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Designing a collective efficiency strategy for Tagus River watershed municipalities: an economic and institutional view

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ABSTRACT

A territorial governance model in predominantly rural regions, focused on endogenous and sustainable development, should be the framework for a democratic decision-making process on territorial strategies of collective efficiency stimulating a business-friendly atmosphere, creation of qualified employment, dissemination of knowledge and social innovation and preservation of the natural and cultural heritage of the territories.

With this premise, it will be up to the Iberian education, scientific and technological systems to work in a network to promote not only the fastest advancement in scientific knowledge about effective solutions in combating climate change, including the overall sectors of economic activity, as well as disseminate it more clearly by companies (particularly in micro-enterprises and small businesses) and by social economy organizations.

In this context, this article intends to be a contribution in the form of critical reflection on a practical case of public policies directed to sustainable regional development, consisting of long-lasting collective work for hydrographic harnessing (the Sorraia Valley irrigation work) with huge benefit for the sustained competitiveness of an extensive agro-forestry system spatially covering a significant part of the continental territory of Portugal.

The main point is that only a transparent process of negotiation open to all stakeholders - through creativity, entrepreneurship, spirit of citizenship and intergenerational solidarity - can lead the region of the Tagus river watershed to a strategy of collective efficiency in the management of their water resources, maximizing the quality of life of people living in this part of Iberian territory.

Key-words: collective efficiency, sustainable management, agroforestry system, territorial governance

1. INTRODUCTION

Taking as geographical reference the watershed of a transnational river - Tagus River, that runs through Spain and Portugal - and its productive specialization in goods of agricultural origin, we question what collective actions might guide the business and institutional agents in accordance with the local-global mediation in the conception of sectoral public policies, meeting the strategic goals for territorial governance and development (United Nations, 2012).

Considering such river, one of the major ones in the Iberian Peninsula, as an essential natural element for the competitiveness of the regional agrarian economy, with evident reflection on the dynamism of the internationalization of agro-food supply chain, very dependent on edaphoclimatic and terroir conditions, the doctoral research carried out between 2010 and 2013 (Oliveira, 2013), based on a holistic and interpretative case study (Yin, 2014), allowed us to observe the widespread adoption of good practices in terms of innovation and environmental sustainability in various associations/organizations of farmers, as well as in food and wine industries.

To such an extent that currently agro-forestry-silviculture activities are supervised by graduated agronomic engineers and technicians, using the fields to test new varieties of seeds and feedstuffs to match local and global market needs, through a model of sustainable

agriculture combining efficient use of water and low carbon emissions, lowering the ecological footprint as much as possible (Climate Technology Centre & Network, 2019).

These observed facts, side by side with many others revealed in that research (some of them discussed further in this paper), permit us to propose an empirically suitable strategy of *collective efficiency*, defined as the competitive advantage derived by clustered firms from local external economies and joint action (Schmitz, 1995). This means that trust between stakeholders and smart designed joint actions can trigger innovation and thus to overstep knowledge transfer barriers for primary activities where micro and small firms are most frequent (Oliveira & Turčinková, 2019; Natário and Oliveira, 2018).

2. THE CASE

2.1. TERRITORIAL ASSETS

Our critical reflexion addresses the need of preservation of the river ecosystem given its strategic relevance to the economy of the Portuguese municipalities of Tagus watershed. It comprises the following regions according to the nomenclature of territorial units for statistical purposes (level 3)[1], illustrated in Figure 1 below: Beira Baixa, Alto Alentejo, Médio Tejo and Lezíria do Tejo. The estuary of the river is located at the Metropolitan Area of Lisbon, where it founds then the Atlantic Ocean. Some figures are shown in Table 1.

Table 1: Population and area – NUTS III crossed by Tagus vs. Portugal

NUTS III (2013)	Population (2011)	Area (km2)	Population density	Nr. municipalities
Beira Baixa	89.063	4.615	19,3	6
Alto Alentejo	118.506	6.084	19,5	15
Medio Tejo	247.331	3.344	74,0	13
Lezíria do Tejo	247.453	4.275	57,9	11
Metropolitan Area of Lisbon	2.821.876	3.015	935,9	18
Portugal	10.243.730[2]	92.226,0	112.5	308

Source: Portugal Statistics (2015; p.16) and Pordata basis (at https://www.pordata.pt/Portugal) for Portugal and NUTS III (2013) areas.

