Governing of agrarian sustainability

Bachev, Hrabrin

Institute of Agricultural Economics

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GOVERNING OF AGRARIAN SUSTAINABILITY[1]

Hrabrin Bachev, Institute of Agricultural Economics, Sofia, Bulgaria

Abstract

The new developing interdisciplinary methodology of the New Institutional and Transaction Costs Economics (combining Economics, Organization, Law, Sociology, Behavioral and Political Sciences) is incorporated into agrarian sphere, and a framework for governing of agrarian sustainability suggested. It takes into account the role of the specific institutional environment (formal and informal property rights, and systems of their enforcement); and the behavioral characteristics of individuals (bounded rationality, tendency for opportunism, entrepreneurships, preferences, risk aversion etc.); and the transaction costs associated with protection and exchange of property rights; and the critical factors of each transaction (such as frequency, uncertainty, asset specificity, and appropriability); and the comparative efficiency of market, private, public, and hybrid governing modes. The discrete structural analysis is applied, and the principle forms for governing of transactions with specific critical dimensions specified. The cases of market and private sector failures are identified, and the needs for a third party (Government, international assistance etc.) intervention justified. The comparative advantages and disadvantages of different modes for public involvement (property rights modernization, regulations, taxes, assistance and support, public provision, hybrid modes) are assessed. The effective governance mix for public intervention in environmental transactions is presented.

Key words: Agrarian Governance**;** Governing of Agrarian Sustainability**;** Efficiency of Market, Private, Public and Hybrid Modes; New Institutional and Transaction Costs Economics

Introduction

The governance of agrarian sustainability is among the most topical issues in academic, business, and policies debates in both developed and developing countries. Experience shows that countries achieve to a different extend the economic, social, environmental etc. goals of sustainable development. That is a result of *specific* governing structures which affect in dissimilar ways individuals behavior and lead to diverse actual performances. Despite that *institutional aspects* are largely ignored, and *"normative"* approaches dominate, and *informal* modes and *transaction costs* are not included into analyses. Consequently, the potential of market and private governing modes for the specific economic, institutional and natural environment in each country can not be properly assessed. Nor the effective modes for public (government, international assistance etc.) interventions in agrarian sphere designed.

In this paper we incorporate the achievements of the new developing *New Institutional and Transaction Costs Economics* (combining Economics, Orgnaization, Law, Sociology, Behavioral and Political Sciences), and suggest a framework for governing of agrarian sustainability.

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"Institutions matter"

Institutions ("rules of the game") determine individuals' rights in society and the way the property rights[2] are enforced (Furuboth and Richter, 1998; North, 1990). The spectrum of rights could embrace material assets, natural resources, intangibles, certain activities, labor safety, clean environment, food security, intra- and inter-generational justice etc. A part of the property rights are constituted by the *formal* laws, regulations, standards, court decisions etc. In addition, there are important *informal* rules determined by the tradition, culture, religion, ideology, ethical norms etc. The enforcement of the rights is done by the state or other mechanisms such as international pressure, community actions, trust, reputation, private modes, self-enforcement etc. The institutional analysis is not interested in de-jure rights but *de-facto* rights individuals and groups possess. For instance, "universal principles" of sustainable development were declared (1992 Rio Earth Summit) and accepted by most countries. However, the extend of adaptation and respect of related rights, and their practical enforcement vary significantly among countries.

The *specific* institutional environment affects human behavior and directs *(governs*) individuals' activities "in a predictable way" (North, 1990). It creates dissimilar *incentives* and *restrictions* for intensifying exchange, increasing productivity, inducing private and collective initiatives, developing new rights; decreasing divergence between social groups and regions; responding to ecological and other challenges. For example, (socially) acceptable norms for use of labor (employment of children, safety standards, minimum wages), plant and livestock (animal welfare, preservation of biodiversity, usage of GM crops), and environmental resources (water use rights; permissions for pollution), all they could differ even between various regions of the same country. Namely the specific institutional structure eventually determines the *potential for* and particular *type of* development in different communities, regions, and courtiers.
Institutional development is initiated by the public authority, international actions (agreements, assistance, pressure), and private and collective actions of individuals. It is associated with modernization and/or redistribution of existing rights; evolution of new rights and emergence of novel (private, public, hybrid) institutions for their enforcement. For instance, the sustainability initially evolved as "movements" and "new ideology" in developed countries (Edwards *et al.*, 1990). Afterward this "new concept" extended, and instituted in the body of formal laws, regulations and public support programs. Numerous initiatives of producers and consumers widespread being an important part of (pushing up) institutional modernization in the area.

