

Inefficient utilization of resources

An anti-commons view in the fishing sector: The aquaculture problem

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ABSTRACT: *Anti-Commons Theory is a very recent development in the area of property rights. It intends to explain why an “anti-commons” emerges and why resources may be prone to underuse. In an anti-commons situation there are too many exclusion rights that lead to the under-use of resources. In Portugal, too many people (and institutions) have been involved in the approval processes of aquaculture projects. They may be involved in reaching a decision about the approval of a project which gives rise to the under-utilization of the resources promoters aimed to exploit. In fact, it takes so long to approve a project that the time required for its implementation is excessively delayed.*

Key words: Anti-commons, Anti-commons Tragedy, Property Rights, Exclusion Rights

TÍTULO: Utilização ineficiente de recursos. O sector pesqueiro numa perspectiva de Anti-Comuns: O problema da aquacultura

RESUMO: *A Teoria dos Anti-Comuns constitui um desenvolvimento muito recente na área dos direitos de propriedade. Pretende explicar a emergência de anti-comuns e por que os recursos têm tendência a serem subutilizados. Numa situação de anti-comuns há excessivos direitos de exclusão que conduzem à subutilização de recursos. Em Portugal, demasiadas individualidades (e instituições) têm estado envolvidas em processos de aprovação de projectos de aquacultura. Podem estar empenhadas em chegar a uma decisão que conduza à subutilização dos recursos que os promotores pretendem explorar. De facto, o tempo dispendido na aprovação do projecto é tão longo que a sua implementação acaba por ser excessivamente retardada.*

Palavras-chave: Anti-comuns, Tragédia dos Anti-comuns, Direitos de Propriedade, Direitos de Exclusão

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Commons and anti-commons can be viewed as two faces of the same coin. The second half of the 20th century demonstrated the great problems caused by under-defined property rights for commons. This has generated tragedies around the world (Filipe *et al.*, 2007). The Hardin's metaphor "tragedy of the commons" (Hardin, 1968) sought to explain problems about human overpopulation, the overexploitation of species and their resulting extinction and about air pollution. The problem is that people have no incentives to preserve the common areas and often these types of resource are overused. A resource is prone to overuse when too many people have the privilege of using it and no one has the right to exclude others from its use (Filipe, 2006; Filipe *et al.*, 2006b).

Meanwhile, other questions have been raised in the discussion on property rights. There has been a new approach to some issues generated by the excessive fragmentation of property rights in the last two decades. This occurred in what has been classified as anti-commons situations. Michelman (1982) presented the anti-commons as "a type of property in which everyone always has rights respecting the objects in the regime, and no one is ever privileged to use any of them except as particularly authorized by others". Heller (1998) states that in an anti-commons problem there is a property regime in which numerous owners hold effective exclusion rights over a scarce resource. Therefore, the coexistence of multiple exclusion rights creates conditions for the suboptimal use of the common resource.

THE ANTI-COMMONS AND THE EMERGENCE OF TRAGEDIES

In fact, Heller brought a powerful tool for the analysis of property rights, which global implications are not known yet. Property rights are under-defined in many situations. In relation to anti-commons, the undefined limits for property rights trigger several problems that are expressed by the under-use of the resources as well as by loss of value. Indeed, an anti-commons problem produces tragedies that are presented as the mirror effect when it is compared with the tragedies of the commons. In fact, a "tragedy of the anti-commons" occurs when multiple agents have the right to exclude others from the use of a scarce resource but none of them has an effective privilege for its use.

When several agents may take decisions about how to use a specific resource which is jointly held and exploited by all of them, and when one of them may impose his/her own decision on the others, imposing his/her veto power, we are faced with this kind of anti-commons problem. In this situation, all the agents must agree on the utilization given to the jointly used resource. Otherwise the resource may simply not be used or be underused.

One way of overcoming the inherent problems of anti-commons situations is to gather all the rights in a usable private property. However, this is often slow and complex.

A number of examples of emerging anti-commons have been given in various areas ranging from Heller's classic example about the transition of Soviet institutions to the market regime, to problems in the telecommunications sector where the regulators require too many specifications. A badly drawn property rights regime can discourage telecom competition and investments, triggering large and hidden costs for companies and telecom markets.

In the area of patents, manufacturers in most industries may need to negotiate the use of several patents in order to create a product and this may also be true of copyrights. As a result, the new product becomes much more expensive.

Such problems can be explained from an anti-commons point of view (Filipe, 2006; Filipe *et al.*, 2006a, 2006b). All of them involve multiple property rights required for the production of something new and there are too many property rights that may exclude others from the production of a new product. Obviously, resources are allocated inefficiently causing a consequent loss of value.

In fact, as we can see, we find the “tragedy of the anti-commons” when resources remain idle even in the economic region of positive marginal productivity. Acting under conditions of individualistic competition, exclusion rights will be exercised even when the use of the common resource by one party could yield net social benefits.