Following the press release by Portugal Statistics about the *Regional Statistical Yearbook 2017*, dated from 20 December 2018, regarding to land use and land cover it is mentioned that:

[1] See European Commission/Eurostat (2018) for technical details.
[2] Actual resident population.

"(…) *the forest area was more expressive in central municipalities of the Centro region, extending in a territorial continuum to municipalities located in the Norte region (…) and to the south, to municipalities located in Lezíria do Tejo and Alto Alentejo. Shrubland areas were more relevant in north-eastern municipalities of Mainland Portugal and in the Algarve and the agroforestry systems in municipalities of the Alentejo region, as well as in Alcochete* [Metropolitan Area of Lisbon, at the south bank of Tagus River] *and Idanha-a-Nova* [Beira Baixa]".

Fig.1: Map of the Portuguese territory.

Source: Portugal Statistics (2015; p.17).

The main territorial-based issue is the viability of investments in urban-rural spaces, both of material and intangible nature, already carried out or planned collaboratively by institutional,

associative and business agents focused on the market valuation of non-transferable and intangible assets – including not only the natural landscape but also built heritage of a region traditionally known as province of Ribatejo amidst the local inhabitants. In other words, it crucial for all interested parts in regional development to take the most of economic and social value from territorial amenities.

An illustrative case is the implemented project designated as *Tagus wine route* ("Rota dos Vinhos do Tejo", as pictured in the map below), with its 4 routes: "Gothic treasure", "Bulls and horses", "Border Tagus" and "Manueline treasure" (Fig. 2).

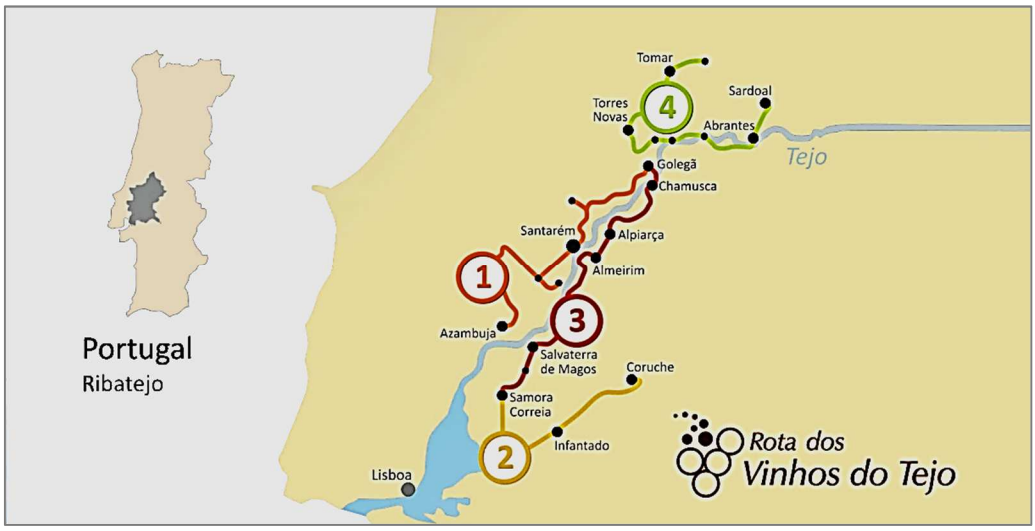

Fig.2: Map of the Tagus wine route.

Source: Adapted from the portal of the Regional commission of Wines of the Tagus. Accessed at (17/10/2018): http://www.cvrtejo.pt/rota-dos-vinhos-do-tejo/mapa-da-rota/mapa-da-rota:420.

Caption: 1-Gothic treasure; 2-Bulls and horses; 3-Border Tagus; 4-Manueline treasure.

Such routes are part of an initiative promoted by Turismo do Alentejo, a legal person of public law of territorial scope responsible for the tourism management of Alentejo area (NUTS 2, illustrated at Fig.1). The respective guide identifies and shows the location of the companies that produce and transform agricultural products with ISO quality and Forest Stewardship Council certifications – e.g. certified wines and olive oil, cork, livestock production (also including bulls and horses) – and gastronomic dishes (Entidade Regional de Turismo do Alentejo/Ribatejo, 2014).

