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Institutional arrangements and natural resource governance in the Bulgarian Black Sea.

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Abstract:

Sustainability: economic sustainability, ecologic sustainability and what are the institutional arrangements that manage to reconcile these two objectives over time.
The study of the governance of common pool natural resources could represent an important tool to understand the complexity of interactions between ecological and socio-economic spheres. This paper aims to achieve several goals. Firstly, is to contribute to natural resource governance literature from the perspective of institutional environmental economics. More specifically, it will contribute to the common pool resources (CPR) theories by broadening the scope to the context in which they are embedded. Secondly it will focus specifically on marine natural resources, via two spatial interconnected case studies: the marine protected areas and the harvesting of the invasive species *Rapana Venosa* in the Bulgarian Black Sea. Thus, trying to determinate the institutional level challenges and explore the potential path of institutional arrangements for the governance of those resources.

Key words: CPR, sustainability, institutional environmental economics, MPAs

JEL : P28, Q5, B520

Introduction

When we examine the concept of sustainability, and more specifically the sustainable use of natural resources, one can see it from two different perspectives. At first, that focus could be the economic sustainability, which will try to ensure long-term economic activity tightly linked to the resource extraction. The sustainable use of those resources will assure the income from the activity dependent on them.
Secondly, one can focus on the ecological sustainability, which copes with conservation and protection issues of the resource itself. The aim could be the preservations of a single species or an entire ecosystem. The more complex and interdependent natural resources are the greater the challenge of their economic and ecological sustainability is.
It is largely accepted among environmental economic scholars that these two aspects,

economical sustainable use and ecological sustainable use and the associated trade-offs are difficult to align and sometimes even to co-exist on the same priority level. However, they represent the core and the very essence of the long time quest for sustainable development of our society.

From this perspective we can highlight the two major spatial level challenges, when setting the objectives of how to deal with natural resources. Both of them arise from the conjunction of economic and ecological spheres on different institutional levels.
The first challenge is on a national level. It deals with the national legal framework: state actors and individual users and defines their relationship with natural resources.
It addresses the sustainable exploitation of those resources and ensuring at the same time the economic activity and income in the long run. Since exploitation of natural resources provides employment to people and thus income to their livelihood, the State tends to favor the socio-economic aspects over environmental concerns. On local level when multiple users of a given natural resource are dependent on it as a source of economic income, then they are jointly interdependent and affected by everything done at an individual level. Therefore, good governance of these resources is crucial for their sustainable use on both national and local level.
For this to happen, a well-defined set of rules is needed in order to control the resource extraction and assure the sustainability of any economic activity. This set of rules as North (1990) states: are in fact institutions that consist of both formal (Constitution, property rights) and informal rules (tradition, codes of conduct etc.). As Jones (2011) argues the best-case scenario for a given protected area or resource governance would be to fulfill the economic sustainability, i.e. the sustainable use of the resources by local users, leaving any biodiversity conservation measures aside.
From this point of view the State could be seen as a controller ensuring the design and implementation of those rules.

The second challenge is on supra-national level. It deals with the State and a higher authority. It often represents the obligation of the State itself to achieve biodiversity conservation objectives and the focus is the ecological sustainability of a given species or ecosystems. Often such obligations are linked to a higher statuary authority, in our case, the European Union. At this level the State operates as an actor or a facilitator of the rules imposed by this supra-national authority. The State must implement those objectives and thus assure the protection measures for natural resources. The controller, or objective definer is this higher supra-institution that imposes ecological sustainability targets.
From those two spatial level of analysis one can observe how institutions are shaping and mirroring socio-economic and ecological characteristics and are a valuable tool to further understand their complexity.

Often, we can observe some sort of misalignment between different levels of authority and their objectives. Objectives that are set internationally, for example to protect certain species, are different from the local ones, which are more directly linked to the livelihood and income of people dependent on those resources.
When those different “interests” eventually meet at a local setting there are institutional arrangements that take place. Over time, they will form the institutional framework that deals with natural resources. Those institutional arrangements will be regarded as the rules and conventions, which establish people’s relationships to natural resources in a

given national context. Depending on the context objectives set by those arrangements will tend either to converge to economic sustainability or ecological sustainability, or at very best will create a sustainable conjunction of both.
One-way to address those level issues is by analyzing the vertically and horizontally linked institutions and the way they interact.

