops’* (I 48, organic, Non-ÖPUL, LN). In literature, societal and peer recognition is widely discussed. Interviewees do not only wish for social recognition of a peer group, e.g. *‘The big well-known vintners are all organic’* (I 42, organic, LN), but also recognition by experts and academia for the vintners’ contributions to environmental quality. The recognition by researchers of floristic biodiversity triggered a change in management practice by one vintner: *‘It [the European birthwort] was always there. Since we know that it is so rare, we do not cut it on purpose’* (I 55, IP, Wu). Another vintner, who had cut the rare European birthwort against the wish of his wife, envisaged to let it grow in the future after interaction with the ecologists of this study (I 23, IP, Wm). Some vintners recognise that ‘strangers’ see and appreciate things that seem normal/not special for them. For their professional work, they would appreciate a stronger societal recognition: *‘Important would be the recognition for his area, telling him [the vintner] that his vineyard is nice’* (I 7, organic, Wm).

Reinforced positive attitudes towards nature conservation and/or trust (see Rode et al., 2015) in ÖPUL as a regulation institution was also confirmed in our interviews. Some vintners appreciate the ÖPUL rules as an adequate way to support them in their learning towards nature-friendly viticulture, e.g.: *‘One is concerned, scrutinises the rules: Why so? Why this?’* (I 24, IP, Wm) or *‘Without money, you will not be able to do much. If that would not have been so [i.e. getting subsidies], I don’t know if I would have done it [i.e.*

the measures]. *Now I would do it also so [i.e. without money]*' (I 46, organic, LN). Some interviewees also welcomed the controls by "Agrarmarkt Austria" AMA to secure the 'quality standard' and the correct implementation of the guidelines for nature protection: *'Control through AMA and leave sample are right because there are always black sheep'* (I 15, IP, Wm). On the other hand, a highly intrinsically motivated organic vintner opted out of ÖPUL' organic measure after herbicide residues of the conventional neighbours were found in his vineyard, resulting in big problems, image loss, and aversion and mistrust against controls (I 76, organic, Wu)

Although the bureaucratic effort (including mandatory management documentation) was criticised by more than one-third of the interviewed ÖPUL participants, some vintners also perceived the documentation as a good way of learning and of capacity building. The documentation, which they would not have compiled without ÖPUL, offers the opportunity to trace and check which steps and cultivation measures were applied the years before: *'[The obligatory documentation] is good so you have your plots under better control. For many [i.e. vintners], it is good to be more systematic, to know when what is in the vineyard'* (I 46, organic, LN). The same was mentioned for the obligatory soil analysis and spreader control for integrated production: *'Spreader control is good; otherwise, you would neglect it. Furthermore, the obligatory soil analysis is good, too, so, you have an overview'* (I 28, IP, LN).

Linked to intrinsic values and positive reinforcement, learning and capacity building were discussed in the interviews and in the workshop and considered by the vintners as important pillars and requirements for successful ÖPUL measures. In the programme, learning is anchored by mandatory training and professional education linked to ÖPUL participation. On the one hand, the case study indicates possible linkages between intrinsic motivation, a positive perception of learning, and the policy design of the ÖPUL scheme: *'In my opinion, the subsidy schemes should focus on knowledge generation. First, awareness raising, providing information – which has to be collected – then accompanying consultancy during the programme period and remuneration at the end'* (I 58, conventional, Non-ÖPUL, Wu). On the other hand, we also see that vintners link learning with reinforcement of attitude regarding service delivery: *'The more you do, the more you should be rewarded'* (I 21, IP, Wm).

