

# Is economic institutional adaptation feasible for agri-environmental policy? Case of Good Agricultural and Environmental Condition standards

JANA POLAKOVA\*

*Department of Agroecology and Biometeorology, Faculty of Agrobiological Sciences, Food and Natural Resources, Czech University of Life Sciences Prague, Prague, Czech Republic*

Polakova J. (2018): **Is economic institutional adaptation feasible for agri-environmental policy? Case of Good Agricultural and Environmental Condition standards.** Agric. Econ. – Czech, 64: 456–463.

\*Corresponding author: [jpolakova@af.czu.cz](mailto:jpolakova@af.czu.cz)

**Abstract:** This review focuses on Czech implementation of standards for soil and water protection called Good Agricultural and Environmental Conditions (GAEC), with linkage to the European Union (EU) level. I investigate different elements of adaptive institutional economics: (i) summarise current knowledge regarding the social reasons for introducing GAEC; (ii) assess the evidence linked to GAEC to better understand the potential as well as boundaries of formalizing cause-effect links; (iii) clarify the pertinence of producers' claims on costs accruing from GAEC implementation. These three points highlight the thesis of this paper: implementation in farmers' practices of the theoretical concept of sustainability in terms of bridging together economics, society and the environment. The economic reasoning for GAEC introduction within adaptive institutional economics stems from the relational positioning of the knowledge of the costs of the impact of agricultural land use on other characteristic rural land uses. GAEC are needed, albeit the size of support obtained by producers surpasses the costs of complying; therefore, the result pays off for farms. We have learned that GAEC implementation is important from regional to EU levels and that its role is more related to economic institutional adaptation than to regulation. Adaptation of institutional economics is therefore feasible, making it possible to understand GAEC as a network which manages and enables knowledge transfer linked directly to regulation. Institutional economics can link sustainability with farmers' practices and accounts for the behaviour of the farmers. In this review, I find that, for society, it is necessary to require measurement of agri-environmental outcomes for water resources, soil and biodiversity through GAEC at appropriate scales. These scales are likely to be relevant to adaptive institutional economy localities perceived by the rural public.

**Keywords:** groundwater protection, producers, rural development

Today, farmers have to make valiant efforts to maintain a balance between farm profitability and satisfying increasing societal demands. As such, their everyday activities are unintentionally framed by the concept of sustainability. The heads of EU Member States adopted the principles of sustainable development in the Declaration on the Environment in 1988. Later, the launch of the Göteborg Strategy on Sustainable Development clarified sustainability as a balancing of economic, environmental and social aspects (Commission of European Communities 2001). According to Folke et al. (2004), sustainability

is directly linked to the capacity to buffer change, learn and develop a framework for understanding how to sustain and enhance adaptive capacity in a complex world of rapid transformations. Within agricultural policy, several requirements on farm practices linked to the sustainability agenda have been set out by the Good Agricultural and Environmental Conditions (GAEC) as mandatory agronomic standards.

The system of GAEC, as it is implemented nowadays, is linked to the existing requirements on Good Agricultural Practices (GAP) which have been in force since the 1990s, with the main goal

---

Supported by the Institutional Support Programme for long-term conceptual development of a research institution of the Ministry of Education, Youth and Sports of the Czech Republic.

<https://doi.org/10.17221/138/2017-AGRICECON>

of ensuring sustainable water management and reducing nitrate content within Europe's vulnerable zones (Table 1).

With reference to our understanding of the concept of sustainability, this paper addresses the question of how far these standards are truly sustainable. Do they reflect sustainability in all its aspects or do they merely represent another demand that minimizes economic profit without being linked to social requirements? Social science studies generally and rural studies particularly have focused on addressing such questions (Dwyer et al. 2002; Nitsch 2006; Cooper et al. 2009). Evidence available in the Czech Republic is placed into context with the help of cross-country examples, particularly examples in connection to Central Europe and the United Kingdom (UK), to provide empirical background for the study. Echoing previous aims, the aim of this review is to contribute to a better understanding of the implications of integrating the theoretical positions of farm business operations with agricultural policy steering within the adaptive institutional economics theory.

