

*Benedikt Ibele*

**USING FIELD EXPERIMENTS TO ASSESS THE PERFORMANCE OF FORMAL AND INFORMAL RULES IN PASTURE GOVERNANCE IN KYRGYZSTAN**

*Бенедикт Ибеле*

**УПРАВЛЕНИЕ ПАСТБИЩ В КЫРГЫЗСТАНЕ С ПОМОЩЬЮ ПОЛЕВЫХ ОПЫТОВ И С ЦЕЛЬЮ ОЦЕНКИ ЭФФЕКТИВНОСТИ ФОРМАЛЬНЫХ И НЕФОРМАЛЬНЫХ ПРАВИЛ**

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*The pasture sector in Kyrgyzstan contributes significantly to the country's economy and forms an essential base for rural livelihoods. The institutions governing the Kyrgyz pasture sector are still in the process of transition from a centrally planned economy as legacy of the Soviet Union to a market-based economy, resulting in a discrepancy of formal and informal rules. The proposed research design aims to investigate this discrepancy posing the question of what the difference in performance between formal and informal rules in the Kyrgyz pasture sector is. In order to answer this question an experimental approach is chosen. This paper looks into different conceptions of formal and informal institutions and ponders on the problems of the dichotomy of formal and informal. Then the experiment to be applied is described. It depicts an asymmetric setting of common pool resource use and investigates the role of formal and informal institutions.*

**Keywords:** *Field experiments; formal and informal rules; irrigation game; pasture governance; common pool resources.*

*Пастбищный сектор в Кыргызстане в значительной степени способствует экономике страны и является важным источником для жизни в сельской местности. После распада Советского Союза учреждения управляющие киргизскими пастбищами находятся еще в процессе от плановой к рыночной экономике, приводящей к несоответствию между официальными и неофициальными правилами. Целью текущего исследования является вопрос: какова разница в исполнении официальных и неофициальных правил. Для того чтобы ответить на этот вопрос был выбран экспериментальный подход. Различные концепты официальных и неофициальных учреждений, а так же их проблемы противопоставленности будут обсуждены и представлены в данном исследовании. К тому же применяемый эксперимент будет представлен. Данный эксперимент представляет ассиметричные.*

**Introduction**

**Problem statement**

Pastoralism is not only a long tradition in Kyrgyzstan; it also contributes significantly to the country's economy and forms an essential base for rural livelihoods. Since the vast majority of livestock is owned by smallholder farmers, the pasture sector is crucial for the reduction of rural poverty (Undeland 2005). Despite the fact that almost 25 years have passed since the break-up of the Soviet Union, the sector is still in the process of transformation from a centrally planned economy as legacy of the Soviet Union to a market-oriented and democratic system of pasture governance (Kasymov 2014, Undeland 2005). Currently, the new pasture law,

which was adopted in 2009, is under implementation throughout the country, supported by donors like the World Bank and the German agency for international development (GIZ<sup>1</sup>). The new law aims to overcome persistent problems in the sector, such as degradation of pastures and an overall low productivity of the sector (Undeland 2005). The process of post-socialist transition towards a market-oriented economy and a democratic regime in Kyrgyzstan are characterized by '(...) a gap between the people and politics, newly designed formal institutions and the existing rules in use' (Kasymov 2014, p. 4), a discrepancy of formal and informal institutions typical for transition countries (Theesfeld 2003).

**Research question**

In Kyrgyzstan pastoralism and irrigated agriculture are closely linked; some pastures are irrigated and farmers and pastoralists are often the same people (Undeland 2005). This paper argues that pasture in Kyrgyzstan is a common pool resource, characterised by a low level of excludability and existing rivalry. For the governance of common pool resources, Ostrom and Basurto (2011) argue that rules crafted by local resource users are more successful than those designed by external experts. Janssen et al. (2011a) found that the level of trust is essential for rules to be effective; types of rules were less influential for successful resource governance than the modus in which they were chosen. Hence, the proposed study aims at investigating, whether resource users are more likely to obey the same rules if they are informal compared to formal rules, given a low level of trust in state authorities.