Diverse *institutional environment* contributes to a different extend to achieving economic, social, environmental etc. goals of sustainable development. If for instance, private rights are not well defined, enforced, or restricted, that would limit intensification of exchange and the overall economic development. Indeed the rights on major agrarian resources were not well defined during transition in Bulgaria and that led to domination of low productive, unsustainable and "gray" structures; and ineffective use of large national resources; and serious economic, social and environmental problems in rural areas (Bachev and Tsuji, 2001). The *"tragedy of commons"* is a classical example for importance of institutional structure (Hardin, 1968). When common ownership and "open access" to natural resources exists there are strong individual interests for overuse since private costs are not proportionate to private benefits. Consequently, low long-term efficiency (unsustainability) come out as a result of this form of organization. The "tragedy of commons" could be avoided by an *alternative institutional arrangement* - introduction of *public regulation* on exploitation (users quotas) or *privatization* of natural resources[3].

Thus *"institutions matter"* and analysis of sustainability are to be done in the *specific institutional* rather than in an unrealistic ("normative", desirable) *context*. Nevertheless, the

[2] While lawyers distinguish between property and human rights, for the economists *all rights are property rights* (Furuboth and Richter, 1998).
[3] In the later case, a private agent will contract and control sustainable use of limited natural resources.

institutional aspect is commonly missing in most of suggested frameworks for analyzing and assessing agrarian sustainability. Accordingly, non-feasible norms rather than real-life arrangements are used as criteria – farming model in developed countries, assumption for perfectly defined and enforced property rights, effectively working public organizations, etc. Therefore, an analysis of *structure* and *evolution* of real or other feasible institutional arrangements for carrying out agrarian activities have to be included in the model.

The costs of governance

Transaction costs are the costs associated with protection and exchange of individuals' rights. In addition to the production costs the economic agents make significant costs for: finding best partners for land, inputs, labor, finance supply and marketing; negotiating the conditions of exchange; completing (writing down) the contract; enforcing negotiated terms; disputing through court or another way; and adjusting or termination along with changing conditions of trade.

Institutional framework and its development also impose transaction costs to individuals – for studying out and complying with various institutional restrictions, formal registration of contracts and entities, efforts to deal with bureaucracy etc. A good example is the current problems of many Bulgarian farms to meet new EU requirements ("institutionally determined" costs) related to new product quality, food safety, environmental, animal welfare etc. standards.

Transaction costs have two *behavioral* origins: individual's *bounded rationality* and tendency for *opportunism* (Williamson, 1996). Economic agents do not possess full information about the system (price ranges, trade opportunities, trends in development) and they have to spend to increase their "imperfect rationality". Individuals are also given to opportunism[4] and if there is an opportunity for some of transacting sides to get non-punishably an extra rent from exchange he (she) will likely do so. Therefore, significant ex-ante and ex-post investments have to be made to protect transactions from hazard of opportunism.

If transaction costs were *zero* then the mode of the governance would not be of economic importance, and individuals would manage their relations with an equal efficiency though free market, or through private organizations of different types, or in a single nationwide company. All information for the effective potential of transactions (exploration of technological opportunities, satisfying demands) would be costlessly available, and individuals would costlessly trade owned resources in mutual benefit until exhausting possibilities for increasing productivity, maximizing consumption, and sustainable development[5].

However, very often the high costs make difficult or block otherwise efficient (mutually beneficial) transactions. Textbook cases of "market failure" are connected with *negative* or *positive externalities* of agrarian activities. Here free-market prices do not reflect the effect on third party's welfare and cannot govern effectively relations. Maximization of social output (welfare) is not achieved, and inefficient allocation of resources and unsustainable development arrives[6]. That necessitates a *"Government intervention"* to eliminate differences between *social* and *private* prices ("internalization of externalities" through taxes, norms, etc.).

The problem of "social costs" does not exist in the world of zero transaction costs and well-defined private rights (Coase, 1960). Situation of maximum efficiency is always achieved independent of initial allocation of rights[7]. However, when transaction costs are significant, then

[4] In two forms: *pre-contractual* ("adverse selection") and *post-contractual* ("moral hazard").

[5] Currently there is a *principle agreement (social contract) for global sustainable development*.

[6] Hence farmers will over-produce "public bads" (noise, air, and water pollution) and under-produce "public goods" (rural amenities, ecological and cultural services; habitat for wildlife, biodiversity etc.).

[7] If the farmer has "right to pollute", the affected agents would pay him a "bribe" to stop polluting. If the farmer does not have "right to pollute", then he would pay a bribe to other agents to let him certain pollution. In either case, the welfare of all agents is maximized without any public intervention.

costless negotiation and exchange of rights is not possible. The initial allocation of property rights between individuals is critical for the overall efficiency and sustainability. Moreover, if rights on important resources are not well defined (e.g. rights on clean air and water) that creates big difficulties in effective allocation (unsolvable costly disputes between polluting farmers and neighborhood). Consequently, some essential activities (transactions) are not carried out at socially effective scale, and existing structures less contribute to sustainable development.