#### GAEC IMPLEMENTATION IN THE CONTEXT OF ADAPTIVE INSTITUTIONAL ECONOMICS

From the point of view of economic theory, GAEC represent regulations which avoid public costs that would result from not accounting for inadequate practice (Cao et al. 2009). However, in farm business operations, GAEC represent a formal rule accruing extra costs. Such perspectives were at times seen as mutually exclusive; however, this article argues that

a third position, namely adaptation of institutional economics, is feasible, making it possible to understand GAEC as a network managing and enabling knowledge transfer linked directly to regulation. Thus, GAEC are an example of institutional economics which can link sustainability with farmers' practices and which account for the behaviour of farmers (Boatman et al. 2009; Cooper et al. 2009). Such a role is potentially possible because institutional economics studies real worlds as required by R. Coase (Coase 1994). Our discussions in terms of the adaptive abilities of institutional economics are based on writings of Mlčoch et al. (2005) and Mlčoch (2016) who developed the ideas of authors like Coase, who investigated why social factors matter when costs are enumerated and why this could be viewed as a problem, and North (1981), whose research sought to link the economic behaviour of actors to institutional change which was thought to be vital for the long-term life of institutions, combined with insights provided by transition management theory (Geels et al. 2011) and complex adaptive systems theory (Folke et al. 2004). An insightful comment by Dvorský et al. (2005), supported by Dockès et al. (2012), highlights that what makes such institutional economics adaptive is the innovation process as 'not only social innovation in the corporate social responsibility sense, but also resulting from the fact that social problems need innovative approaches'. In using this term, adaptive farms are brought by default into the discussion. Institutional economics still speaks of how voluntary in addition to non-voluntary standards, similar to formal and informal institutions, representing the 'rules of the game' in North's term (North 1990), look within agriculture. I argue that this may be close to the

Table 1. Historical overview of agri-environmental standards from 1994 to 2015

	Regulation at farm level	Point	For period
Good Agricultural Practices (GAP)	nitrate directive requirements <sup>s, re</sup>	to protect water resources to reduce nitrates contamination in vulnerable zones	1994–today
	environmental measures & maximum stocking densities <sup>a</sup>	to reduce adverse environmental impacts	1993–1999
	environmental protection requirements & usual good farming practice <sup>a</sup>	to reduce adverse environmental impacts	2000–2004
Good Agricultural and Environmental Conditions (GAEC)	10 requirements <sup>a</sup>	to comply with landscape, water, soil protection practice; to maintain agricultural land	2004–2013
	7 categories <sup>s, re</sup>	to comply with landscape, water, soil protection practice to maintain agricultural land	2015–2020

a – as in past; re – reference base; s – standard

Source: Hart and Baldock 2010

term ‘adaptive farms’, although such farms cannot be examined herein due to the complex nature of their relationship to climate change science. Instead, the focus here is on how farmers comply with institutions. Consequently, the relationship (and mutual influence) that is examined here is that of farmers-institutions; in the case of this paper the institutions are GAEC.

Defining GAEC is thus influenced by the dynamics of adaptive elements in institutional economics, striving to implement the adaptive approach at the farm practice level and policy level in tandem. Table 1 summarises the history of adaptation relevant to these agri-environmental standards.

GEAC is not just a mere agro-ecological approach, but must be considered as a sustainable, complex network of different tools. Each EU Member State can define reasonable standards for GAEC, taking into account ‘the specific characteristics of the areas concerned, including soil and climatic condition, existing farming systems, land use, crop rotation, farming practices, and farm structures’ (Elbersen et al. 2010). EU Member States are free to set a certain priority, for example, groundwater protection (Boatman et al. 2009), with the help of the specific GAEC in relation to groundwater protection, in addition to applying standards that aim to ensure other natural resources priorities. As such, the institutions constructed by GAEC are of the ‘agreed in the game’ kind and open the field for the strategic manoeuvring of actors (Kabele 1998).