These establishments have their doors open all over the year to host tourists interested to enjoy of entertainment and/or work activities (like horse riding and others illustrated in Fig. 3) and enjoy a pleasant staying at manor houses owned by aristocratic families since two centuries ago, offering to guests all the comfort and relaxation.

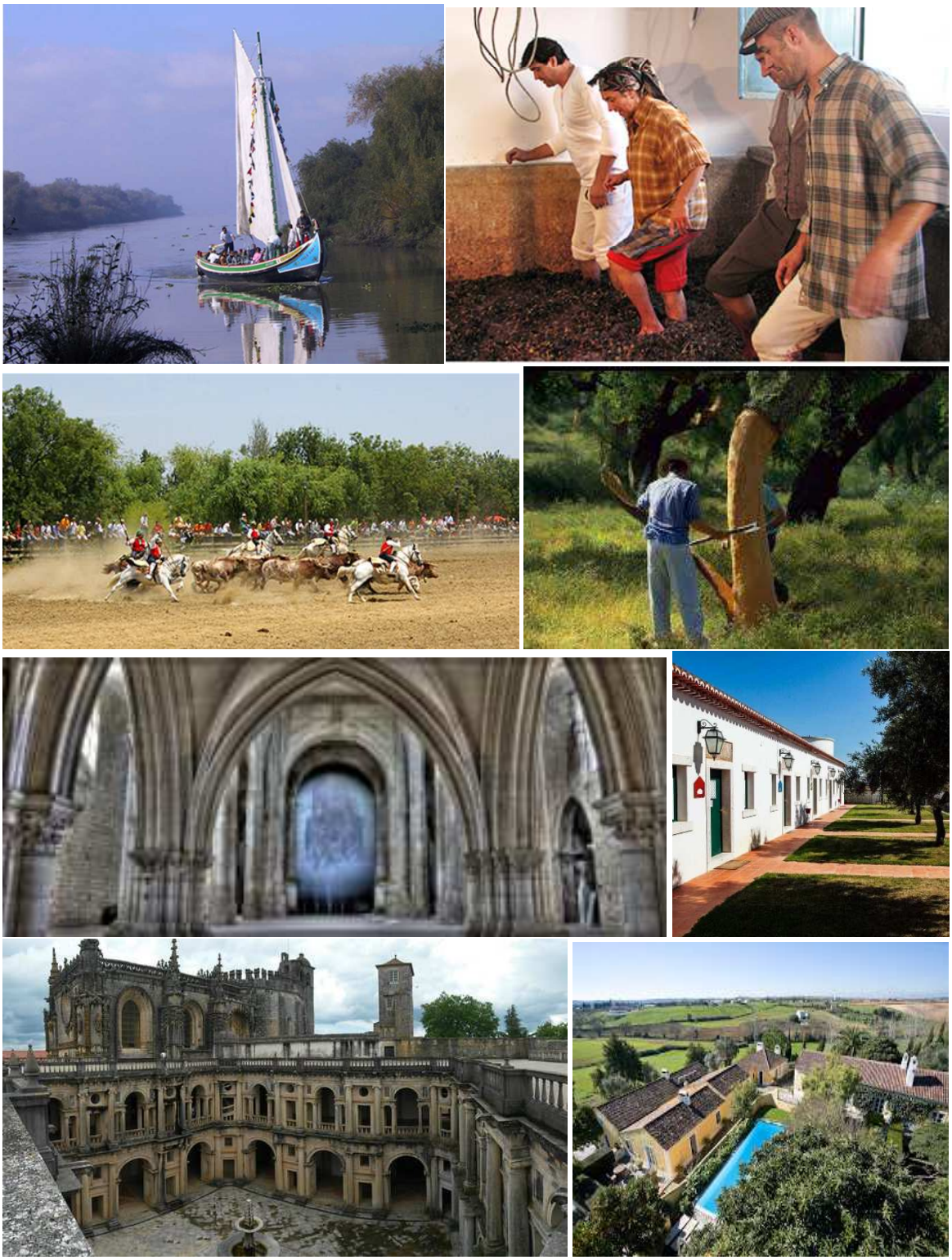

Fig.3: traditional rural activities and religious heritage in Ribatejo.
Caption:
1-travelling across the Tagus' small islands ('mouchões') in a traditional boat called 'catraio'; 2-stepping on the grapes in the wine mill ('lagar'); 3-'Campinos' guiding the bulls; 4-harvesting of cork (bark of the cork oak, scientifically known as Quercus Suber 5- Cloister of the convent of Saint Francis (Santarém); 6-rural tourism place (nearby Tomar); 7- cloister of the Convent of Christ (Tomar), heritage of mankind (UNESCO); 8-rural tourism place (nearby Santarém).