Related to intrinsic motivation and positive reinforcement, we could also find preferences for a result-oriented policy scheme as it existed, for instance, in the Province of Lower Austria in the past: *'The subsidy could be even higher the more flora and fauna you have in your vineyard'* (I 50, organic conversion farm, LN) or *"Eco-points" were good, since you got the points afterwards for what you did. Not like now [in advance]. That was better'* (I 20, IP, Wm). However, another interviewee questioned the long-term learning effect of result-

based payments: *'Five euros for each grass-lily. That wouldn't be sustainable, since the vintner would just start counting the grass-lilies even though he is not interested at all'* (I 7, organic, Wm). In this 'result-based' scheme, the actual result or the environmental condition of the vineyard would be the basis for the subsidy and not the practices for environmental quality. With this scheme paying for results and not for the implementation of prescribed practices, the current control of dates and management activities, which some vintners even consider as ineffective, would be obsolete. Moreover, a shift to a result-based compensation design would ask for baseline surveys and constant monitoring to control the improvement of the environmental condition. Providing this information might be difficult. The Austrian Court of Audit (RH, 2013, 2016) has repeatedly demanded evidence on the effectiveness of the present policy design to check the effective use of tax money in improving environmental quality, but without much success.

Rode et al. (2015) also listed the prescriptive effects and reinforcement achieved by compelling non-intrinsically motivated individuals to comply as important crowding-in mechanisms. On the one hand, the prescriptive effect for vintners, i.e. desirable societal action indications that should potentially lead to changing perceptions, values, and norms in the long term (Rode et al. 2015), appears in the above described social recognition and appreciation of the vineyard landscape as well as in the vintner's effort to preserve it under 'social pressure'. On the other hand, ÖPUL regulations themselves seem to have a prescriptive or coordinative effect: *'[Integrated production] is nature friendly and gives a certain framework within the plant protection products'* (I 55, IP, Wu). However, it is not easy to understand if and to what extent these normative structures also resonate with non-intrinsically motivated individuals. Maybe they would rather reinforce intrinsic motivations such as health or the desire to preserve nature even amongst non-participants: *'Erosion control is important for humus build-up. Organic management is important for self-protection and sustainability'* (I 9, organic, Wm), *'[I don't use herbicides] because they are poisonous and I don't want that they go into the soil, into the water'* (I 35, conventional, Non-ÖPUL, LN), *'Nature-oriented management, sustainability, is a concern for me. I am sceptical against chemistry. That is my business philosophy'* (I 61, conventional, Non-ÖPUL, Wu), *'Just what is necessary: the less pesticides, the better for the purse'* (I 51, IP, LN) or *'I don't do it [i.e. the ÖPUL measures] for the money. [E.g.] I even now [after the termination of the integrated production measure] don't use herbicides at all'* (I 23, IP, Wm). However, some intrinsically motivated vintners recognise the fact that ÖPUL requirements are compulsory for all participants. Thus, motivated vintners feel more encouraged in their doing as they would be when confronted with bad examples of their colleagues: *'General abolition, general ban on green spraying. Understock injection is a deadly product!'* (I 45, conventional, Non-ÖPUL, LN). Therefore, they consider controls as important: *'The idea [of such a measure] is good, but the implementation would be complicated. Too complicated to control. There is a lot of misuse..'* (I 24, IP, Wm).