A large number of researchers have focused on monitoring of one of the crucial elements in GAEC: buffer strip functions for restoring or maintaining groundwater quality linked to agroecosystems (Nitsch 2006; Jongeneel et al. 2007; Boatman et al. 2009; Bio Intelligence Service 2010; Elbersen et al. 2010; Brouwer et al. 2011; Söderberg et al. 2011; European Environment Agency 2012; Roberts et al. 2012; Sutherland and Darnhofer 2012; Commission of European Communities 2013; ECA 2014; Novotný et al. 2014; McVittie et al. 2015), whilst several studies concur that challenges at different levels of decision-making may stymie progress in implementing these evaluations in practice (Gatzweiler 2005; Lockie 2006). The literature has also emphasised principles relating to buffer functions from the viewpoint of implementation of the nitrates directive, highlighting the linkages to the specific GAEC in relation to sustainable governance of water resources (Dostál et al. 2003; Dvorský et al. 2005; Klír et al. 2012). There are further elements of institutional economics, incor-

porated within the farm business position, including the merit of codifying the ‘rules of the game’ linked to land use in terms of relational knowledge that may often be much more pluralistic and less standardised than in the formal guidance on rural development policy (Dwyer et al. 2002; Bruckmeier and Tovey 2008; Ingram 2008). In addition, researchers have underlined communication leading to better public awareness of EU rural development policies (Dwyer et al. 2007; Ingram and Morris 2007; Cooper et al. 2009), although they start from the farm business before moving to adaptive farms and also to institutional economics and its view on adaptation.

## SOCIETAL ASPECTS

An important part of the reasoning regarding the introduction of GAEC has been the need to articulate the evidence of the societal value of GAEC to rural land use other than agriculture. For example, UK government-commissioned project has brought forth comprehensive data regarding the impact of GAEC standards, whilst noting multiple perspectives on sustainability (Cao et al. 2009). The study set out to study the costs imposed on farmers, the nature and magnitude of such costs, the plausible value for money and any change in farmer behaviour. The outputs were based on a survey of 300 farmers, two farm advisor workshops and interviews with a technical advisory panel, in cooperation with Department of Environment, Farming and Rural Affairs (Defra) and its agencies. Researchers classified farmers into several types, which could be broadly divided into two groups: those who were more emotive, sensitive to needs, not directive, but rather favouring an inclusive approach, and those who are more rational and pragmatic, favouring hard facts, business-focused and who need concrete reasons to pay attention. The study referred to Dwyer et al. (2007) who found three categories of opinions about GAEC. In Category 1, the opinion was that the GAEC only strengthen existing rules; thus, it was implausible that GAEC introduction had any new impact on the compliance with the rules. In Category 2, the perspective has been that GAEC strengthened existing regional, supra-regional or EU rules but problems were identified as regards farmers’ practices before 2005; thus, a new stimulus aim at encouraging farmers to comply has been regarded as advisable. In Category 3, more advanced GAEC conditions were labelled as problematic by many pro-

<https://doi.org/10.17221/138/2017-AGRICECON>

ducers; therefore, farmers often chose to risk receiving the penalty. This indicates that the rules were not set up to encourage the farmers to practice sustainable farming. Certainly, this linking of categories is an observed correlation. What GAEC mean to society with respect to rural land use other than agriculture, is still described only as an indirect linkage, not a fully-fledged consequence. Therefore, GEAC might be considered as not sustainable. However, looking at GEAC through a post-modern lens, considering the LEADER approach in rural development, the situation changes (Ray 1998). In this view, GEAC emerge as a network managing and enabling knowledge enhancement linked directly to regulation and as a legitimate tool for sustainability.