1.1. A LOCAL VIEW OF TAGUS RIVER'S ECOSYSTEM: THE SORRAIA VALLEY.

On the sustainable management of the Tagus River watershed, theme of a first international conference jointly featured by scholars of the University of Castilla – La Mancha (Spain), Polytechnic Institute of Santarém (Portugal) and other Portuguese universities[3], it deserves to be mentioned a remarkable organization: Association of Irrigators and Beneficiaries of the Sorraia Valley, one Portuguese affluent of the Tagus River that crosses the NUTS III Alto Alentejo and Lezíria do Tejo .

Using digital technologies to support hydraulic engineering, this association has developed a very meritorious role in the sustainable management of a vast irrigation work, since 1957, which includes the reservoirs of Maranhão, Montargil and Magos, as well as a series of streams, canals and dams, covering a surface area of 16.351 hectares in the Portuguese districts of Portalegre, Évora and Santarém (Fig. 4).

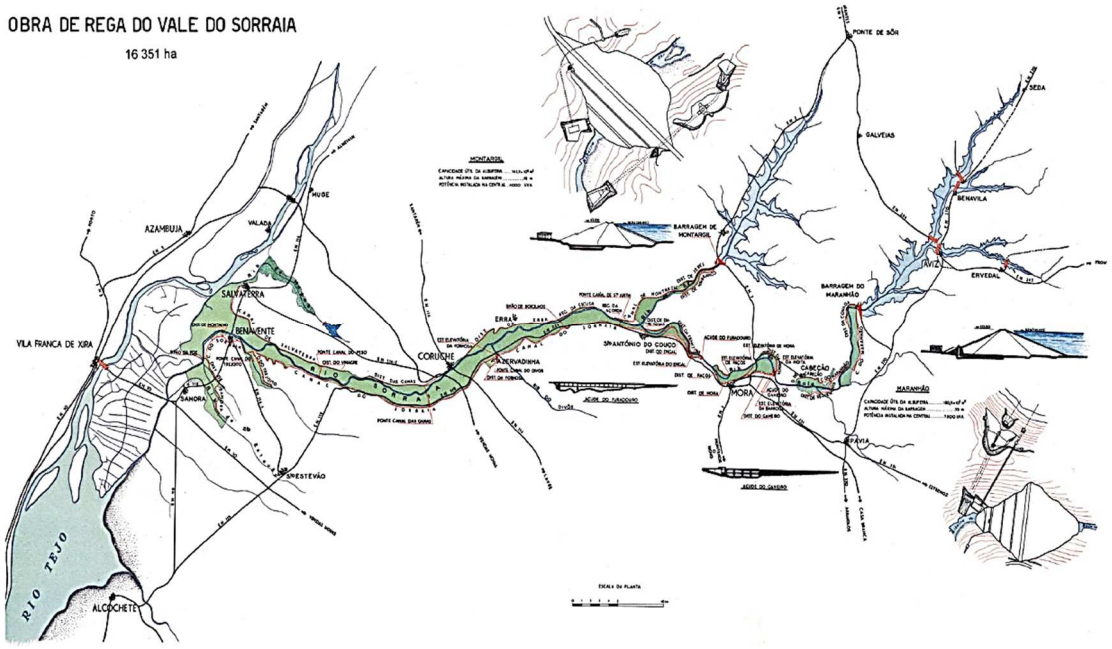

Fig. 4: Map of the irrigation work of Sorraia Valley/Vale do Sorraia.
Source: Associação of Regantes and Beneficiários of Vale do Sorraia website. Accessed at (17/10/2018): http://www.arbvs.pt/_ZDATA/Obra%20de%20Rega.PNG.