Thus the *type of governance* becomes crucial since various modes give unequal possibilities for participants to coordinate transactions, and stimulate acceptable behavior of counterpart, and protect their contracted and absolute rights from unwanted expropriation. In the world of *positive* transaction costs the *rational* agrarian agents will seek, chose, and develop such modes for governing of their activities and relations which maximize their benefits and minimize their (production *and* transacting) costs. In the long run only *efficient* modes for governing of different transactions will prevail (sustain) in agriculture (Williamson, 1996).

Sustainability of agrarian structures is a necessary but *not sufficient* condition for sustainable development[8]. The overall *goals* of sustainable development cannot be automatically achieved through totally decentralized actions (free market competition, private initiatives). There is a need for special (designed and installed) *governance* which include a significant public (community, national, transnational, global) intervention in agrarian sector.

There is not a singe (universal) mode for effective organization of *all type* of agrarian transactions in *any possible* institutional and economic surroundings. Individual governing forms have *distinct features* (advantages and disadvantages) to coordinate, stimulate, and protect transactions. Besides, agents have specific *personal characteristics* - awareness, entrepreneurships, preferences, risk aversion, tendency for opportunisms etc. Furthermore efficiency of governing mode will depends on the *specific attributes* of each transaction. Therefore, *individual* transaction in to be put in the *centre* of the analysis, and the *comparative efficiency* of the feasible modes for governing of *socially desirable* transactions assessed.

Principle governance matrix

Generally, every agrarian transaction could be governed through a great variety of *alterative* forms. For instance, *supply of environmental preservation service* could be governed as: a *voluntary* activity of a farmer; though *private contracts* of the farmer with interested or affected agents; though *interlinked contract* between farmer and a supplier (processor); though a *cooperation* (collective action) with other farmers and agents; though a (free) *market* or assisted by a third party (certifying and controlling agent) *trade* with special (eco, origins) products; though a *public contract* specifying farmer's obligations and compensation; though a *public order* (regulation, taxation, quota); within a hierarchical *public agency* or by a *hybrid* form.

Different governance modes are alternative but not equal modes for organization of transacting. The *free market* has big coordination and incentive advantages ("invisible hand", "power of competition"), and provides "unlimited" opportunities to benefit from specialization and exchange. However, market governance could be associated with high uncertainty, risk, and costs due to price instability, great possibility for facing an opportunistic behavior, "missing market" situation, etc. The s*pecial contract form* ("private ordering") permits better coordination, intensification, and safeguard of transactions. However, it may require large costs for specification of contract provisions, adjustments with constant changes in conditions, enforcement and disputing of negotiated terms, etc. The *internal (ownership) organization* allows greater flexibility and control on transactions (direct coordination, adaptation, enforcement, and dispute resolution by a *fiat*). However, extension of internal mode beyond

[8] Sustainability of farms is one of the major criteria (indicator) for sustainable agrarian development.

family boundaries may command significant costs for initiation and development, and current management (collective decision making, control of the opportunism of the members of a coalition, supervision and motivation of hired labor, etc.).

The discrete structural analysis is suggested to evaluate the comparative efficiency of the alternative governing forms (Williamson, 1996). Very often the *direct* assessment of related transaction costs is very difficult or impossible to make. Therefore, we **first** identify the *"critical dimensions"* of transactions responsible for the *variation* of transaction costs [9]. When *recurrence* of transactions *between same partners* is high, then both (all) sides are interested in sustaining and minimizing costs of their relations (avoiding opportunism, building reputation, setting up adjustment mechanisms etc.). Besides, costs for development of a special private mode for facilitating bilateral (multilateral) exchange could be effectively recovered by frequent transacting.

When *uncertainty*, which surrounds transactions increases, then costs for carrying out and secure transactions go up (for overcoming information deficiency, safeguarding against risk). Certain risks could be diminished by production management or through a special market mode (e.g. purchase of insurance). However, the governance of most transacting risk would require a special private forms - trade with origins; providing guarantees; using share-rent or output-based compensation; employing economic hostages; participating in a risk-pooling, inputs-supply or marketing cooperative; complete integration.

Transaction costs get very high when *specific assets for relations with a particular partner* are to be deployed. Relation specific investments are "locked" in transactions with a particular buyer or seller, and cannot be recovered through "faceless" market trade. Therefore, *dependant* investment (assets) have to be safeguarded by a special form such as long-term contract, interlinks, hostage taking, joint investment, or ownership integration.

Transacting is particularly difficult when *appropriability* of rights on products, services or resources is low. "Natural" low appropriability has most of the agrarian intellectual products - agro-market information, agro-meteorological forecasts, new varieties and technologies, software etc. Besides, all products and activities with significant (positive or negative) externalities are to be included in this group. If appropriability is low the possibility for *unwanted* (market or private) exchange is great, and the costs for protection of private rights (safeguard, detection of cheating, disputing) extremely high. The agents would either over produce (negative externalities) or under organize such transaction (positive externalities) unless they are governed by an efficient private or hybrid mode (cooperation, strategic alliances, long-term contract, trade secrets, or public order).