Perhaps the considerable delay in producing the ex-post evaluation report for rural development outcomes for the 2007–2013 period at either national or EU scales is unwitting evidence. It is reasonable to expect that the report will cast light on the theoretical lens issues just pointed out (change of the evaluation paradigm), whilst appreciating GAEC outcomes for sustainability, e.g. as a benchmark for incentive-based agri-environmental measures (Boatman et al. 2009). According to Article 87 under Regulation No. 1698/2005 (EU), evaluators are bound to present information in relation to ‘the degree of utilisation of resources, the effectiveness and efficiency of the programming, its socioeconomic impact and its impact on the European Community priorities. Further, they shall cover the goals of the programme and aim to draw lessons concerning rural development policy. Not least, they identify the factors that contributed to the success or failure of the programmes’ implementation, including sustainability, and identify the best practice.’ With regard to what GAEC mean for characteristic rural land use (other than agriculture), and thus for society, ambitions in this regard are tremendous, highlighting the fact that there is a range of information that is much needed with respect to the usage of rural development funds.

Linked to the riddle of the delayed delivery of the ex-post rural development evaluation report, GAEC encapsulate the following dictum: the application of empirical studies to the policy world leads one to stress the importance of fitting institutional rules to a specific social-ecological setting. Uniform policies are not effective (Ostrom 2009). This represents a key barrier that may stymie clear conclusions as to generalising what GAEC mean to society

or to describing the determinants of the standards’ successfulness beyond regional limitations.

Therefore, monitoring the GAEC is very important for stabilising the challenging transition from the increasingly outdated theoretical perspectives (not considering the real world of farmers) to adaptive farms within institutional economics, as documented by Boatman et al. (2009), which work with real worlds.

## ECONOMIC CONSEQUENCES OF GAEC

The economic reasoning of GAEC introduction stems from the relational positioning of knowledge of the costs stemming from the impact of agricultural land use on other characteristic rural land uses. For instance, according to the groundwater resources criterion, Lewis (1997) estimated the costs of bringing farming practice up to the nitrate directive standards for England, including the costs to rural communities resulting from the land remediation, from consequences of erosion. The cost with respect to the 1996 price level is £199 million, although with no explicit statement of farmers’ transaction costs, the figures cannot be generalised. The most affected water authority estimated that their costs would be £70 million, in 1996 prices, over the next ten years.

The farm business model perspective has long predominated in economic evaluations, whilst to date, farmers in their everyday activities complain about the time costs associated with handling red tape (Cao et al. 2009), i.e. transaction costs. For the Czech Republic, evaluators highlight that the costs of adapting to new GAEC are considerably higher for the individual farmer, who continually has to undertake significant adjustments, than for corporate farms. Consequently, GAEC are important, although so far, they have only been a partial success. The size of direct payments obtained by farmers surpasses the costs of compliance; hence, the result pays off for all farm businesses (Poláková et al. 2013). Whilst this is convincing in terms of the farm business model perspective (Jongeneel et al. 2007), institutional economics goes further and considers the issue raised by Dwyer et al. (2007). It is not possible to assess what would have happened without the policy, or the initiative, despite the fact that the EU approach to evaluating economic effectiveness typically requires comparing visible effects against the situation with no policy, which is difficult to observe by experimental measurements. The most challenging step is the



separate assessment of farm business impacts and the costs of steering agricultural policy towards a more complex evaluation of the adaptive approach in terms of sustainability outputs for mutually linked ecosystems.