In addition to the systematic dissemination of legislation on water resources and hydro-agricultural use, the organization performance has been remarkable concerning to water quality and quantity monitoring by ensuring its supply respecting quotas established through

[3] Pedro Oliveira made part of the committee which organized this conference ("*Sustainable management of hydric resources, challenges for 21st century*"), on 13th October 2018, at the Higher School of Education of Santarém.

a democratic and transparent process of negotiation between the all set of interested parties, thus preventing individualistic behaviors in the use of a vital resource for the sustainability of the agroforestry business and agri-food industries established in the territory. But, from a view point of ecosystem sustainable management and rural innovation boost, the most interesting action led by this same organization is the implementation of a huge and innovating project (Act – *Evaluation system of water and energy efficiency*) which aims to assess the efficient use of water and energy in hydro-agriculture uses[4].

This example shows how essential it is that all stakeholders interact transparently and constructively in cooperative solutions to prevent any regulatory failures, notably in the application of the arrangements signed by national authorities of the Iberian countries (including controversial issues like building new dams over the Spanish part of Tagus River to supply water to Andalusia and the postponed foreclosure nuclear power plant in Almaraz (Spain), 100 kms upstream of the river border with Portugal (Fig. 5) [5].

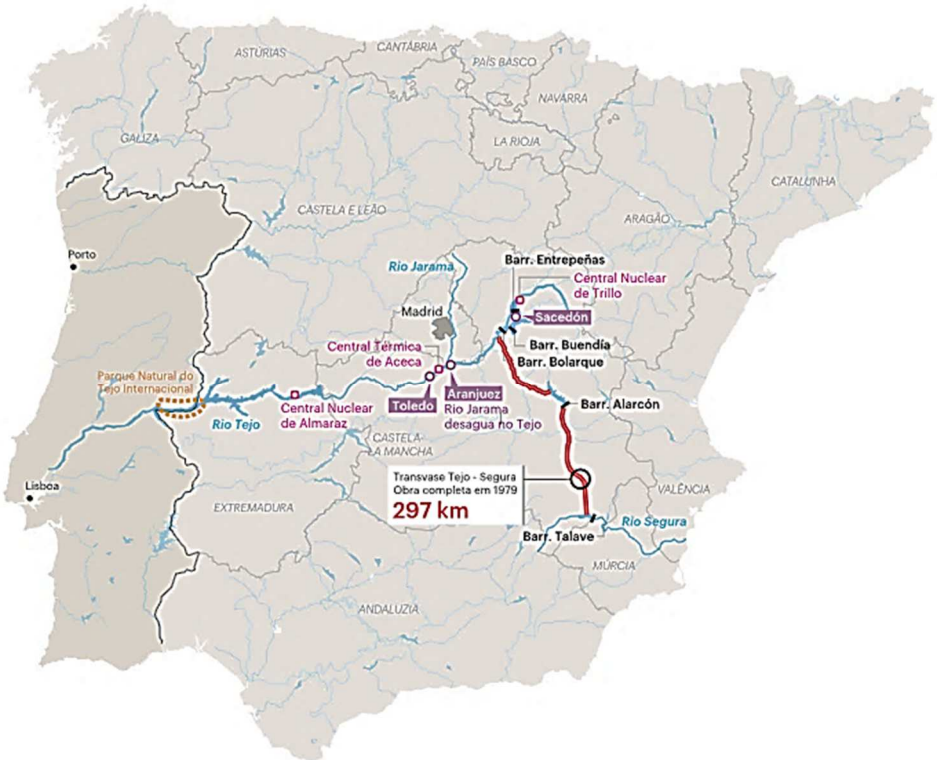

Fig. 5: Tagus River in the Iberian Peninsula. Source: https://static.publico.pt/infografia/2017/portugal/tejo-poluicao.svg.

[4] The targeted objectives of this project are described at: https://inovacao.rederural.gov.pt/grupos-operacionais/13-projectos-groupos-operacionais/59-agir-avaliacao-da-eficiencia-da-agua-e-energia-em-aproveitamentos-hidroagricolas (last access in March 31, 2019).

[5] See the article "Nuclear energy sparks major tensions between Spain and Portugal" at: https://guests.blogactiv.eu/2017/02/20/nuclear-energy-sparks-major-tensions-between-spain-and-portugal/ (last access in March, 24 2019).

