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Impact of Agricultural Transition on Soil Protection in Ukraine: The Role of Institutional Change

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ABSTRACT

At the time of post-socialist agricultural transition in Ukraine the focus was on privatisation of land resources, decentralisation and restructuring of the sector. While its impact on agricultural productivity has been thoroughly analysed, there have been few studies addressing the environmental effects of the process. Using the method of document analysis, this paper examines in detail the change in institutions regulating soil protection in agriculture and discusses its implications for the behaviour of agricultural producers and specific soil protection measures applied. The results of analysis suggest that having destroyed the elaborate Soviet soil protection system, Ukraine did not manage to develop a new set of legal rules, nor their enforcement mechanisms, to enable soil protection in the new political and economic setting. This paper discusses the reasons for this institutional failure and provides insights that can be applied to assess the impact of agricultural transition on soils in other countries in Europe and beyond.

1. Introduction

Ukraine is a country in Eastern Europe covering an area of over 603,000 km^2. Agricultural land comprises almost 69% of its territory; about 78% of agricultural land (54% of the total area) is cultivated (State Statistics Service, 2015). Being situated on the so called "black earth belt", Ukraine is famous for being soil rich: Chernozem comprises 60.6% of Ukraine's agricultural land (Bulygin, 2006).

Erosion is said to be the major threat to Ukrainian black earth soils and their fertility (e.g. Sumelius et al., 2005). Unfortunately, there seems to be no consistent and reliable data on the rate, scope and dynamics of this type of Chernozem degradation in Ukraine. The joint FAO-ISRIC study of soil degradation in Central and Eastern Europe (van Lynden, 2000) indicates that wind and water erosion have been observed on 10.5% and 15.4% of the country's territory, respectively. Ukraine's public authorities claim that water erosion is the most significant degradation type, affecting 22% of the country's territory; the rate of water erosion is over 15 tons per hectare per year (State Committee of Land Resources, 2004). Wind erosion has been observed on 14% of Ukrainian territory and the area subject to it increases threefold in years with dust storms (ibid.). The erosion processes cause the loss of around 460 million tons of soil annually (State Committee of Land Resources, 2004). Sheet and rill erosion cause the loss of 0.5 tons of humus and around 0.6 tons of nutrients per hectare, the latter being much higher than introduced with fertilisers (ibid.). The resulting production losses constitute 9-12 million tons of grain annually (ibid.).

Bulygin (2006) argues that the official data on soil erosion is unreliable: the last countrywide soil survey was carried out in 1957-1961. Since then, the data obtained during the survey has been extrapolated by methods the author deems inappropriate because they do not take into account new factors such as agricultural transition. Consequently, Bulygin (2006) claims that at least 50% of the country's agricultural land (40% of the country's territory) is subject to erosion, and the area of eroded land is increasing by 80,000 hectares per year (ibid.).

Though the completeness and reliability of the available data on soil erosion in Ukraine man be questioned, it seems clear that soil erosion on agricultural land in Ukraine persists and according to several authors (e.g. Birmili et al., 2008) even accelerates. The persistence of soil erosion is in itself a topical research problem as regards the need to feed the increasing world population and the increasing demand for food being produces in a sustainable way. The problem deserves further attention considering the substantial transformation of Ukraine's agricultural sector after the

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break-up of the Soviet Union in 1991 (Csaki and Lerman, 1997; Swinnen, 1997; von Cramon-Taubadel et al., 2001; Lerman et al., 2002). Sumelius et al. observe that "the most widespread problem, erosion, existed prior to the economic transition, and still remains" in Ukraine (Sumelius et al., 2005; p. 162). However, the reasons for this problem in and after Soviet times cannot plausibly be the same.

This paper examines in detail the change in institutions regulating soil protection in agriculture and discusses its implications for the behaviour of agricultural producers and specific soil protection measures applied. Here, the terms agricultural transition and institutional change, though related to each other, are explicitly distinguished. The former has a broader meaning which covers not only change in institutions, but also change in the ideology and economic system which determine the organization of agricultural production, and the resulting change in the structure and size of agricultural producers. Furthermore, in this paper the term institutional change addresses change in specific institutions regulating soil protection in agriculture.

The problem of soil degradation on agricultural land in post-Soviet context has not been thoroughly addressed up to now, though several strands of literature considered issues related to it. The 1990s and the first half of the 2000s were marked by high interest in agricultural transition (e.g. Swinnen, 1997; von Cramon-Taubadel et al., 2001). The main focus here was on privatisation of land resources, decentralisation and restructuring of agricultural sector, and their impact of agricultural productivity. Up to now, there have been only few studies addressing the environmental effects of transition. For example, several publications linked land cover change and land abandonment in post-socialist countries to agricultural transition (Müller and Munroe, 2008; Baumann et al., 2011; Prishchepov et al., 2012; Stringer and Harris, 2014). The issue of soil degradation has been seldom addressed.