Unsurprisingly, the current strand of research on GAEC linked to the focus of this paper cannot avoid challenges in monitoring the sustainability outcomes of these practices. The fact that what would have happened in the absence of the initiative cannot be assessed, although EU evaluations linked to economic effectiveness require such a comparison of visible results is not only a major challenge but also means that experimental measurements are unlikely to be informative (Boatman et al. 2009; Cao et al. 2009). It appears that standards were set and are required but that their impact cannot be measured and that therefore justification for some standards (not all) may be questionable. This erodes the idea behind sustainability, necessitating measures aimed at its accomplishment to be accountable. Researchers who seem to have met the challenge have engaged with the immense value of characteristic rural land uses other than agricultural production (Lefebvre et al. 2011). They did this by changing the meaning of the transitional impacts of why GAEC were introduced. The researchers note the big challenge in complementing the economic effectiveness of the reference line to the effect that ‘the GAEC framework results in a high variety of minimum requirements throughout Europe and sometimes even within the EU Member State when GAEC are defined at the regional level’ (Lefebvre et al. 2011). So while France requires that the land managers who receive direct aid place a minimum proportion of cropland under vegetation cover alongside waterways (or hedgerows or on slopes), Italy requires farmers to preserve terraces. Or, while the UK does not permit the removal of dry stone walls (Cao et al. 2009), the Czech Republic (and Italy) have introduced bans on the conversion of permanent grassland to arable land at the farm level. As a further example, Slovakia requires that land managers preserve vegetation of a width of 10 metres without mineral fertilisation of land parcels alongside rivers, lakes and reservoirs, while the Czech Republic requires a 3 metres wide buffer alongside waterways located on terrain with up to 7° (degrees) slope and a 25 metres wide buffer linking water courses located on more than a 7° (degrees) slope. In comparison, Austria differentiates four types of buffers depending on how steep the terrain is, while enabling producers

to reduce the required buffer width to one half when they apply precision farming technology (Poláková et al. 2013). Instead of one simple standard that can be easily measured by a unified economic measure (Cao et al. 2009), echoing the idea of modernity, we face a post-modern world where a high variability of standards applies within the simple framework of seven GAEC principles that correspond to the complexity of distinctive socioeconomic, agronomic, bioclimatic and environmental conditions.

## CONTRIBUTION TO SUSTAINABILITY

Until now, multifaceted societal and economic factors, related to agriculture, continue to determine the complex innovations for sustainability within evolving rural spaces. What matters most for the farm business position is the range of factors directly affecting farm decisions, including technology, energy, markets and the aid to land managers (Cao et al. 2009). These factors are related to the reasons for introducing GAEC and stem from the application of a command-and-control approach in agricultural policy. The assumption is that only on the basis of an approximate ensemble of those factors will individual producers anticipate the relevant adaptations to on-farm land management, in addition to social and financial motivations to act in response to existing land-based conditions, namely biophysical, environmental, agronomic and climatic conditions (Ingram and Morris 2007; Ingram 2008; Cooper et al. 2009). It is acknowledged, with reference to Boatman et al. (2009), that disentangling the cause-effect link is not easy. Such difficulty complicates the projection of the concept of sustainability into the real practices of farmers.

To seek to ensure that land use is sustainable with respect to natural resources, economic interests and societal demands is a characteristic which is central to adaptive farms and which is therefore also important for institutional economics. The policy-makers dealing with post-war land use did not adequately comprehend the impact of subsidies on replenished aquifers, healthy soils, clean water and differentiated landscapes within agroecosystems responsive to rural residents at respective reference land use localities (Cooper et al. 2009). This caused considerable problems for the harmony of rural space functions, from Eastern to Western Europe (Addiscott 1991; Stoate et al. 2001; Urban

<https://doi.org/10.17221/138/2017-AGRICECON>

and Střelec 2011; Poláková et al. 2013; Novotný et al. 2014). Today, therefore, notes Cooper et al. (2009), an important part of the reasoning regarding the introduction of GAEC has been the need to provide societal justification for using EU taxpayers' funds on production aid to land managers.