Such arrangements have been negotiated over an institutional basis starting with the signature of the *Treaty of Limits* (1864). Since then a few conventions were signed by both national governments as well as a lot of official meetings have taken place, being worth of notice the most recent *Conferences of the Parties* (Table 2).

Table 2: Conferences between Portuguese and Spanish Governments since year 2000.[6]

	Focus
I Conference of the Parties (Lisbon, July 27, 2005)	The Parties analyzed the balance of the work related to the development of the Convention, focusing on the mechanisms of cooperation in situations of scarcity and drought, and decided to give a special impetus to cooperation on the implementation of the European Union Water Framework Directive (2000/60/EC)
II Conference of the Parties (Madrid, February 19, 2008)	The Parties expressed the willingness to emphasize the importance of the Convention on Cooperation for the Protection and Sustainable Use of Waters of the Luso-Spanish Watersheds, showing their satisfaction with the work carried out and by the progress achieved by the Commission for the Application and Development of the Convention (CADC) since the conclusion of the first Conference of the Parties.
II Conference of the Parties (Oporto, July 20, 2015)	The Parties decided to mandate the CADC to draw up a joint document Management Plans of on the Hydrographic Region (2016-2012) belonging to the international shared basins, aiming to inform the interested public and the European Commission on the progress achieved by Portugal and Spain in this area. In the field of information systems, both decided to carry out the analysis of suitability, in view of the objectives of the Albufeira Convention, of the currently existing hydrometeorological monitoring network and to prepare a joint project for its updating and eventual densification, mobilizing Community funds.

However, despite the negotiating effort made by the Iberian governments to establish balanced solutions, the reality shows that are insufficient to respond to the problem of extreme drought which has led to a worrying reduction in the water flow of the Tagus River, mainly in Spain.

Besides that, there are pulp mills, paper and tanneries located at the Portuguese territory whose residues have been dumped for decades in the Tagus River and affluent rivers, as well as waste-water from cities along respective banks (from Madrid until Lisbon), seriously damaging international Tagus watershed ecosystem (Araújo et al., 2015).

Furthermore, there is a worrying phenomenon of siltation (i.e. the silt gets laterally deposited on the banks of the rivers), as shown in Fig. 6, because of deforestation along its banks,

[6] The information gathered in this table was adapted from the internet site of Commission for the Application and Development of the Convention (CADC) On Cooperation for the Protection and Sustainable Use of the Waters of the Luso-Spanish Hydrographic Basins - http://www.cadc-albufeira.eu/pt/conferencia-partes/. Besides Tagus River, it should also be taken in consideration the Minho. Lima, Douro and Guadiana as shared rivers between both countries.

caused by inappropriate overuse of its steeper banks for farming and forest fires. More precisely ((Araújo et al., 2015; p.823):

> *Deforestation can impact the water cycle in many ways. Fewer trees result in less transpiration, which reduces the amount of local rainfall and increases the severity of droughts. These events eventually reduce the amount of available water and the flow of rivers. Less vegetation also creates more runoff, thereby lowering water tables and reducing the amount of water stored in the soil.*

Fig. 6: Image of the Tagus River in Ribeira de Santarém (Portugal).
Source: Google earth maps.

2. DISCUSSION

Moreover, as biodiversity is a societal challenge in the European Union Horizon 2030 Agenda, it becomes necessary a "new industrial strategy" that defends the adoption of new green technologies and sustainable industrial processes.

It is thus up to the education, scientific and technological systems of both countries to work jointly to foster new advancements in scientific and technological knowledge getting more effective solutions for climate change problems. Subsequently, such solutions should be disseminated to the overall of economic activity sectors - particularly micro- and small enterprises - speeding-up innovation at all territorial scales (from local to global).

This dissemination should be expressed into environmentally friendly practices, in coherence with the so-called Circular Economy, which means to streamline the financing mechanisms of Community programs to promote R&D in the European Union, particularly at the level of cross-border cooperation.

In this sense, it is important to urgently review public policy models defined according to realities largely unknown by regional communities. For instance, at the level of regional development, there exists a centralizing model of supervision of courses offered by the Portuguese system of higher education that lacks strategic orientation for the development of peripheral territories.