Secondly, we "*align* transactions (differing in their attributes) with governance structures (differing in their costs and competence) in discriminating (mainly in transaction cost economizing) way" (Williamson, 1996). According to the *combination* of the specific characteristics of each transaction, there will be different the most effective form for governing of transactions (Table 1). Agrarian transactions with good appropriability, high certainty, and universal character of investments (partner can be changed anytime without significant additional costs) could be effectively carried *across free market* through *spotlight* or *classical contracts*. Here organization of transactions with a special form or within the farm (firm) would only bring extra costs without producing any transacting benefits.

[9] "Frequency", "uncertainty", and "asset specificity" have been identified by Williamson (1996), and "appropriability" added by Bachev and Labonne (2000).

Table 1. Principle Modes for Governing of Agrarian Transactions*

Generic modes	*Critical dimensions of transactions*								
	Appropriability								
	High								Low
	Assets Specificity								
	Low				High				
	Uncertainty								
	Low		High		Low		High		
	Frequency								
	High	Low	High	Low	High	Low	High	Low	
Free market	⚲	⚲							
Special contract form			⚲			⚲			
Internal organization					⚲		⚲		
Third-party involvement				✚				✚	
Public intervention									✚

⚲ - *the most effective mode*; ✚ - *necessity for a third party involvement*

* Differences in personal characteristics of agents are disregarded. Only extreme levels of critical factors of transactions are considered. In the real agrarian economy there is a big variation of critical dimensions and thus effective governing forms (including mixed, hybrid, interlinked etc.).

Recurrent transactions with low assets specificity, the high uncertainty and appropriability, could be effectively governed through a *special contract*. The *relational contract* is applied when detailed terms of transacting are not known at outset (high uncertainty), and a framework (mutual expectations) rather than specification of obligations is practiced. Partners (self) restrict from opportunism and are motivated to settle emerging difficulties (situation of frequent bilateral trade). Besides, no significant risk is involved since investments could be easily (costlessly) redeployed to another use or users (no assets dependency exist).

A special contract forms is also efficient for rare transactions with low uncertainty, high specificity and appropriability. Dependent investment could be successfully safeguarded through contract provisions since it is easy to define and enforce relevant obligations of partners in all possible contingencies (no uncertainty surrounds transactions). Here the occasional character of transactions does not justify their internalization within the farm (firm).

Transactions with high frequency, big uncertainty, great assets specificity (dependency), and high appropriability, have to be organized *within the farm/firm* (ownership mode). For instance, managerial and technological knowledge is quite specific to a farm, and its supply has to be always governed through a permanent labor contract and coupled with ownership rights. Capital investments in land are to be made on owned (or long-leased) rather than rented land (high site and product specificity). All "critical" to farm material assets will be internally organized - production of forage for animals; important machineries; water supply for irrigated farming etc. While universal capital could be effectively financed by market form (bank credit), highly specific investments can be only made through internal funding (own funds, equity sell).

According to the *personality* of resource owners and (transacting) *costs of* their *coalition*, different *type of farm (agro-firm)* will be efficient - one-person farm, family farm, partnership, cooperative farm, and corporative farms. Depending on the entrepreneurial capital, and the specific legal framework, support policies, tradition etc. various farms will have unlike effective *horizontal* and *vertical boundaries*[10]. Furthermore, an agrarian organization will be *sustainable* if

[10] In *transitional* East European agriculture most investments happened to be in a regime of high dependency. As a result (over)integrated modes such as subsistence farming or large cooperatives and

it manages all transactions in the most economical for the owner(s) way (Bachev and Peeters, 2005). If a farm does not govern transactions effectively, it will experience high costs and difficulties using institutions (possibilities, restrictions) and carrying out transactions *comparing* to other feasible organization. In that case, there will be strong incentives for exploring the existing potential *(adapting to sustainable state)* through changes in farm size, or via reorganization or liquidation of the farm (alternative use of resources).

If specific capital cannot be effectively organized within the farm (economy of scale and scope explored, funding made), then an effective governing form *outside farm-gates* is to be used - group farming, joint ownership, interlinks, cooperative, lobbying for public intervention. When strong *assets* (capacity, time of delivery, site, branding) *inter-dependency* with an upstream or downstream partner exists, then it is not difficult to govern transactions through a *contract modes* (strong mutual interests for cooperation and restriction of opportunism). For instance, in Germany (and some other developed countries) the effective cooperative agreements between farmers and drinking water companies are widely used (symmetrical dependency) and led to production methods protecting water from pollution. However, very often farmers face *unilateral dependency* and need an effective (ownership) organization to protect their interests. Transacting costs for initiation and maintaining of such "collective organization" is usually great (big number of coalition, different interests of member, opportunism of "free-riding" type) and it is either unsustainable or do not evolve at all (Olson, 1969). That creates serious problems for efficiency (sustainability) of individual farms - missing markets, monopoly (quasi-monopoly) situation, impossibility to "induce" public intervention, etc.