Rural issues contributed significantly to the evolution of the reasoning behind GAEC, because the idea of bringing economics, society and nature under one common denominator resulted in a change of the paradigm in rural development from an exogenous agricultural sector production-concentrated model, whereby GAEC is the pre-condition for all area-based supports to farms (in case of the first or second pillar), to an increased role of agri-environmental policy (Anon 2013). Researchers note, when evaluating the impact of such reorientation of agricultural policy, that 'agricultural pressure on the environment has been much reduced' after the 1990s transition period in the Czech Republic (OECD 2008), i.e. good conditions with respect to natural resources may have been partially the result of agricultural policy steering standards based on command-and-control approaches and partially the result of effective investments by farmers and policy makers in up-to-date monitoring systems. For instance, according to monitoring reports of the Ministry of Agriculture (Annual report on the state of agriculture 1998, 2004–2011), farmers apply slightly less nitrogen-based mineral fertiliser than was measured in 1990 (after a phase when use fell to around 40% in 1993 compared to the 1990 base year; in 2006 it again rose to around 8%). Looking at such data provokes the question of to what extent these phenomena are the effect of steering agricultural policy or are due to other factors. In other words, what is behind such differentiation if we speak about common agricultural policy and sustainability? Are we really experiencing sustainability in practice or is it just an unintentional drive of the farmers under the influence of some other factors. Is this true sustainability characterised by renewed merging of the three pillars or are we still living in a world of separated economic, environmental and social issues that are just masked by a new concept?

## CONCLUSION

In this review, I discussed the use of the concept of adaptive institutional economics, emphasising where the concept may be helpful and considering

the limitations to its applicability caused by the environmental, ecological and social aspects.

The main findings regarding the inclusion of GAEC within the use of institutional economics are as follows:

- GAEC implementation from regional to EU levels is important, albeit it functions more like a network that manages sustainability rather than as regulation of the command-and-control style. Given the feature of network management linked directly to regulation, it is important to be aware that the size of income support obtained by producers surpasses the costs of compliance; hence, the result pays off for all farm businesses.

- Flexible institutions and multilevel governance are prerequisites for defining the space of differentiation as a space for research development in terms of the relational positioning of the GAEC reference as a basis for institutional economics. Whilst differing across various countries, the space of differentiation carries us back to rural residents' quotidian work activities, urban residents' holiday making, staying in rural cottages, working on a farm, taking a train trip, visiting family or friends, supporting older relatives, resting, relaxing, activities in natural landscapes, walking, wine tasting and shopping for local products. All these land uses have a functional link to the sustainable governance of natural resources, despite their earlier labelling as 'unproductive'.

In light of the EU budget allocations for rural development priorities at the national level, it is very important for society to require measurement of sustainability outcomes for water resources (and soil and biodiversity) under land-based measures such as GAEC at the appropriate scales. These scales can be presumed to be relevant to localities that can be perceived either by rural residents or the urbanised evaluators of rural development policy. Detrending the success of GAEC measures is therefore as topical as ever, whilst reference to institutional economics is crucial to understand adaptive farms in their approach to harvesting the benefits to climate change adaptation. Yet, 'shades of grey' and crossovers between these perspectives of GAEC considered as network management directly linked to adaptive farms and GAEC as a managing network directly linked to regulation within institutional economics are inevitable when building upon relational knowledge in the link to natural resources, economic budgets and rural development monitoring potentials. These approaches thus continue to be partially valid, despite the challenges that they face.