It is crucial to create better working conditions in respective institutions, giving to researchers and teachers enough motivation to play a socially more active role.

In other words, without undercutting the relevance of the publications of the teaching body in international scientific journals quite influential at the global level, the performance of the public institutions of higher education located at NUTS III Lezíria do Tejo and Médio Tejo (Polytechnic Institutes of Santarém and Tomar, respectively) is definitely correlated with the social and economic impact of the research work produced by its scholars, employees and students in search of solutions to the problems of various order affecting the respective communities - including not only the business sector but also the social economy organizations.

The sustainability of these institutions will inevitably be due to the recognition of their social value by the various actors able to determine the design of regional policies – namely territorial cohesion policy makers and NGOs. As the community gets the perception of the usefulness of knowledge produced inside such institutions to respond to the environmental challenges, the likelihood of demand for graduations and services provided by them will increase.

Emerging proposals launched by private interest groups, involving substantial financial resources from public funds, with a very significant opportunity cost in terms of social cohesion (e.g. building more dams at the Tagus River), the Iberian universities and polytechnic institutes should act in consortium and decide on the reasonableness of the same; with scientific rigor and autonomy both to the central governments and to those groups.

It is important that these institutions are actively heard in regional and inter-municipal governance bodies, with the aim of contributing with expertise and exemption for the establishment of Territorial Pacts consistent with the socio-economic realities of targeted territories. In this way, the populations will have a better awareness of the environmental threats to their quality of life in the present and in the future – such as, for example, the highest frequency of heat waves or extreme drought phenomena - in the Iberian Peninsula.

Furthermore, this greater involvement of universities and polytechnic institutes in democratic processes of public choice is fully aligned with the social and environmental responsibility that populations, in general, are depositing in these entities. Such responsibility will justify a public and private financing model of the higher education sector based on the economic, social and environmental impact of its scientific, technological, educational, artistic and sporting products.

This more active role played by such sector in the search for solutions to respond to these societal challenges, in close liaison with policymakers and economic agents, will be a clear demonstration of the virtue of devolution and decentralization. Citing Bresser-Pereira (2004):

> *In synthesis, decentralization–delegating authority to lower levels–is crucial to managerial public administration. Decentralization is a public management strategy, but devolution is a political decision with managerial consequences. Decentralization is often decided top-down and is a strategy for increasing the head-offices' capacity to achieve proposed objectives, but devolution is usually a response to demands for more local or regional autonomy to which government officials in the central government reluctantly accede*.

Taking a systemic approach, we argue that territorial governance and sustainable management of integrated agroforestry chain value – from agricultural and forestry activities to the transformation of commodities and the distribution of their products by the international markets - might contribute to the decarbonizing of economy, the increase of renewable resources use, employment creation and in overall the development of territory (Ferreiro, Sousa, & Oliveira, 2015).

These goals integrated the EU 2020 Strategy and its "three mutually reinforcing priorities": i) "smart growth: developing an economy based on knowledge and innovation"; ii) "sustainable growth: promoting a more resource efficient, greener and more competitive

economy"; iii) "inclusive growth: fostering a high-employment economy delivering social and territorial cohesion" (COM (2010) 2020).

3. FINAL CONCLUSION

From previous discussion it is therefore possible to infer that governments (from local to international scales, including multi-tier negotiation) must interact with society in general - particularly with higher education institutions which should analyse rigorously all alternatives, assessing the respective 'trade-offs' - through a democratic and inclusive debate, empowering the riverside populations.

In a systematized manner, as addressed by Oliveira & Turčinková (2019) and Oliveira & Natário (2016), largely inspired in a previous and exhaustive empirical research (Oliveira, 2013), a robust strategy of collective efficiency for Tagus River watershed shall be based on:

- Systematic dialogue within business associations to raise members' awareness about rapid changes in markets and the potential added value by using digital technologies, in partnership with higher education institutions and research centres (through advanced graduation and applied investigation). Such organizational and institutional proximity may induce optimized technological choices and effective management decisions in a business environment characterized by a great deal of uncertainty, worsened by dramatic climate changes and political tensions at global scale.