Several scholars see the reason for soil degradation in the type of land management regime. Specifically, private property in natural resources has been often advocated as providing strongest incentives to take care of the resources owned (e.g. Demsetz, 1967; Smith, 1981; Pearse, 1992). In the field of soil protection this hypothesis has been frequently supported by empirical research examining the correlation between land tenure security and farmers' investments in soil conservation (e.g. Gebremedhin and Swinton, 2003; Fraser, 2004; Kabubo-Mariara, 2007). Following this logic, land privatization in Ukraine should have led to the decrease in soil erosion, which does not seem to be the case.

There exist several case studies which suggest that other factors beyond land tenure matter for the decisions about land cultivation practices and adoption of soil protection measures (e.g. Brasselle et al., 2002). Specifically, the role of socio-economic factors has long been recognised (Blaikie and Brookfield, 1987; Pagiola, 1999; Napier et al., 2000; Boardman et al., 2003). Part of the existing studies in the field consider farmers' perceptions of soil degradation and their decisions regarding soil protection measures, thus focusing on social norms (Kerr and Pender, 2005; Okoba and De Graaff, 2005; Moges and Holden, 2007; Engdawork and Bork, 2015). Other studies examine the development, content and implementation of soil protection policies, thus focusing on the legal rules (e.g. Fullen et al., 2006; Barbayiannis et al., 2011; Prager et al., 2011). The interplay between the legal rules and social norms has been considered by e.g. Prazan and Dumbrovsky (2011) and Posthumus et al. (2011), who focus rather on static situations without paying much attention to institutional change.

In spite of the seeming abundance of research on different aspects of soil degradation, the lack of research linking land degradation agricultural transition has been observed (Stringer and Harris, 2014). Specifically, to date, there seems to exist no study that provides a detailed analysis of change in institutions regulating soil protection in agriculture. This paper contributes to filling the existent knowledge gap. The insights gained from Ukraine can be applied to assess the impact of agricultural transition on soils in other countries in Europe and beyond.

The paper starts with brief introduction to the analytical approach, the study area and methods of data collection and analysis. Utilising the document analysis method, the paper examines the change in legal rules regulating soil protection in agriculture and discusses its implications for the behaviour of agricultural producers and specific soil protection measures applied. Analysis of in-depth interviews with agricultural producers is complementary to the document analysis. Its results corroborate the results of the document analysis and briefly address the farmers' attitude to soil erosion and soil protection measures applied by them.

2. Materials and Methods

2.1. Approach

Most frequently, two classes of institutions are distinguished within institutional economics: legal rules and social norms (Commons, 1931), also referred to as formal and informal institutions (e.g. Knight, 1992; North, 1994; Furubotn and Richter, 2000) or rules in form and rules in use (Ostrom, 1999).

Legal rules indicate which actions are prescribed, permitted and prohibited; their execution is enforced by the legal system (Commons, 1931). In the case of soil protection, legal rules grant a right to, or impose a duty on, agricultural producers to apply specific soil management or land cultivation practices, and at the same time assign to officials the legal power to monitor and control producers' actions. Monitoring and control are explicitly distinguished. The former is understood as recording information about actions or phenomena without legal power to influence or change them. The latter implies the legal power to impose sanctions if observed actions or phenomena are against legal rules. Social norms are the behavioural patterns which are adopted by individuals in the process of interacting with other members of society and are induced by incentives outside the legal system (Bromley, 2006).

The correlation between the two classes of institutions is often underlined. Several authors claim the importance of taking social norms into account when designing legal rules, which would facilitate implementation of the latter (e.g. Kasper and Streit, 1999). Other authors stress the "institutionalization" phenomenon when repeated mandated actions are with time performed voluntary, meaning that the rules prescribing those actions are transformed into social norms (Commons, 1934).

Bromley suggests distinguishing a third class of institutions: property relations. Though acknowledging himself that, as any other rights, property rights are a product of a legal system, he underlines that this specific type of rights regulates various benefit streams arising from land ownership and use (Bromley, 2006). Regardless of whether property relations are to be considered a separate class of institutions or not, paying attention to them addresses the hypothesis of private property in land providing stronger incentives for soil conservation than land lease.

Considering the two classes of institutions, institutional change may have two forms: change in legal rules and change in norms and conventions. The main interest of this paper lies in the alteration of legal rules regulating soil protection in agriculture. The analysis of this institutional change proceeds in a straightforward way by comparing the legal rules in Soviet times and after transition, and discussing their implications for the behaviour of agricultural producers and soil protection measures. Specifically, the analysis aims to trace the change in (1) the rights and duties of agricultural producers when managing their land and deciding on soil protection