Third, we identify situations of *market* and *private sector failures* - the *critical points* for sustainable development. Serious transacting problems arise when condition of assets specificity is combined with high uncertainty, low frequency, and good appropriability. Elaboration of a special governing structure for private transacting is not justified, specific investments are not made, and transactions fail to occur at effective scale ("market failure" *and* "contract failure"). Similar difficulties are also encountered for rare transacting associated with high uncertainty and appropriability. In these cases, *a third part* (private agent, NGO, authority) *involvement* in transactions is necessary (through assistance, arbitration, regulation) in order to make them more efficient or possible at all. The emergence and unprecedented development of the organic farming and system of fair-trade are good examples in that respect. There is an increasing consumer's demand (price premium) for organic, semi-organic and fair-trade products in developed countries. Nevertheless their supply could not be met unless an effective *trilateral* governance (including an independent certification and control) has been put in place.

When appropriability associated with a transaction is low, there is no pure market mode to protect and carry out transactions effectively. Nevertheless, *respecting* others rights (unwanted exchange avoid*)* or *"granting"* additional rights to others (needed transactions carried) could be governed by *"good will"* or *charity actions* of individuals, NGOs, or international organizations. A great number of voluntary environmental initiatives (agreements) have emerged by competition in food industries, farmers' preferences for eco-production, and responds to public pressure for sound environmental management[11]. Environmental standards are usually "process-based", and "environmental audit" is not conducted by an independent party, which does not guarantee "performance outcome". Therefore, most of these initiatives are seeing as a tool for external image manipulation. Recent huge food safety and eco scandals demonstrated that such schemes could often fail (high bounded rationality and opportunism). In any case, voluntary initiatives could hardly satisfy the entire demand especially if they require significant costs.

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companies dominate. In matured economies the agrarian assets are with more universal character and farm borders are greatly determined by the family borders, and more market and contract forms prevail.

[11] The unprecedented development of "codes of behaviors", eco-labeling and branding, environmental cooperatives, and "green alliances" etc., all are good examples in that respect.

Some *private modes* could be employed if a high frequency (pay-back of investment is possible) and mutual assets dependency (thus incentive to cooperate) exists[12]. In these instances, unwritten accords, interlinking, bilateral or collective agreements, close-membership cooperatives, codes of professional behavior, alliances, internal organization, etc. are used. However, emerging of special large-members organizations for dealing with low appropriability would be very slow and expensive, and they unlikely be sustainable in a long run ("free riding" problem). Therefore, there is a strong need for *a third-party public* (Government, local authority, international assistance) *intervention* in order to make such transaction possible or more effective.

For example, supply of environmental goods by farmers could hardly be governed through private contracts with individual consumers because of the low appropriability, high uncertainty, and rare character of transacting (high costs for negotiating, contracting, charging all potential consumers, disputing). At the same time, supply of additional environmental protection and improvement service is very costly (in terms of production and organization costs) and would unlikely be carried out on a voluntary basis. Besides, financial compensation (price-premium) of farmers by willing consumers through a pure market mode is also ineffective (high information asymmetry, enforcement costs, etc.). A third-party mode with a direct Government involvement would make that transaction effective: on behalf of the consumers the Government agency negotiates with individual farmers "contracts for environment conservation and improvement service", coordinates activities of various agents (including direct production management), provides public payments for compensation of farmers, and controls implementation of negotiated terms[13].

Effective modes for public intervention

There is a big variety of possible *forms for public intervention* in market and private transacting. The comparative institutional analysis of public modes is to include: *firstly,* the *correspondence* of public involvement to the real needs of development and identified needs for a third party intervention in transactions (Table 1). *Secondly*, the *comparative* advantages of alternative modes for public involvements comprising *all costs* - direct (tax payer, assistance agency) expenses, *and* transacting costs of bureaucracy (coordination, stimulation, mismanagement), *and* costs for individuals' participation and usage of public modes (expenses for information, paper works, payments of fees, bribes, etc.), *and* costs for public control and reorganization of bureaucracy. And *third*, the *comparative efficiency* of selected form and other feasible modes of governance - partnerships with private sector; property rights modernization etc. Accordingly, public intervention is to be initiated *only if there is* a *net benefit* - when *effects are greater than additional* (individual and social) *costs for the third-party involvement*.

Depending on the uncertainty, frequency, and necessity for specific investment of public involvement there will be different the most effective forms (Table 2 presents an example with "environmental transactions"). Principally, the interventions with low uncertainty and assets specificity would require *smaller* Government organizations (more regulatory modes; general laws and contract enforcement). When uncertainty and assets specificity of transactions increases a *special contract mode* would be necessary - public contracts for provision of private services, public funding (subsidies) of private activities, temporary labor contract for carrying out special public programs, leasing out public assets for private management etc. And when transactions are characterized with high assets specificity, uncertainty and frequency then an *internal mode*

[12] E.g. inter-dependency between a bee keeper and a neighboring orchard farm.