- Reinforcement of tax incentives to companies that reinvest profits in experimental development through projects in cooperation with producers' organizations, public units of R&D and higher education institutions located in the region. This will help to internalize the market failures inherent to the 'spillovers' of knowledge originated in the scientific and technological system under the umbrella of Europe 2030 Agenda for Sustainable Development and the *Millenium Develoment Goals* of United Nations[7].

[7] See the 2030 Agenda for Sustainable Development Declaration, signed in 2015, at: https://sustainabledevelopment.un.org/post2015/transformingourworld (last access on March, 31 2019).

- Promotion of communication actions amid students at secondary and recurrent education levels programming visits to industrial and agricultural units of production, motivating them for future professional careers linked to the rural economy – particularly in information systems and agronomic engineering. Such action may count with the sponsorship of associations of farmers and industrial companies inserted in the agro-forestry value chain.

In a final word, devolution, transparency and balanced process of negotiation open to all stakeholders - triggering creativity, entrepreneurship, spirit of citizenship and long term view regarding to well-being of future generations - shall lead the region of the Tagus River watershed to a strategy of collective efficiency of respective hydric resources, maximizing the quality of life of those who born, grow, work and live in this vast Iberian territory.

4. REFERENCES

Araújo, R. S., Alves, M., Melo, T. C., Chrispim, Z., Mendes, P., & Júnior, G. S. (2015). Water resource management: A comparative evaluation of Brazil, Rio de Janeiro, the European Union, and Portugal. *Science of the Total Environment, 511*, pp. 815-828.

Bresser-Pereira, L. C. (2004). *Democracy and Public Management Reform: Building the Republican State.* Oxford Scholarship Online. Retrieved from: https://www.tandfonline.com/doi/abs/10.1080/10967490601185773

Climate Technology Centre & Network. (2019). *General agro-forestry-silviculture and mixed farming solutions*. From https://www.ctc-n.org/technology-library/agriculture-and-forestry/agro-forestry-silviculture-mixed-farming/general-agro

Entidade Regional de Turismo do Alentejo/Ribatejo. (2014). *Roteiros Enogastronómicos: Da terra à mesa - RIBATEJO.* Beja: Turismo do Alentejo, ERT.

European Commission/Eurostat. (2018). *Regions in the European Union: Nomenclature of territorial units for statistics - NUTS 2016/EU-28.* Luxembourg: Publications Office of the European Union.

Ferreiro, M. F.., Sousa, C., & Oliveira, P. (2015, July 16-18). Governance and Innovation in Rural Territories: a network analysis. *Proceedings of the VI Congress of Rural Studies*, pp. 1-20. From http://hdl.handle.net/10400.15/1386

Instituto Nacional de Estatística/Portugal Statistics. (2015). *NUTS 2013: As novas unidades territoriais para fins estatísticos* . Lisboa.

Natário, M. M., & Oliveira, P. M. (2018). Portuguese SME Innovation Sources: Trends of the Last Decade. *2018 Proceedings, 29*, pp. 1-16. From https://aisel.aisnet.org/capsi2018/29

Oliveira, P. (2013). *A influência do meio local nas dinâmicas de inovação do complexo agroalimentar do Vale do Tejo: análise e formulação de estratégias territoriais de ação coletiva.* Doctoral thesis, ISCTE-IUL, Lisbon (Portugal). Retrieved from http://hdl.handle.net/10071/6378

Oliveira, P. M., & Natário, M. M. (2016). Territorial Innovation Systems and Strategies of Collective Efficiency: The Case of Tagus Valley Agro-food Complex. *European Journal of Innovation Management, 19*(3), 362-382. Retrieved from https://doi.org/10.1108/EJIM-07-2014-0072

Oliveira, P., & Turčinková, J. (2019). Human Capital, Innovation and Internationalization of Micro and Small Enterprises in Rural Territory - A Case Study. *Acta Universitatis Agriculturae et Silviculturae, 67*(2).

Schmitz, H. (1995). Collective efficiency: Growth path for small-scale industry. *The Journal of Development Studies, 31*(4), pp. 529-566. Retrieved from: https://www.tandfonline.com/doi/abs/10.1080/00220389508422377

United Nations. (2012). *Governance and development. Thematic think piece.* United Nations System Taks Team on the Post 2015 UN Development Agenda.

Yin, R. K. (2014). *Case study research: Design and methods.* Thousand Oaks, CA: Sage.

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