Following North's work, institutions, will be defied as being the formal or informal rules, procedures, routines, norms and conventions, which are often seen as relatively persistent features shaped by historical processes and events.
Still Adger *et al.,* (2003) argues that any given environmental decision is likely to be the product of a particular configuration of institutions (both formal and informal), scale (local, national or global) and historical context.

This analysis of the two institutional level issues: supra-national (EU/ national, state level) and the pair state level/local users level will help us to identify the underlying institutional dynamics when dealing with common pool natural resources and lead to more comprehensive analysis of the current situation in Bulgaria.
Furthermore, it will help us to identify why and when the objectives of those different institutions start to drift apart and thus lead to new institutional arrangements (in either a negative or positive way). Such in-depth analysis will enable us to understand the complexity of institutional arrangements and contribute to the literature on marine resources governance in particular context of the Eastern Europe.
By looking closely on those institutional dynamics we can understand what will be the potential path taken in Bulgaria when dealing with Marine protected areas and CPRs in general. Will the institutional arrangements (formal and informal) lead to economic or ecological sustainability, or at best-case scenario to a mixture of both?

In the reminder this paper will proceed as follows. In section 1 the concept of common pool resources and the potential expanding of their analysis will be discussed. In section 2 the concept of path-dependency in natural resource governance will be stressed out. Section 3 summarizes the primary findings from the specific case study on CPRs in the Bulgarian Black Sea. Those primal findings will be related to the analytical frame from the previous sections. The final section 4 concludes.

1. Expanding the scope of common pool resource analysis

The definition of common pool resources in this paper will follow the one established by (Becker and Ostrom, 2002). According to them CPRs are based on two attributes: the difficulty to exclude beneficiaries and the substractability of use. First they are non-exclusive, this means that their consumption (harvesting) is available to everyone. The value of those resources is thus tied to the possibility of exclusion from use. In such a case, limiting some beneficiaries could be seen as a social form of organization. This social form is usually applied to natural resources via particular jurisdiction or institution (formal or informal) that sets the rules.
Second, common pool resources are rival, there is the possibility that one user can diminish the available resource for others. The classic example is a fisherman who harvests fish and thus leaves less stock for the others.
From this perspective CPRs could be regarded for both their ecological and their institutional significance in order to analyze the interdependences between natural and

social order.
Furthermore the paper will follow Ostrom's suggestion to distinguish two levels of CPRs: resource system and resource unit.
According to her, resource system represents a stock of variables, which under certain conditions can produce a maximum quantity of a flow without harming the stock or the resource system itself (ex. ocean, lake, fishing grounds). Resource units, or flows, are what individuals harvest from the resource systems (ex. fish/sea).
Resource units cannot be jointly used, only the resource systems can (ex. one fish for one boat/one fishing area for many fishermen). This substractability of the resource leads to the limit of the number of units produced by common pool resource systems and any extensive harvesting could lead to their overuse.

Questions of how to govern and manage common pool resources are not new in literature. It has been the study of numerous scholars. It is a commonly accepted statement between scholars that common pool resources are caught in the tragedy of their overexploitation (Hardin, 1968). Famously known as "the tragedy of the commons". When resources are left to open access and without a proper legal framework, one can expect potential user conflict, overuse and even destruction of those resources. In economic terms, the tragedy of the commons may occur when an economic good is both rival in consumption and non-excludable. This situation is inevitable unless some external solution is imposed. Two possibilities arise: a state control (strict state governance) or market control (privatization).
In responding to these conclusions, a large body of scholars argues that in fact there exists a large variety of solutions and institutional arrangements that individuals can use to overcome this « tragedy of the commons » scenario. Two decades of research on the commons had aimed to identify those universal principles for the design of what is now the CPR institutions (Ostrom, 1990; Ostrom *et al.,* 2002).