CHOICES ABOUT COMMON RESOURCES. EXCLUSION RIGHTS AND UNDERUTILIZATION OF RESOURCES. A MATHEMATICAL APPROACH

Let's consider $V_i(x_i, x_j)$ as the value of the common resource to agent i ; and we consider a situation (for simplicity's sake, let's take the typical anti-commons situation) in which two agents (co-owners) hold exclusion rights that limit each other's use of the common property¹. No one agent may use the resource without the consent of the other agent. Agent i grants agent j the right to use the common resource. Agent j owns a complementary right to exclude agent i from the use of the common resource. The two agents may independently grant each other some limited right to use the common resource. Therefore, the respective grants will be denoted as x_i and x_j . The profit that agent i derives from this joint project is $V_i(x_i, x_j)$ and the positive externality that agent j exerts on i 's value can be modeled as

$$\frac{\partial V_i}{\partial x_j}(x_i, x_j) > 0 \quad (1)$$

If we consider the case of exclusion rights exercised simultaneously and independently by the various right holders, it will tell us where multiple owners exercise their veto on equal terms and symmetrically for this anti-commons situation. Hence:

$$V_i(x_i, x_j) = V_j(x_j, x_i) \quad (2)$$

Uncoordinated choices will be made and the Nash equilibrium will be given by:

$$\frac{\partial V_1}{\partial x_1}(x_1, x_2) = 0 \text{ and } \frac{\partial V_2}{\partial x_2}(x_2, x_1) = 0 \quad (3)$$

It is natural to assume that V_i is concave in x_i . We should expect a symmetric equilibrium, as a consequence of the symmetry assumption, in the form $x_i = x^e = x_2$.

Compared with the efficient choices of x_i , those that maximize $V_i + V_2$, we have (the first order conditions):

$$\frac{\partial V_1}{\partial x_1}(x_1, x_2) + \frac{\partial V_2}{\partial x_1}(x_2, x_1) = 0 \text{ and } \frac{\partial V_2}{\partial x_2}(x_2, x_1) + \frac{\partial V_1}{\partial x_2}(x_1, x_2) = 0 \quad (4)$$

It is natural to assume that $V_i + V_2$ is concave and that this admits a symmetric solution $x_i = x^e = x_2$.

We can show that $x^e > x^c$. This means that the uncoordinated choices of two agents lead to underutilization of the common resource. Hence, the uncoordinated exercise of exclusion rights leads to underutilization of a common resource.

Nevertheless, if authorities determine that resources must have quotes to be used and the quotes must be kept at below optimum levels, the direct effect is virtually the same. In fact, some agents (regulators) use certain exclusion rights to restrict the use of a resource exploited by others.

PROJECTS OF AQUACULTURE IN PORTUGAL. LOSS OF VALUE. A PROBLEM OF ANTI-COMMONS?

This problem of anti-commons may be studied in Portugal for projects in aquaculture area. We can see that many entities must give their approval for a project to be implemented and that all the administrative procedures motivate a situation of delayed global authorization. There can be no doubt that many interesting projects

which are profitable, fishing-friendly and viable will simply not begin to be exploited because there are just too many exclusion rights. Even though there is an agent that wants to exploit a resource with important economic, biological and social consequences, bureaucracy and administrative procedures simply make the project unviable.

A significant loss of value can be anticipated. In fact, this problem has destroyed value because financial resources were required to present the project but no value has been created due to the delay in approval. The agent who supports the project loses both an important amount of time to implement it as well money because of the period of lost production. In many situations, projects are not implemented because the right moment for it has been and gone.

This view is consistent with the suggestion of Buchanan and Yoon (2000) that the anti-commons construction offers an analytical means of isolating a central feature of “sometimes disparate institutional structures”.

The inefficiencies introduced by overlapping and intrusive regulatory bureaucracies are widely recognized and may be studied with the help of anti-commons conceptualization. When an entrepreneur seeks to invest in an aquaculture project and the action is inhibited by the need to obtain permits from various national and regional agencies, each of which holds effective exclusion rights on the project, we encounter the mirror effect of the “tragedy of the commons”.

The Portuguese case suggests that environmental authorities involved in the approval process have prevented not only some value-reducing development but may also have prevented value-enhancing development. Economists and environmentalists have perhaps concentrated too much attention on the commons side of natural and environmental resources and neglected the anti-commons side.

This debate also raises another interesting issue: neither the motivation of the bureaucratic authorities nor the constraints on their exclusion rights is captured by a simple one-dimensional theoretic model. Those who have the power to issue permits may not seek to maximize rents and, perhaps of greater importance, may be authorized to refuse permits only with cause. These agencies cannot or may not wish to acquire pecuniary gains. Therefore, the allowance for such non economic motivation on the part of the excluders also suggests that the potential conflict may not be primarily distributional but also reflect different objectives to facilitate welfare development. The introduction of these institutional issues may enhance the scope of this research.