<https://doi.org/10.17221/138/2017-AGRICECON>

## REFERENCES

- Addiscott T. (1991): Farming, Fertilisers and the Nitrate Problem. CAB International, Wallingford.
- Anon (2013): Program rozvoje venkova 2007–2013. Available at <http://eagri.cz/public/web/mze/dotace/program-rozvoje-venkova-na-obdobi-2007/programove-dokumenty/program-rozvoje-venkova-cr-puvodni.html> (accessed Dec 23, 2016). (in Czech)
- Bio Intelligence Service (2010): Environmental Impacts of Different Crop Rotations in the European Union. Report to Directorate General Environment. Bio Intelligence Service, Paris.
- Boatman N., Gosling J., Ramwell C. (2009): Quantifying the Environmental Impacts of the Campaign for the Farmed Environment – Final Report. The Food and Environment Research Agency, York.
- Brouwer F., Walker A., Hoste R., van Wagenberg C. (2011): Literature Study on the Cost of Compliance with EU Legislation in the Fields of Environment, Food Safety and Animal Welfare. Unpublished report of the European Commission. Agricultural Economics Research Institute, Wageningen UR, the Hague.
- Bruckmeier K., Tovey H. (2008): Knowledge in sustainable rural development: from forms of knowledge to knowledge processes. *Sociologia Ruralis*, 48: 313–329.
- Cao Y., Elliott J., Jones G., Simpson D., Boatman N., Laybourn R., Northing P., Ramwell C., Turley D., van Driel K., Condliffe I., Dennis E., Dwyer J., Mills J. (2009): Evaluation of Cross Compliance. Report for Department of Environment, Farming and Rural Affairs (Defra). ADAS, Leeds.
- Coase R. (1994): Institucionální uspořádání výroby. In: Jonáš J. (ed.): Oslava ekonomie: přednášky laureátů Nobelovy ceny za ekonomii. Academia, Praha. (in Czech)
- Commission of the European Communities (2001): A Sustainable Europe for a Better World: a European Strategy for Sustainable Development. Commission of the European Communities, Göteborg.
- Commission of the European Communities (2013): Staff Working Document: Reporting as Regards Implementation of Nitrates Directive 91/676/EEC for the 2008–2011 Period, SWD (2013) 405. Commission of the European Communities, Brussels.
- Cooper T., Hart K., Baldock D. (2009): The Provision of Public Goods through Agriculture in the European Union. Report to the European Commission. Institute for European Environmental Policy, London.
- Dockès A., Tisenkopfs T., Bock B. (2012): Agricultural Knowledge and Innovation Systems in Transition. Report for project funded from EU FP6 programme FP6-2005-SSA-5A. European Commission, Brussels.
- Dostál J., Klír J., Kozlovská L., Kvítek T., Růžek P. (2003): Principles of Good Agricultural Practice Focusing on Water Protection against Nitrates from Agriculture. Institute of Agricultural Economics and Information, Prague.
- Dvorský J., Jelínek A., Koutná K., Mana V., Semrád Z., Smrček L. (2005): Integrated Handbook with Regard to Principles of Good Agricultural Practice. Ministry of Agriculture, Ekotoxa s.r.o., Opava.
- Dwyer J., Baldock D., Beaufoy G., Bennett H., Lowe P., Ward N. (2002): European rural development under the agricultural policy second pillar: Institutional conservatism and innovation. *Regional Studies*, 41: 873–887.
- Dwyer J., Ingram J., Mills J., Taylor J., Blackstock K., Brown K., Burton R., Dilley R., Matthews K., Schwarz G., Slee R.W. (2007): Understanding – Influencing Positive Environmental Behaviour among Farmers and Land Managers – a project for Defra. CCRI, University of Gloucestershire, Brighton.
- Elbersen B., Jongeneel R., Kasperczyk N. (2010): Cross-Compliance Assessment Tool – Policy Oriented Research FP6 Specific Targeted Research Project. Alterra, Wageningen UR, the Hague.
- European Court of Auditors (ECA) (2014): Integration of EU Water Policy Objectives with the CAP: a Partial Success – Special Report No. 4/2014. European Court of Auditors, Luxembourg.
- European Environment Agency (2012): Climate Change, Impacts and Vulnerability in Europe 2012 – Report No. 12/2012. European Environment Agency, Copenhagen.
- Folke C., Carpenter S., Walker B., Scheffer M., Elmqvist T., Gunderson L., Holling C. (2004): Regime shifts, resilience, and biodiversity in ecosystem management. *Annual Review of Ecology, Evolution and Systematics*, 35: 557–81.
- Gatzweiler F. (2005): Central and Eastern European agriculture and environment: the challenges of governance at multiple levels. *Sociologia Ruralis*, 45: 139–152.
- Geels F. (2011): The multi-level perspective on sustainability transitions: responses to seven criticisms. *Environmental Innovation and Societal Transitions*, 1: 24–40.
- Hart K., Baldock D. (2010): Impact of CAP Reforms on the Environmental Performance of Agriculture. Unpublished report to the OECD. Institute for European Environmental Policy, London.
- Ingram J., Morris C. (2007): In a transition towards sustainable soil. *Land Use Policy*, 24: 100–117.
- Ingram J. (2008): Farmer-agronomist knowledge encounters. *Agriculture and Human Values*, 25: 405–418.
- Jongeneel R., Brouwer F., Farmer M., Muessner R., de Roest K., Poux X., Fox G., Meister A., Karaczun Z., Winsten J.,