This common-pool resources literature is focusing on the self-governing systems of local actors and community based approaches. Those research studies were able to identify different combinations and conditions that support the design and evolution of institutions from local level and that are able to ensure natural resource governance. While literature on CPRs comprises case studies that demonstrate specific conditions under which users manage to self-organize and sustainably govern resources on which they depend. However, a link with the context in which they emerge is somehow missing.

As Jones (2011) and Agrawal (2001) states: CPR literature for most of the time aims to identify combinations of enabling conditions that will support the evolution of self-organized institutions that will manage the commons on a local level.
But, in order to address the complex institutional dynamics and the so-called "CPR", theories need to broaden their scope to external structure factors, different from the local level extent of analysis.
According to Jones et al, (2011*)* there is a need to address the interactions of those local users with market, the State and other exterior structures that influence them in order to understand the natural resource governing institutions in their entirety.
Cash *et al.,* (2006) also point out the importance of a more large-scale institutional analysis. In their study, they summarize the main responses to natural resource governance and CPR specifically: the 'institutional interplay' or the vertical and

horizontal link between institutions. A separate study of any on those governance responses represents a gap in the analysis of this complex system.

One question could arise from this analysis, on whether the institutional arrangements are actually the result of a co-evolution and if they are dependent on external factors. To explain a change in the rules, we must examine the relationships between local level variables and the broad institutional context. Many of those variables are affected by the larger regime in which users are embedded.

In this paper two external factors will be addressed as important elements in shaping the institutional arrangements of CPRs and their users: the State policy context and the market articulation.

Another external factor that CPR literature has done little to examine is the role of the state. Yet, there is a reason why there is little attention to the state and markets, from the scholars of the commons. Their efforts tend to show the importance of local users. As Agrawal (2001) states, what that local focus of analysis tends to ignore is the large context in within the cases are shaped.
But the State is central in the functioning of the CPR governance structures (Mansbridge, 2013). Higher levels of state action are necessary to make lower levels work well. Local decision-making group must be 'nested' in more higher authority structures (such as state but not exclusively) in order to be able to manage their resources efficiently (Mansbridge, 2013). Jones (2001) recognizes as well that the state has an important role in CPR governance in order to ensure the fulfillment of obligations to high authority institutions such as the Habitats/Birds Directive on European level and the Convention on Biological Diversity on international level.

Another important aspect of the resource governance and management is its use after extraction, after appropriation. Once the resource is removed from the common pool, most of the time, it is subject of private use. Sometimes it is used within the resource system itself or becomes an exportable good. In that last case the foreign marketability may be the incentive that leads to it's harvesting and can be a factor of its overuse. This is an important point, as it will affect the relationship between the resource and its users-resource and thus the institutional arrangements for its governance. Without this external demand the resource loses its economic value and thus becomes unprofitable for future use.
On the other hand, if these external conditions exist, institutional arrangements will be needed in order to expand the capacity of using such resources. The sustainability of those resources will depend on those particular institutional arrangements.
There are few studies on CPR governance that pay attention to external factors and especially market driven changes in resource exploitation. As Agrawal (2001) suggests there is a need of greater attention to those external factors that affect the sustainability of the common institutions and natural resources. Markets are embedded in those institutional arrangements and shape the resource use.
However, there is a wide agreement between scholars on CPR that increasing linkages of commons to markets usually has an adverse impact on their management and often leads to overexploitation as income is at stake. Typically, new market introduction creates a new demand pressure on natural resources (ex. harvesting effort) and changes in local power relations. As in the case of Bulgaria a new market actors that gain access

to a particular resource may start to seek alliance with other actors or event with the State in order to legitimize their actions. At the same time the state representative actors can themselves become involved in the new emerging market and find themselves appropriators of the common property. This is very common practice in Easter Europe and in Bulgaria, where foreign market dependency is reinforced with the privatization after the fall of socialism in the 1989. From this perspective it is interesting to observe the path institutions take or tend to follow when dealing with natural resource governance.