[13] Namely, *public environmental contracts* with individual farmers have been broadly used in EU as an effective form for governing the supply of environmental preservation and improvement services.

and *bigger public organization* would be necessary – e.g. permanent public employment contracts, in-house integration of crucial assets in a specialized state agency or public company.

Table 2 Effective Modes for Public Intervention in Environmental Transactions*

Level of Uncertainty, Frequency, and Assets specificity				
Low				**High**
New property rights	**Regulations**	**Taxes**	**Assistance and support**	**Public provision**
Private rights on natural, biological, and environmental resources; Private rights for (non) profit management of natural resources; Tradable quotas (permits) for polluting; Private rights on intellectual agrarian property and origins; Private liability for polluting	Quotas for emissions, and use of products and resources; Regulations for use of GM crops; Bans for use of certain inputs and technologies; Norms for nutrition and pest management; Regulations for water protection against pollution by nitrates; Regulations for biodiversity and landscape management; Licensing for water use; Quality and food safely standards; Standards for good farming practices; Mandatory (environmental) training; Certifications and licensing; Compulsory environmental labeling; Designating environmental vulnerable and reserve zone; Set aside measures; Inspections, fines and, ceasing activities	Tax rebates, exception, and breaks; Environmental taxation on emissions or products (pesticides, fertilizers); Levies on manure surplus; Tax or levies schemes on farming or export for funding (innovation, extension etc.) activities	Recommendation and information; Demonstration; Direct payments and grants for environmental actions of farms and (farm, community etc.) organizations; Preferential credit programs; Environmental contracts; Government purchases (water and other limited resources); Price and farm support for eco-production; Funding of environment and management training programs of agrarian agents; Assistance in farm associations	Research and development Extension and advise; Agro-market and know-how information; Agro-meteorological forecasts; Sanitary and veterinary control; Specialized (quasi) public agency or company; Pertaining "precaution principle"

** Environmental transactions are associated with respecting environmental rights and improving environmental performance of agents.*

In the beginning, existing problems (difficulties, costs, failures) in organization of market and private transactions have to be specified. The appropriate government involvement would be to create environment for: decreasing uncertainty surrounding transactions, increasing their intensity; protecting and making less dependent private investments. For instance, State establishes and enforces quality and safety standards for farm inputs and produces, certifies service providers, regulates employment relations, transfer water management rights to farms associations, set up minimum farm gate-prices etc. All that facilitates and intensifies (market and private) transactions and increase sustainability.

Next, practically possible modes for increasing appropriability of transactions have to be considered. Low appropriability is often caused by unspecified or badly specified private rights. In some cases, the most effective government intervention would be to introduce and enforce *new private property rights* – e.g. rights on natural, biological, and environmental resources; tradable quotas for polluting; private rights on intellectual agrarian property and origins etc. That would be efficient when privatization of resources or introduction (and enforcement) of new rights is not associated with significant costs (uncertainty, recurrence, and level of specific investment are low). That Government intervention effectively transfers the organization of transactions into market and private governance, liberalizes market competition and induces private incentives (and investments) in certain activities (the matrix in Table 1). For instance,

tradable permits (quotas) are used to control the overall use of certain resource or level of a particular type of pollution[14]. They give flexibility allowing farmers to trade permits and meet own requirements (adjustment costs, specific conditions of production). That form is efficient when a particular target must be met, and progressive reduction is dictated through permits while trading allows compliance to be achieved at least costs (private governance). Such trading rights also allow *market for environmental quality* to develop[15].

In other instances, it would be efficient to put in place *regulations* for trade and utilization of resources and products – e.g. standards for labor (safety, social security), product quality, environmental performance, animal welfare; norms for using natural resources, GM crops, and (water, soil, air, comfort) contamination; ban on application of certain chemicals or technologies; foreign trade regimes; mandatory training and licensing of farm operators etc. Environmental regulations aim changing farmers behavior and restrict negative externalities. They make producers responsible for the environmental effects of their products or management of products uses (e.g. waste). This mode is effective when general improvement of performance is desired but it is not possible to dictate what changes (in activities, technologies) is appropriate for wide range of operators and environmental conditions (high uncertainty and information asymmetry). When level of hazard is high, outcome is certain and control is easy, and no flexibility exists (for timing or nature of required result), then ban or strict limits are the best solution. However, regulations impose uniform standards for all regardless of the costs for compliance (adjustment) and give no incentives to over-perform beyond a certain level.