<https://doi.org/10.17221/138/2017-AGRICECON>

- Ortęga C. (2007): Compliance with Mandatory Standards in Agriculture. A Comparative Approach of the EU vis-à-vis the United States, Canada and New Zealand. Agricultural Economics Research Institute, Wageningen UR, the Hague.
- Kabele J. (1998): Přerody (Principy sociálního konstruování). Charles University in Prague, Karolinum Press, Prague.
- Klír J., Kozlovská L. (2012): Good Agricultural Practice for Water Protection – Certified Methodology for Practice. Research Institute for Plant, Prague.
- Lefebvre M., Espinosa M., Gomez y Paloma S. (2012): Agricultural Landscape. European Commission, JRC, Ispra.
- Lewis K., Skinner J., Bardon K., Tucker D., Chamber B. (1997): Impact of agriculture in the UK. Environmental Management, 50: 111–128.
- Lockie S. (2006): Networks of agri-environmental action: temporality, spatiality and identity in agricultural environments. Sociologia Ruralis, 46: 22–39.
- McVittie A., Norton L., Martin-Ortega J., Siametti I., Glenk K., Aalders I. (2015): Operationalizing an ecosystem services-based approach using Bayesian Belief Networks: An application to riparian buffer strips. Ecological Economics, 110: 15–27.
- Mlčoch L. (2005): Institutional Economy. Karolinum: Charles University Prague, Prague.
- Mlčoch L. (2016): Economy, Ecology: Human Values and Civilization Problems. Karolinum: Charles University Prague, Prague.
- Nitsch H. (2006): Administrative Arrangements for Cross Compliance. FP6 research project. Institute of Rural Studies, Federal Agricultural Research Centre, Braunschweig.
- North D. (1981): Structure and Change in Economic History. W.W. Norton & Co., London, New York.
- North D. (1990): Institutions, Insitutional Change and Economic Performance. Cambridge University Press, Cambridge.
- Novotný I., Váňová V., Vopravil J., Podhrázská J., Fiala R., Dostál T. (2014): Handbook with Regard to Protection against Water Erosion. Research Institute of Meliorations and Soils, Prague.
- OECD (2008): Czech Republic Country Report. OECD. Available at <http://www.oecd.org/czech/40753719.pdf> (accessed Jan 2016).
- Ostrom E. (2009): A general framework for analyzing sustainability of social-ecological systems. Science, 325: 419–422.
- Poláková J., Berman S., Naumann S., Frelih-Larsen A., von Toggenburg J., Farmer A. (2013): The Sustainable Management of Natural Resources with a Focus on Water and Agriculture. Report prepared for the STOA Panel of the European Parliament. STOA, Brussels.
- Ray C. (1998): Towards a theory of the dialectics of local rural development within the European Union. Sociologia Ruralis, 37: 345 – 364.
- Roberts W., Sutter M., Haygarth P. (2012): Phosphorus Retention in Vegetated Buffer Strips: A review. Environmental Quality, 41: 389–399.
- Söderberg T. (2011): Environmental Effects of Cross-Compliance. Swedish Board of Agriculture, Jönköping.
- Stoate C., Boatman N.D., Borralho R.J., Carvalho C.R., de Snoo G.R., Eden P. (2001): Ecological impacts of arable intensification in Europe. Environmental Management, 63: 337–365.
- Sutherland L., Darnhofer I. (2012): Of organic farmers and ‘good farmers’: Changing habitus in rural England. Rural studies, 28: 232–240.
- Urban J., Střelec M. (2011): Czechia Searching Future Agriculture and Landscape: Preliminary Study. Glopolis Institute, Prague.

Received May 15, 2017

Accepted October 31, 2017

Published online October 8, 2018