2.Path dependency in natural resource implementation and Natura2000 sites

In their article, Becker and Ostrom (1995), argue that the primal institutional design is more important than the specific institutional arrangements afterwards.
For example, simply designating an area as a nature reserve, or privatize it, could easily be locked-in as "universal solution " slogan that can lead to a one case fits all paradox, and thus masks important underplaying dynamics of informal institutional design and change.
In public policy research, path dependency is commonly used to describe a situation where the present policy choice is shaped or constrained by formal or informal institutional paths that result from choices made in the past (Pierson, 2000).

Several scholars (Bromley and Cernea 1989, Ostrom 1992, Cleaver 2000) have recognized the key role institutions play in shaping CPR users and their relationship to the resources.
Another aspect in broadening the scope of CPR analysis is to study the formal and informal institutions that are tightly linked to their governance and management. Articulation between those horizontal and vertical (formal and/or informal) institutions in which the CPRs are embedded could represent a tool to understand CPRs governance dynamics.

Together the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/ EEC) form the basis of European biodiversity policy. All Member States should transpose the requirements of both directives onto their national legal frames. Besides changing national law, another obligation arising from the two Directives is the designation of Special Protection Areas (SPA) and Special Areas for Conservation (SAC), jointly referred to as Natura2000 sites.

Both Directives (the Birds and Habitats) leave the choice to each member state in choosing the national policy instruments for the implementation of Natura2000 sites. This possibility to choose freely the set of rules is another interesting aspect to analyze the path institutions tend to follow when dealing with natural resource governance and management in any particular context. Institutional structure of the country prior to the Natura2000 protected areas is also important.

Implementing new policy or rules requires breaking up with established rules, procedures, policy instruments and ideology. Also Policy is dependent on what the political context is. When dealing with European Union environmental policy, there is a clear formal transposition of the Directives into the national legislation. The study of the formal institutions of this transposition is easily identified. However, the study on the

practical policy implementation instruments is a more difficult task. Informal institutions will tend to shape those new rules. Adger et al, (2003) argues that any given environmental decision in likely to be the product of a particular configuration of institutions (both formal and informal), scale (local, national or global) and the historical context. Informal institutions are important. Also according to Codling et al, (2003) there is a rise in the recognition of the importance of informal institutions that can lead to sustainable use of the resource or to its overexploitation.

Bouwma *et al.* (2016) are one of the few scholars that have studied the institutional path dependency when implementing Natura2000. They argued that the Natura2000 implementation tends to follow the national institutional context and for most of the time there is a clear tendency for countries to develop new instruments instead of using the existing ones. Also, these new instruments tend to emerge from the state predominant policy mix. In Eastern European countries, for example the process of any formal rule implementation tend to follow the recently shift (since 1990s) to a market economy. The same authors argue that in Eastern European countries there is no path dependency when implementing Natura2000, simply because there is no existence of environmental policy instruments prior to the Directives. In order to implement them, new instruments (formal or informal) will tend to emerge making a new path in environmental and natural resource governance in those regions.

Another interesting point is addressed by Chavdarova (2002):the informal economy is very specific to the post-communist period, and especially in Bulgaria. It is common that informal institutions are filling up the formal institutional gap. The informal economy being as an undeniable aspect of the current Bulgarian socio-economic dynamics and institutional settings. The link to--with natural resource relationship is an interesting aspect to broaden the analysis.