Regarding the long-term effect towards changed perceptions, values, and norms for a more environmentally friendly viticulture, we found two different perceptions. Some vintners reported that ÖPUL has been a stimulus for them to practice more sustainable viticulture: *'The programme itself is quite good. It is not necessary to drive into with every chemical mace. There is a learning effect from the beginning'* (I 56, IP, Wu), *'Formerly, everything was open [i.e. open soil, vineyards were not greened]. However, then came the change. Recently, because of the drought, every second row is open'* (I 10, conventional, Wm), *'The awareness for landscape-preserving measures could be increased therewith [i.e. ÖPUL]. But it still goes far too little however'* (I 73! organic, Wu). Some vintners continued to implement the measures (e.g. organic viticulture, erosion control, or the old measure of herbicide abstinence) from the 2000–2007 period even without subsidies. The majority of ÖPUL vintners underlined that in case of a programme stop, they would continue with parts of the measures even without funding. But there have also been observations that the 'positive' effects of ÖPUL disappear the moment the programme terminates. For example, one interviewee referred to the observed on-off participation of neighbours in the herbicide abstinence measure. This measure was implemented in the 2000–2007 ÖPUL programme, stopped in the 2007–2013 period, and was re-introduced in the next scheme. *'[The] herbicide abstinence [measure] was cancelled and that is the reason why they [i.e. the other vintners around] are now spraying on a large scale'* (I 18, IP, Wm). Schildberger et al. (2007) also came to this observation in their investigation on herbicide damage in Austrian viticulture. After the success of lower levels of herbicide use during the 2000–2007 funding period, the levels went back up to the level of earlier stages, after the compensation payment was cancelled in the 2007–2013 programme period. In general, it is difficult to understand how comparatively 'short-term' and/or changing ÖPUL measures affect social systems and socio-psychological patterns such as norms, values, or worldviews of farmers and rural communities in the long run (Fisher, 2012; Frey, 1992; Rico García-Amado et al., 2013). However, there are several indications that there have been learning processes on greening, erosion control, and, in some cases, also herbicide use in the study sites. These learning processes are positively reinforced by best practice of neighbours and peer recognition and maybe even long-term value change towards more sensitivity and responsibility towards nature embedded in mechanisms that are linked to identity and self-efficacy and internal satisfaction with farming (van Dijk et al., 2016). Thus, it seems that in some cases, payments have actually provided a spur for changing perspectives and rationalities and resulted in a broader structural change (van Hecken et al., 2017).

Concluding Remarks

Our results show that the framework of Rode et al. (2015) is applicable to understand motivation crowding of agri-environmental schemes targeted at vineyards. The research suggests that vintners are motivated not only by financial incentives but by a complex combination of different socio-psychological mechanisms that are intersecting and contingent, either reinforcing, aggravating, or hindering the delivery of environmental services. To address environmental quality and ecological risks in an effective policy design, it might be crucial to grasp the different combinations of mechanisms for motivation crowding. In our case study sites, we identified three types of vintners based on different crowding-in and crowding-out mechanisms:

- 1) The first group is not willing to participate in AES because of administrative burden, aversion to control, and desire for autonomy. Due to economies of scale, smaller farmers and less specialised farmers are confronted with comparable higher share of transaction costs. Some farmers of this group doubt the effectiveness of the measures, but none questions the ecological goals per se.
- 2) The second group flexibly reacts to financial incentives and appears to be susceptible to the risk of short-term frame shifting. Payments from AES are a welcome short-term additional income, more or less independently from the outline of the scheme. Therefore, they will stop the measure at the very moment the payments are terminated or lowered beyond a critical level.
- 3) The third group of participating vintners showed indications of changed perceptions, rationalities, values, and norms for a more environmentally friendly viticulture. A short-term economic motivation was followed by a long-term change in ecological motivation that was nurtured through, for example, social learning, peer recognition, experience, and good examples.

Schemes that allow for more experimentation with context- and farm-specific approaches could result in more diversity, better ecological outcomes, and, finally, in less ecological risks. As ÖPUL clearly cannot reach the first group of farmers, more research is needed to better understand how different strategies of risk governance, such as legal standards, information, capacity building, incentives, and reflective discourse might be best combined to bring a change. For example, the lighthouse vintners – who are not only ecologically but also economically successful – might serve as best-practice examples and become important allies in an integrated governance strategy. Scoping studies that are assessing different motivational mechanisms prior to design and rollout of AES might be beneficial to design well-functioning policies that are depending on the willingness and ability of diverse vintners to be implemented. Designing AES to improve environmental quality and to reduce environmental risks might be dysfunctional if designed as stand-

alone schemes. Rather, they should be embedded in a broader risk governance approach that addresses different groups with diverging motivations.

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