In other instances, using the incentives and restrictions of the *tax system* would be the most effective form for intervention. Different sorts of tax preferences (exception, breaks, credits) are widely used to create favorable conditions for development of certain (sub)sectors and regions, forms of agrarian organization, segment of population, or specific types of activities. Environmental taxation on emissions or products (inputs or outputs of production) is also applied to reduce use of harmful substances. For instance, taxes on pesticides and fertilizer are used in Scandinavian countries and Austria to decrease their application and environmental damaging impact. In Holland levies on manure surplus was introduced in 1998 based on levies for nitrogen and phosphorus surpluses above a levy free surplus per hectare. The system creates strong incentives to minimize leakages (and not just usage), and reduce flexibility to substitute taxable for non-taxable inputs. However, it is associated with significant administrative and private costs (ECOTEC, 2001). The environmental taxes impose the same conditions for all farmers using a particular input and give *signals* to take into account the *"environmental costs"* inflicted on the rest of society. Taxing is effective when there is close link between activity and environmental impact, and when there is no immediate need to control pollution or to meet targets for reduction. Tax revenue is also perceived to be important to maintain budget and activities of special (e.g. environmental) programs. However, an appropriate level of charge is required to stimulate desirable change in farmers behavior[16]. Besides, nitrogen emission can vary according to the conditions when nitrates are applied and attempting to reflect this in tax may result in complexity and high administrating costs. Distribution impact of such taxes must be socially acceptable, and implications for international competitiveness also taken into account.

In some cases, *public assistance and support* to private organizations in the best mode for intervention. Large agrarian (rural) support and development programs have been widely used in all industrialized countries. They let "proportional" development of agriculture, improvement of farmers welfare ("income parity"), and in some instances undesired effects (over-intensification,

[14] Manure production quotas in Holland until recently, water abstraction licenses and water rights trading in UK and Australia, nutrition trading schemes in some US river catchments, etc.

[15] Permits can be taken out of market raising environmental quality above the level "planned" level.

[16] In Scandinavia introduction of tax brought about reduce use of pesticide. In California the doubling of the rate in 1992 had no discernable effect on sales (low price elasticity of demand for pesticide)

environmental degradation, market distortions). The public *financial* support for environmental actions is the most commonly used instrument for improving environment performance of farmers. It is easy to find a justification of the public payments as a compensation for provision of "environmental service" by farmers. All studies shows that value placed upon landscape exceed greatly the costs of running the schemes. However, share of farms covers by the various agri-environmental support schemes is not significant since the voluntary (self-selection) character does not attract farmers with the highest environment enhancement costs (most intensive and damaging environment producers). In some cases, low-rate of farmers' compliance with environmental contracts is a serious problem (Dupraz *et al*., 2004). That problem cannot be solved by higher administrative control (enormous enforcement costs) or introducing bigger penalty (politically and juridical intolerable). A disadvantage of "the payment system" is that once introduced it is practically difficult ("politically unacceptable") to be stopped when goals are achieved or there are funding difficulties. Moreover, withdraw of subsidies may lead to further environmental harm since it would induce adverse actions (intensification, return to conventional farming**).** The main critics of the subsidies are associated with their "distortion effect", negative impact on "entry-exit decisions" from polluting industry, unfair advantages to certain sectors in the country or industries in other countries, not considering the total costs (transportation and environmental costs, and "displacement effect" in other countries). It is estimated that agri-environmental payments are efficient in maintaining current level of environmental capital but less successful in enhancing environmental quality.

Often providing *public information, recommendations, training and education* to farmers, other agrarian agents, and consumers are the most efficient. In some cases, *pure public organization* (in-house production, public provision) will be the most effective as in the case of agrarian research and education, agro-market information, agro-meteorological forecasts, border sanitary and veterinary control etc.

Usually, the specific modes are effective if they are applied *alone with other modes* of public intervention. The necessity of *combined* intervention (*governance mix)* is caused by the complementarities (joint effect) of individual forms; possibility to get an extra benefits (e.g. "cross-compliance" requirement for participation in support programs); particularity of problems to be tackle; specific critical dimensions of governed transactions; uncertainty (little knowledge, experience) associated with the impact of new forms; capability of the Government to organize (administrative potential to control, implement) and fund (budget resources and/or international assistance) different modes; and not least important the dominating (right, left) policy doctrine.

Besides, the *level* of effective public intervention (governance) depends on kind of the problem. There are public involvements which are to be executed at *local* (community, regional) level, while other requires *nationwide* governance. And finally, there are transactions, which are to be initiated and coordinated (governed) at *international* (regional, European Union, worldwide) level due to the strong necessity for *trans-border actions* (needs for cooperation in natural resources and environment management, exploration of economies of scale/scale, governing of spill-overs) or consistent (national, local) *government failures*.