Economic field experiments have been suggested for the investigation of institutions and economic behaviour in common pool resource governance (see e.g. List 2011; Janssen et al. 2011a; Ostrom and Basurto 2011). This study would like to take up on that and investigate the following research question: what is the difference in performance between formal and informal rules in a field experiment on irrigation in Kyrgyzstan? Exemplary hypotheses include: i. agro-pastoralists, who disobey formal rules, obey the same rules, if they participate in crafting them; ii. agro-pastoralists reduce asymmetry, if they participate in crafting rules; iii.

<sup>1</sup> Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, www.giz.de, no official translation.

collective action is more likely to occur, if agro-pastoralists can choose their own rules; etc. Since institutions are at the centre of the research, it is necessary to examine different concepts of institutions, in order to explain what is meant by formal and informal rules.

#### *Institutions*

In neoclassical economic theory institutions did not play a significant role. Preferences and incentives were assumed to be stable in a perfect market with rational actors, where the price mechanism ensured the efficient allocation of resources. If institutions were considered, they were seen as exogenous. Like any theory, the frictionless economy of neoclassical economic theory was an incomplete depiction of reality. The insight that transaction costs, the frictions of the economy, amount for a large part of the economy, gave rise to the view that 'institutions matter' (Williamson 2000). Institutions are the rules of the game that aim at reducing transaction costs. They create order in an imperfect world and are socially constructed to compensate for bounded rationality (Vatn 2005, p. 214f.). Amongst institutionalists there is an ongoing discourse on formal and informal institutions. The following section provides an overview on this discourse and introduces a definition that is used for the purpose of this research.

According to North (1990), institutions are formal rules (e.g. constitutions, laws) and informal constraints (e.g. customs, beliefs) that shape human interaction. The notion of (informal) institutions as constraints was criticised by various authors, amongst others Hodgson (2006) and Vatn (2005), who emphasise that institutions always have an enabling character as well. The authors argue that what North describes as informal constraints are in fact also rules. Furthermore, Hodgson (2006) emphasises that the dichotomy of formal rules and informal constraints put forward by North has created some confusion. First of all, if 'formal' is associated with legal it is not clear whether 'informal' means illegal or non-legal. A second understanding could be that formal means explicit and informal tacit and a third possibility is that formal is designed and informal spontaneous. This makes three important distinctions, not one (Hodgson 2006, p. 11). The author further emphasises that in fact, formal rules, like laws, rely heavily on a system of informal rules to be effective. Nevertheless, Hodgson notes that the distinction between formal and informal is important, but argues for more precise terms like legal, non-legal, and explicit. He defines institutions as 'durable systems of established and embedded social rules that structure social interaction' (Hodgson 2006, p. 13). For Bromley (2008) institutions are the result of collective interests, bundled by public policy. His perspective focuses on the rights and privileges, and duties of actors (Bromley 2008, p. 8). Instead of the distinction between formal and informal rules, the distinction can also be made according to the

mechanism of rule enactment, i.e. self-enforcement and external enforcement, or the distinction between the mechanisms of rule-making, i.e. between endogenous and exogenous crafting of institutions.

Aoki (2007) conceptualises institutions as 'shared beliefs' among actors. In a game theoretical understanding this concept can be referred to as 'behavioural beliefs', in a sense of an expectation of the behaviour of players. He defines institutions as: 'self-sustaining, salient patterns of social interactions, as represented by meaningful rules that every agent knows and incorporated as agents' shared beliefs about the ways how the game is to be played' (Aoki 2007, p. 7). Actors may have different understandings about rules and the details of related consequences, the salient pattern, however, is that actors know that the rule is true and everybody else does so too. In that sense it is not decisive whether an institution is a law or a custom, formal or informal; what makes it effective is the shared belief in the institution. Hence, Aoki argues that all institutions are ultimately endogenous (Aoki 2007, p. 11).