Chavdarova (2002) states as well that there is a historically embedded resistance to formal institutions, conventions and rules, usually seen as imposed from outside. Formal rules are seen as imported or alien and thus not relevant. Informal, by contrast are perceived as natural. There is a clear pattern of rejection of authority embedded in Bulgaria as part history. There is alienation from the state due to the history in the region (Byzantine Empire (1014-1185), Ottoman Empire (1396-1878), foreign dynasty kings (from 1878 till 1944), Russian domination (1944-1989), and more recently the European Union (2008-present). Formal and informal rules connected to natural resources and their governance will be clearly influenced by those regional dynamics. Thus by studying national case studies on CPRs we can shed more light on the dynamics that occur between EU policy and domestic factors, such as historicity, policy mix and market articulation, that eventually evolve and lead to the choice of specific set of instruments.
A growing number of researchers see the importance of local institutions for resource management, as they are able to adjust to local dynamics. However, we can believe that local self-organized actors alone cannot carry out the function of national or supra-national institutions. Thus cross-scale linkages are needed. They are often referred as nested institutions.

By looking closely at these institutional dynamics we can understand what will be the potential path taken in Bulgaria when dealing with Marine protected areas and CPRs in general. Will the institutional arrangements (formal and informal) lead to economic or

ecological sustainability, or as a best-case scenario a mixture of both?

3. The case of MPAs in Bulgarian Black sea: identifying context-sensitive institutional arrangements

A primary focus of any MPA is the conservation of marine species and habitats, as well as the ecological systems and their function, *via* regulation of "harvesting", extraction and access zoning. Natura2000 marine protected areas (MPAs) can act as a key conservation measure to safeguard marine ecosystems and biodiversity as well as the services these ecosystems provide.

There are two possible ways that the current economic theory is analyzing Marine protected areas, as a tool for marine ecosystem conservation and as a tool of fishery management. As Carter (2003) states marine resources can be seen as natural capital that can be invested or used in order to generate income. For the most part, marine resources are common property and MPAs are those specific zones designated to protect them. MPAs were originally conceived as passive mechanisms for species and ecosystem protection. As their name suggests, the goal of such areas is to protect a specific zone from certain human activity. In reality marine reserves have as much to do with people as with nature.

From this point of view and if we follow Ostrom's considerations we can regard MPAs as the resource system itself and the species inside those areas as resource units. The governance and management of marine natural resources should go beyond single sized issues, species or ecosystems in isolation. Also, it should recognize that human's activities both affect the ecosystem and depend on it.

According to the Marine Strategy Framework Directive (MSFD) on European level (EU, 2008) "Good environmental status" must be accomplished by 2020 via ecosystem approach management. Good environmental status refers to ecological sustainability of the resource and good socio-economic state could refer to the economical sustainability of the resource use. The European Union highly emphasizes the use of ecosystem approaches when dealing with biodiversity management and specifically its use for MPAs. As it is defined in the Convention on Biological Diversity (CBD) ecosystem approach is "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way".
From this point of view, an ecosystem approach for managing the seas cannot and should not be implemented in a specific sector alone, but must be cross sectorial.

Much of the economic literature on Marine protected areas (MPA) focuses on their valuation practices and more specifically on their benefits and costs. (Carter, 2003); (Farrow, 1996); (Sumaila, Rashid & Charles, Anthony. (2008).
While dealing with conservations and protection of natural resources economist tend to focus on the benefits and costs related to those areas. Benefits related to biodiversity protection (as non-use values) and cost (of implementation). Most of the studies on the economic impacts of MPAs had stressed and compared the costs and benefits of MPAs. Using CBA is economically speaking right, but one problem that arises form this is the fact that analysis seldom fit all case specific sites. In his article Milon (2000) describes the "drama of marine system governance". According to him the ecosystem has both

marine and socio-economic attributes and should be analyzed jointly if we want to determinate the institutional arrangements and structures for efficient MPA management.