The public (regulatory, inspecting, provision etc.) modes must have built *special mechanisms* for increasing *competency* (decrease bounded rationality and powerlessness) of bureaucrats, beneficiaries, interests groups and public at large as well as restricting possible *opportunism* (cheating, interlinking, abuse of power, corruption) of public officers and other participants. It could be made by training, introducing new assessment and communication technologies, increasing transparency (independent assessment and audit), and involving experts, beneficiaries, and interests groups in management of public modes at all levels. Furthermore, applying *"market like"* mechanisms (competition, actions) in public projects design, selection and implementation would significantly increase incentives and decrease the overall costs.

Principally, *pure* public organizations should be used as a *last resort* when all other modes do not work effectively. The "in-house" public organization has higher (direct and indirect) costs for setting up, running, controlling, reorganization, and liquidation. Unlike market and private forms there is *not an automatic mechanism* (competition) for sorting out the less effective modes[17]. *Public "decision making"* is required which is associated with high costs and time, and it is often influenced by strong private interests (power of lobbying groups, policy makers and their associates, employed bureaucrats). Along with the development of the general *institutional environment* ("The Rule of Law") and measurement, communication etc. *technologies,* the efficiency of pro-market modes (regulation, information, recommendation) and contract forms would get bigger advantages over the internal less flexible public arrangements.

Usually *hybrid modes* (public-private partnership) are much more efficient than pure public forms given the coordination, incentives, and control advantages. In majority of cases, involvement of farms, farms organizations and other beneficiaries increase efficiency - decrease asymmetry of information, restrict opportunisms, increase incentives for private costs-sharing, reduce management costs etc. For instance, a hybrid mode would be appropriate for carrying out the supply of non-food services by farmers such as preservation and improvement of biodiversity, and landscape, and historical and cultural heritages.[18] That is determined by farmers information superiority, strong interlinks of activity with traditional food production (economy of scope), high assets specificity to the farm (farmers competence, high cite-specificity of investments to the farm and land), and spatial interdependency (need for cooperation of farmers at regional or wider scale), and not less important - farm's origin of negative externalities. Furthermore, enforcement of most of the labor, animal welfare, biodiversity etc. standards is often very difficult or impossible at all. In all these cases, stimulating and supporting (assisting, training, funding) private voluntary actions are much more effective then mandatory public modes in terms of incentive, coordination, enforcement, and disputing costs.

Anyway, if there is a strong need for a third-party *public* involvement but an *effective* government intervention is not introduced in a due time agrarian "development" would be substantially deformed *(Government failure is possible).* In Bulgaria for instance, there have been a great number of bad examples for Government under- and over-interventions in agrarian sector (Bachev and Tsuji, 2001). Consequently, primitive and uncompetitive small-scale farming; predominance of over-integrated and personalized exchanges; ineffective and corrupted agrarian bureaucracy; blocking out of all class of agrarian transactions (such as innovation and extension supply, long-term credit supply, supply of infrastructure and environmental goods); and development of large informal (gray) sector, all they have come out as a result.

Conclusions:

The comparative institutional (and transaction costs) analysis gives new tools to better understand driving factors, modes, and prospects of agrarian development. It also provides powerful means to assist the design of public policies and modes for public intervention as well as private contracts, organizations, and collective actions. In the traditional framework there is only one mechanism for governing of sustainable agrarian development. "Free market prices" (and market competition) effectively coordinate entire activity of resource owners, entrepreneurs, and consumers. Rare cases of market "failures" are recognized but perfect "government intervention" is seen as a remedy. In the real agrarian economy, there are additional important factors affecting individual choice and agrarian sustainability (namely institutions and transacting costs), and a great variety of effective governing mechanisms. The specific

[17] It is not rare to see highly inefficient but still "sustainable" public organizations around the world.
[18] Environmental cooperatives are very successful in Holland and some EU countries (Hagedorn, 2002).

institutional environment is a crucial factor, which eventually determines the "type" of agrarian development. In the particular economic, institutional, natural etc. environment agrarian agents use or develop a great variety of effective (and thus highly sustainable) market and non-market modes to govern their relations. Accordingly, at any given period of time, farms of various type (subsistent, family, cooperative, corporative) and size could persist in agriculture.

The analyses of institutional, behavioral, dimensional etc. factors of transaction costs identify an immense range of "market failures" associated with unspecified or badly specified property rights; inefficient public contract enforcement system; high uncertainty and asset specificity, and low appropriability of transactions. The economic agents deal with market deficiencies developing different private (bi-, tri-, multi-lateral) forms for effective transacting. Private sector also "fails" to organize some transactions at effective scale. Thus there is a strong need for a third-party public (government, international assistance etc.) involvement in agrarian sector. Different modes of public intervention (property rights modernization, regulations, support, public provision and organization, hybrid modes) are with unequal efficiency in the specific conditions of a particular country or region. Therefore, diverse set of institutions and governing arrangements could lead to the (universal) goals of sustainable development. On the other hand, sustainability could be significantly compromised if both market and private sector fails, and no effective public intervention takes place (government failure is feasible).

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