Crawford and Ostrom (1995) define institutions as 'enduring regularities of human action in situations structured by rules, norms and shared strategies' (p. 582). The three approaches to institutions, rules, norms and shared strategies, are identified by the authors as three influential branches in the literature on institutions. The perception of institutions as rules rests on the understanding that actions inconsistent with those prescribed are sanctioned. The concept of institutions as norms assumes that patterns of interaction are based on a shared understanding of proper or improper behaviour. Finally, the approach of institutions as shared strategies assumes that institutions are equilibria of mutually understood actor preferences and optimising behaviour. In the latter view, the responsibility for the institutions is placed on the individuals, rather than an external third party, like the state (Crawford and Ostrom 1995, p. 582f.). The authors do not see the approaches as contradicting. How institutions are understood depends also on the theoretical question posed. All three approaches, however, have a common grammar. The authors propose a framework to analyse the grammar of institutions and compare institutions, the ADICO framework. The five letters stand for components of institutional statements; Attributes – the attribute specifying to whom the statement applies, Deontic – describes what the subject may, must or must not do, aIm – describes the action or outcome, Conditions – describes where, when, who, and to what extent the statement applies, and or Else – the sanctions associated with defecting behaviour. The syntax of ADICO reveals the differences between norms, rules and shared strategies: shared strategies contain at minimum the components AIC, norms contain ADIC, rules contain ADICO (Crawford and Ostrom, p. 584). Schlüter and

Theesfeld (2010) argue that shared strategies have a more informal character, since there are no formal sanctions in place.

This paper acknowledges the difficulties with the conceptualisations of formal and informal rules described above, having also in mind the ultimately endogenous character of all institutions. For the purpose of the analysis of common pool resource governance, the level of rule crafting and the associated trust is relevant (Ostrom 2006; Ostrom and Basurto 2011; Janssen 2011a). For the context of irrigation and pasture management in Kyrgyzstan, the difference is between those rules which are externally designed rules and self-organising rules, where the resource users, the pastoralists, participate in crafting. This distinction contains also features of legal and non-legal rules and explicit and tacit rules, which Hodgson recommends instead of the formal-informal dichotomy. Since the differences between these typologies of rules in our specific case all represent formal and informal rules, this paper resorts to those terms despite their shortcomings. Institutions are referred to as sets of rules that govern social behaviour.

**Materials and Methods**

In order to investigate the differences in performance between formal and informal rules in the Kyrgyz pasture sector, the proposed study intends to choose an experimental approach. The research builds on the irrigation game, developed by Juan-Camilo Cardenas and Marco Janssen (Janssen et al. 2011a; Jansen et al. 2011b; Janssen et al. 2012). The experiment was adapted by Dimitrios Zikos, introducing a momentum of sanctioning, communication and rule-crafting by the participants (Zikos et al. 2010). The design of the experiment simulates water allocation at a hypothetical water channel, including power asymmetries between upstream and downstream locations. The return in irrigation water can be increased by investing in infrastructure; hence, investing in the common pool resource increases social welfare. In the modified form the game consists of three stages with ten rounds each: the first stage introduces and investigates the social dilemma; in the second stage additional rules are introduced, representing formal rules, and in the third stage the participants are invited to craft their own rules, in order to simulate informal rules.

The experiment is designed for five participants, who have the positions A, B, C, D or E, to which they are randomly assigned. Player A has the most upstream position, meaning he has the right to withdraw water first. Players B, C, D and E then withdraw water in alphabetical order, to simulate the positions on the irrigation channel. The positions of the players remain fixed for the whole game. First in each round players receive 10 tokens. Then, they confidentially make a decision on how much to invest into the public irrigation

infrastructure. The investment made determines the water available for irrigation. If no tokens are invested no water is available and the players remain with their 10 tokens. If all players invest 10 tokens their return is doubled, 100 units of water are available. Table 1 shows the water available depending on the tokens invested. After the investment is completed, players withdraw water in the order of their position; A withdraws first, E last. One token has the same value as one unit of water. The tokens represent a monetary value and are converted into money after the game.