THE AQUACULTURE AS AN AXIS OF THE PORTUGUESE POLICY

The Portuguese experience shows that the impacts of investments in the aquaculture sector have been of little relevance and target only traditional species. Investments have not allowed significant productions. This situation is the reflex of:

- insufficient economies of scale and the technical and organizational inadequacies of the project promoters;
- the emergence of the “tragedy of the anti-commons” problem as defined by Buchanan and Yoon. This reflects an excessive partition of the property rights and the existence of multiple bureaucratic circuits that create enormous complexity and administratively slow processes of project approval and implementation;
- the dimension of the environmental issues involved and the lack of a plan regulating the coastal areas and establishing the territories to be used in the aquaculture sector are equally significant impediments.

The analysis of the recent Fisheries Operational Program (2007-2013) suggests the following risk evaluation.

One of the axes on which the Program is structured aims to develop the aquaculture sub sector of fisheries and corresponds to about 42% of the total cost of the Program. It can therefore be considered one of the main objectives of the Portuguese Fisheries Policy.

There are proposals for investments of around 165 million euros in aquaculture and in the sub sector of the manufacture and commercialization of fisheries products. It is treated as a bulky investment that underlines the proactive nature of this axis in the global context of the Program.

At the same time, it should be noticed that the participation of private initiative in the planned investments is expected to be very important to this axis of the Program and represents about 70% of the total private investment in fisheries.

The opportunity and relevance of these objectives is obviously not put in question. However, we should note that these objectives involve significant risks, especially for the development of aquaculture.

Some of these risks are worthy of emphasis, namely:

- experience has shown that the companies involved do not have the size, economies of scale or the technical and organizational capacities to work on these projects;

- there are additional risks to these developments such as larger periods of return on investment and additional competition in this area, particularly from the productions of Southern European countries.

The Program clearly reveals great expectations from the private sector. However, financial participation from the European Fisheries Fund is at lower than usual rates of co-participation. This becomes particularly serious due to the “tragedy of the anti-commons”. The bureaucratic ‘impediments’, especially those resulting from the necessary environmental impact evaluation, give rise to a series of difficulties that appear at this level. The Public Authorities must therefore eliminate or minimize the bureaucratic obstacles associated to the realisation of this kind of project.

SOME FINAL CONSIDERATIONS ABOUT ANTI-COMMONS

The problem of anti-commons is a very recent issue in scientific research. Studies about anti-commons require innovative approaches to research. The research confirms that there are interesting results when some phenomena are analyzed through an anti-commons perspective.

In fact, anti-commons considerations may result not only from taking problems of the real world into account but also from the new methodologies used to analyze this in research.

This perspective of analysis was intended to complement other viewpoints on the resource utilization issue. More discussion is needed about the boundaries of the concept to clarify its precise meaning in the broader context of property rights.

NOTA

1. As proposed by Parisi, Schulz and Depoorter (2005).

REFERENCES

BUCHANAN & YOON (2000), «Symmetric Tragedies: Commons and Anticommons». *Journal of Law and Economics*, vol. 43(1), pp. 1-13.

FILIPE, J. A. (2006), «O Drama dos Recursos Comuns. Um caso de Aplicação da Teoria dos Jogos aos Comuns da Pesca. Estudo da Cooperação aplicada à pesca da sardinha nas Divisões VIIIc e IXa do ICES». PhD Thesis presented at ISCTE. Lisboa.

FILIPE, J. A., COELHO, M. & FERREIRA, M. A. M. (2006a), «A Tragédia dos Anti-Comuns: um novo problema na gestão da pesca?». ISEG. UTL. Seminário do Departamento de Economia (N:15/2005/2006). *Working paper*.

FILIPE, J. A., COELHO, M. & FERREIRA, M. A. M. (2006b), «The Drama of the Commons: an application of Cournot-Nash Model to the sardine in Portuguese Waters». Thirteen Annual International Conference on

Advances in Management (ICAM 2006), Proceedings. HYPERLINKLisboa, 19-22 de Julho de 2006. <http://icam2006.eg.iscte.pt/>.

FILIPE, J. A., COELHO, M. & FERREIRA, M. A. M. (2007), **O Drama dos Recursos Comuns. À Procura de Soluções para os Ecossistemas em Perigo**. Sílabo, Lisboa.

HARDIN (1968), «The Tragedy of the Commons». *Science*, vol. 162, pp. 124-148.

HELLER, M. A. (1998), «The tragedy of the anticommons: property in the transition from Marx to markets». *Harvard Law Review*, vol. 111.

MICHELMAN, F. I. (1982), «Ethics, economics and the law of property». In J. R. Pennock & J. W. Chapman (Eds.), **Nomos XXIV: Ethics, Economics and the Law**. New York University Press, New York.

PARISI, F., DEPOORTER, B. & SCHULZ, N. (2005), «Duality in Property: commons and anti-commons». *International Review of Law and Economics*, vol. 25(4), pp. 1-25.

DGPA (2007), Programa Operacional da Pesca 2007-2013, versão provisória, http://www.dg-pescas.pt/pls/portal/docs/FOLDER/DGPA_CONTENT_AREA/NOTICIAS/DESTAQUES/PO_PESCA_22_5_07.PDF.