However, very few studies deal with the institutional aspects of MPA implementation, governance and management. As Farrow (1996) states, the environmental quality of a certain protected area could be affected by other activities. For example if one area is set to protect certain species or habits but at the same time fishing restrictions on other species are not set. This practice could damage the overall biodiversity status of the area, leading to a loss of the objectives set by those areas.
Harvesting one particular species may reduce the entire biological diversity of the area and also if the practice is damaging, then, the very essence of this protected area is compromised.
The governance and management of common pool natural resources cannot entirely be understood by analyzing separate CPR cases. MPAs are a tool to manage and protect some specific species, but human activities continue to take place. Following this train of thought two specific cross-connected case studies were selected in the Bulgarian Black Sea. Adopting Ostrom's definition and typology of CPRs, the study will focus on two different CPRs: one considered as the stock, the resource system itself (the marine protected areas), and the second the resource unit, extracted from those areas (the *Rapana Venosa* whelk*).* Focusing the study on one level without another will lead to a major gap in the understanding of the complex relationships between people and natural resources in this region. Their governance and management are interdependent and reflect the same institutional arrangements and governance of natural resources in Bulgaria.

As Konsulova et al, (2010) states, MPAs are valuable tool for conserving Black Sea habitats and biodiversity. In Bulgaria MPA sites are declared by the Ministry of Environment and Waters and follow the guidelines of the Bulgaria Academy of science.
Currently there are two marine reserves on the Bulgarian Black seacoast designated under Natura2000. : Kaliakra marine reserve and Sand bank Koketrays. In those areas however there are some human activities taking place, including the exploitation of both mineral (sand) and living resources (bottom trawling for *Rapana venosa*).
As Nicolae *et al*. (2011) stressed that there is a high potential conflict of objectives between marine Natura2000 sites and fishery activities.
In this case, both reserves (Kaliakra and Koketrays) are designated under the Bird and Habitat directives and are Natura2000 sites with specific protection objectives on species and seabed habitats. However, to date the sites don't have management plans due to the impossibility of consensus between stakeholders. In such an arrangement it is essential to establish institutional links between decision-makers, scientists and local users, building the so-called "co-management". In fact many of the local actors are against these areas because they think it will affect negatively their economic activity. Most of them believe that these areas will completely compromise their fishing and harvesting activities. There is a general lack of information and even a voluntary disinformation from the part of the state about the outcomes and impacts once the MPAs are designated. Moreover there are evident informal ties of some state representatives that actually own fishing boats or own processing factories in the area.
On the other hand, scientific bodies and NGOs are seen as 'green mafia' and are not trusted at all among local population.

Kalikara and Koketrayts marine reserves are set to fulfill the protection of certain species following the objectives of the supranational institution (the EU). Meanwhile, rapana whelk harvesting is a local activity that prevails in that area, thus damaging the seabed and habitats.

3.1. Harvesting *Rapana Venosa*: from invasive species to valuable CPR

An invasive species is a species that is non-native to the ecosystem under consideration, whose introduction causes both ecological and economical harm. Whether intentionally or unintentionally introduced these biological invasions once established are notable for their capacity to transform both structural and functional properties of existing ecosystems (Marbuah *et al*., 2014).
The economic analysis of invasive species is often linked to monetary valuations of biodiversity loss and potential damages caused by these invasions (for both the private and public sector)(Lovell et al, 2006), (Sumaila, *et al.,* 2002). However there is practically no research on the way people economically exploit those invasive species. A major lack of study is the positive impacts from harvesting invasive species, or the potential positive impacts on ecosystem services (by reducing the pressure) or on economic activity (by generating income).
The shift from undesirable species causing biodiversity loss to valuable common pool recourse could represent an interesting analysis.
Furthermore, research on the institutional responses and arrangements to these invasions could represent a valuable tool to understand the complex dynamics between ecological and economic spheres in this particular study.

An interesting analysis could be carried out from the study of the *Rapana Venosa* invasive species, as its marketability causes a positive impact on local economic actors (by generating income) while reducing its stock and thus the negative impact on local habitats.
From this perspective this particular CPRs could be regarded from both their ecological, economical significance leading to their institutional one in order to analyze the interdependences between natural and social order.