**Table 1: Water Production as a function of units invested in the public infrastructure.**

Total units invested by all 5 players	Water available
0-10	0
11-15	5
16-20	20
21-25	40
26-30	60
31-35	75
36-40	85
41-45	95
46-50	100

Source: Janssen et al. 2012, p. 66.

The experimental design represents a reciprocal common pool resource dilemma, where upstream participants need the contribution of downstream participants to infrastructure and downstream participants need to trust upstream participants to resist the temptation of depleting the common resource. This asymmetric game, hence, includes a provision and an appropriation dilemma (Janssen et al. 2012, p. 67). Rational, self-interested players would not invest into the provision of infrastructure. The numerical Nash equilibrium would thus be that all players just keep their 10 tokens they receive in each round. Every player would have 100 tokens after 10 rounds. However, the social optimum could be more than double the earnings for each player (Janssen et al. 2012, p. 67). After a baseline set of 10 rounds, three rules are presented to the participants, who can choose one of the rules in an anonymous vote. At this stage modifications of Zikos et al. (2010) are already included. The three rules are:

i. *Rule 1 (random water distribution)*: In each round two players are randomly selected to receive the right to harvest water. At the end of each round a die is thrown. If a six is thrown, an inspector checks whether only those entitled to harvested water. On those who broke the rule a penalty of six tokens is imposed and they have to return the water withdrawn.

ii. *Rule 2 (rotation rule)*: A fixed rotation of the positions on the channel is implemented, where in each

round only two players are allowed to withdraw water. A and B are allowed to harvest in the first round, C and D in the second and so forth. Like in rule 1, decisions are randomly inspected, if a six is thrown and cheating is punished the same way.

iii. *Rule 3 (property rights)*: Each participant is entitled to 20% of the water available. The amount is announced in each round after the investments are made. Again, the decisions are inspected if a six is thrown.

Note that the Nash equilibrium remains the same for all rules; it is still rational for self-interested players not to invest. In a third set of rounds, participants can modify the rules of the game and decide on a sanctioning system. The participants cannot change the basic structure of the game. They are not allowed to change the positions ABCDE along the channel or the payoff structure. However, they can come up with own rules, also on monitoring and sanctioning or decide to keep previous rules.

The experiments will be conducted in Kyrgyzstan in a laboratory setting, with students, and in the field with agro-pastoralists in two villages. This paper argues that the application of the irrigation game in the pasture sector is legitimate since pasture and irrigation in Kyrgyzstan are closely linked. Furthermore, the adapted irrigation game is a tested and standardised experiment to study the performance of rules in common-pool resource governance and, hence, provides a powerful tool to answer the research question posed. In addition to the experiments, socio-economic data will be collected with a standardised questionnaire from all participants. In an open discussion after the experiments participants will be interviewed about their behaviour during the game.

### Results

The research design described above will be implemented in May 2014 in Kyrgyzstan. The first stage of the irrigation game represents the baseline. In the second stage formal rules are introduced, since they are crafted external to the participants. However, a certain level of participation is given, since participants decide which rule is implemented. The third stage of the game simulates informal rules, since the participants are asked to craft their own rules. The difference in performance between the stages can indicate differences in the performance between formal and informal rules. The results will be analysed with statistical tools. The behaviour of the participants will also be correlated with the socio-economic data collected, in order to analyse if such factors influence the behaviour in the experiments.

### Discussion & Conclusions

The results are expected to indicate the role of formal against informal institutions for pastoralists in pasture management in the studied region of Kyrgyzstan. Inferences on the role of the state and trust of pastoralists

in the government may be drawn. Hence, recommendations for policy makers might be given, which could prove useful in the context of the ongoing reform of the pasture sector and the continued attention to the sector by donors. Furthermore, the findings of the experiment add to the comparison of the performance of the adapted irrigation game in different regions of the world. The findings can potentially also contribute to the understanding of formal and informal rules and add to the discussion on institutions described above.

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Рецензент: д.э.н. Цикос Д.