As previously stressed *Rapana venosa* is known to cause significant negative ecological and positive socio-economic effects in the Black Sea ecosystem.
The unintentional introduction, from the Sea of Japan, of this gastropod occurred approximately in the 1940s and within 15 years it colonized the entire Black sea.
In the Bulgaria Black sea *Rapana Venosa* whelk was first encountered in the late 50s with a devastating bloom in the year 2006-2007 year (Micu and Todorova , 2007).
It caused a considerable damage to the local ecosystems. And was the cause of the extinction of numerous species (for example, the oyster *Ostrea edulis*), the decline in the bivalve populations and the deterioration of the mussel beds (Zaitsev and Ozturk, 2001).
According to their study (Janssen et al, 2013), catch, processing and export started in Bulgaria in the early 1990s. This is right after the change of the political context in the country and the fall of socialism in the 1989 and the market economy transition afterwords.
There is practically no demand in the Black sea region, and most part of the catch is exported directly to Japan, Korea and Eastern Countries (Janssen *et al.,* 2014).

To date the rapana fishery has become the most important commercial marine species on the Bulgaria coast (up to 50% of the total landings) (Janssen *et al.,* 2014). Because of no regional demand it is mainly exported and employees approximately 1500 people (in 2014) people, most of them poor women employed in the processing factories.

When analyzing the development of the rapana fishery we have to mention the large public concern of the impact of bottom trawling on the marine environment during the 90s. As a result of the growing public and scientific alarm, the Ministry of Environment and Waters promoted a ban on bottom trawl techniques in 2001. The National Agency of Fisheries and Aquaculture (NAFA) opposed these measures. They argued that rapana fishery is not fully exploited and one should focus on short-term profit. Due to lack of resources and informal political lobbying the trawling ban was very poorly implemented. In practice the fishing effort continued as before only declared "illegal" and thus become more erratic. In 2012 the ban was lifted thanks to the efforts of a large business lobby and settlement was found with policy makers, the environmental concerns were disregarded. Specific zones for the harvesting were defined, however Illegal beam trawling continued with exponential growth. Most of the catches happen in previously designated zones of marine protected areas.
In 2018, a local fisherman association made plea to the government and the Ministry of foods and agriculture asking them to regulate the activity and limit the number of actors entering the industry. There are also a significant number of small scales unregistered fishing boats that harvest by manual means (mostly scuba diving). These actors are difficult to account for as they are self-organized by informal means. Most of the time they borrow boats from each other and mark those areas for fishing *via* large floating bottles. The perimeter near the floating bottle is said to be a "reserved zone" for the day. Actors respect those rules by an informal consensus. The catches are directly discharged on the beach during the night. As the activity is still at its regulating stage there is no national data on rapana catches. One possible way to evaluate the total annual catch is by measuring the exportation rate.

While *Rapana Venosa* is known to cause significant negative ecological impact, over the past few years it has became a highly priced commercial resource.
From this point of view, its extraction is needed both from ecological (positively reducing the ecosystem damage) and economic perspective (generating income). The dilemma gets complicated from the fact that the very means for its harvest as well as the area it takes place in. Rapana catches are mostly done by drag and trawling techniques that are highly destructive for the seabed habitats and thus lead to further environmental deterioration. Those practices take place as well in the two Marine protected areas (Kaliakra and Koketryts) and thus compromise their conservation objectives.

4. Conclusion

The research summarized in this paper is still ongoing and the study of the CPR cases is still in process. Most of the case information provided in this paper is still at its initial stage gathered by semi-structured interviews and participant observation.
However, the complex situation of governing the CPRs in Bulgaria is evident. More specifically, at this stage the mismatch of the institutional objectives set for the governance of natural resources in Bulgaria is quite clear. Institutional arrangements

around those CPRs tend to follow the economic sustainability but in an erratic and informal way that is still not well established.
Environmental governance is a cross-scale challenge and while different problems can be resolved on different levels, it is still unclear how local-level self-organization (bottom-up) and participatory approaches to governance can articulate with international and national top-down regulatory strategies (Adger *et al.,* 2003).
Formal institutions are important in setting the rules for natural resource governance however sometimes informal institutions tend to shape their very existence.
A thick analysis will tend to combine those institutional forms with the policy context in order to enable a more general and comparable economic observation about institutional arrangements when dealing with CPRs in Bulgaria.

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