

Towards a More Territorial Analysis Approach Deepening in the Stakeholders' Discourses of Three Multi-Functional Southern European Irrigated Systems

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Abstract

The management of irrigation has become the protagonist in a debate where society questions their own socioeconomic, environmental, and cultural limits while emphasizing its multi-functional role. This article maps the interaction between irrigation multi-functionality and territorial management in Southern Europe (Spain, France, and Italy) in order to: 1) promote a discussion about the future of multi-functional irrigated systems, 2) provide the basis for a territorial management of irrigation systems from the inclusion of civil society into decision-making processes, 3) justify the ability to propose an agreement between competing water uses and key stakeholders, 4) determine the profile of the involved stakeholders regarding their discourses, and 5) elucidate some strategies and actions for improving good governance. The obtained results show the diversity of competing water discourses defined for each irrigation system, the ability or not for managing the differences between stakeholders demands, and provide some strategies for improving good governance.

Keywords: Irrigated systems, multi-functionality, stakeholder, participation, governance, territorial management, Southern Europe

1. Introduction

Farming systems are facing a combination of challenges posed by irregular production levels, fluctuating input and output prices, and growing concerns over the impact of agricultural activities on the environment (Le Gal et al., 2011). As a fundamental element for the development of society, water is at the centre of economic, environmental, political and social debate (Bues and Theesfeld, 2012). The ongoing debate from scientific, political, and social demands is focused on the availability and management of water resources, the food production and security, and the intensified demands for environmental protection of the commons (Strzepek and Boehlert, 2010). In previous decades and progressively, these issues becoming a part of the discourses and perceptions related to the development of the territory (Namara et al., 2010). That is, both the interest in environment conservation and the concern for the good environmental status of water resources have grown in a similar way as other areas of European policy in becoming relevant factors in agricultural dynamics (Rawat, 2014). In parallel, concerns about water scarcity and management have focused attention on the agricultural use of water and irrigation, which represents the largest worldwide sector that uses water, and is widely seen as a low-value, wasteful and ‘‘inefficient’’ use of water, especially in arid regions with competing water uses (Giannoccaro et al., 2013). In a context where climate change directly affects availability in terms of the quantity and quality of natural resources, these concerns and society’s perception of the sector have resulted in making irrigation and its management the protagonists in a debate where a part of society questions their socioeconomic outcomes, their environmental impacts and their influence on rural development (Iglesias et al., 2011). According to Pahl-Wostl and Kranz (2010), irrigation has to adapt to a changing world in which many of the factors that have traditionally driven its development –food production, population settlement, and rural development– are still valid (Godfray et al., 2010). Others authors believe that society must find a balance between new social demands from potential impacts on ecosystems and the social legitimacy of competing water demands (Dono et al., 2012). As a result, the actions and policies regarding water, agriculture, land and soil, rural development, biodiversity, heritage, or landscaping tend to be in conflict concerning the use of natural resources in space and time (Knox et al., 2012).

There is definitely a need for developing and promoting improved water governance in multi-functional irrigated systems, especially in view of increasing uncertainty in the availability of water resources as well as in terms of an integrated approach to the plurality of interests related to rural development (Folke, 2007). At the same time, increased attention needs to be paid to the considerable lack of scientific, methodological and technical knowledge needed to meet this challenge (Abernethy, 2010). The goals of this paper are to highlight: 1) the debate on irrigation management based on an analysis of its multi-functional role, 2) the proposal of a territorial management model of irrigation –defined as the social organisation of a territory as it relates to the availability and management of water resources, the confluence of conflicting and/or competing water uses and demands, and their ability or inability to establish agreements that minimize conflicts of interest–, and 3) identify and compare the confronted discourses from stakeholders demands on different multi-functional irrigated systems in order to provide new information about those motivations, attitudes, and values affecting the decision-making processes. The paper aims to contribute to the theoretical and empirical scholarly literature about multi-functional irrigated systems management. According to this, the article is divided into three parts. The first part presents the conceptualization of multi-functional agriculture and irrigation. The second part focuses on the bases of the territorial management of irrigation as a new and useful approach for addressing future challenges from stakeholders' interaction. Finally, the last part of this article presents and compares the discourses of three irrigated systems of Southern Europe from key stakeholders values, demands, proposals, and critiques that are associated with the development of irrigation.

2. The Multi-Functionality of Agriculture and Irrigation

Land-water nexus is essential for food production, rural development, landscape conservation, and environment preservation. That is, a duality exists between the generation of private goods and public functions (Randall, 2002). In this sense, multi-functional agriculture produces goods both private (i.e. food, raw materials, and tourism) and public, which are divided into social concerns (i.e., the viability of disadvantaged rural areas, combating rural depopulation, and protecting cultural and heritage values) and environmental (i.e., the protection of landscapes, the promotion of biodiversity, and the reduction of soil erosion (Potter and Tilzey, 2005).

2.1 The Concept: between Definitions and Interpretations

The conceptualisation of multi-functionality is understood within the social and ecological dimensions of farming activity and it differs at the country level, among scientific disciplines, and within the framework of its application. Common goods, agricultural heritage, rural employment, food security, and environmental services are just some examples of concepts linked to their definition (Morgan et al., 2010). Even with the diversity of approaches that encompass the multi-functional character of agriculture, this concept expands into three competing dimensions. First, there is the dimension related to organic food production, the promotion of local products, and the limitation of intermediaries in food distribution systems. Secondly, there is the dimension concerning the conventional relationship between farming and rural areas, a concept which is extended to activities related to rural tourism (Nilsson, 2002), and others that focus on landscape and heritage management as a core value within the rural matrix (Garrod et al., 2006). Finally, multi-functionality is the dimension related to mitigating the environmental impacts of agricultural practices on rural capital (Brunstad et al., 2005).

However, this interpretation of agricultural multi-functionality is not accepted by authors such as Marsden and Sonnino (2008), who provide a social vision of agriculture, suggesting three complementary functions linked to farming: 1) the multi-activity associated with conventional agriculture, 2) the spatial regulation of the production-consumption matrix, and 3) multi-functionality as part of sustainable rural development. In the first case, the authors differentiate between the concept of multi-functionality and the concept of multi-activity in agriculture, where the latter is limited to combining the conventional agriculture practices with other activities promoted at the farm level (Fuller, 1990). In the second case, multi-functionality involves providing multiple functions associated with agriculture in order to satisfy the demands of those who use rural goods and services (i.e., protected areas, heritage, and the landscape). Finally, in the third case, multi-functionality is promoted as the ultimate mechanism for achieving a balance between food security and sovereignty, for protecting and managing natural resources, and for maintaining the population in rural areas as a strategic factor for land management. It should be noted that the concept of multi-functionality in agricultural practice first arrived on the international scene in 1992 in the framework of the Earth Summit held, within Rio de Janeiro.

According to Aumand et al. (2006), two approaches focus on the multi-functionality of agriculture: one from the supply side –diversified agricultural production– and the other in accordance with the European rules –which define a regulatory framework that includes agricultural social demands. Over time, a third interpretation of multi-functionality –from the disciplines of sociology and rural geography –was promoted to define a new model of agriculture that was territorially integrated and based on the local use of natural resources while recognising environmental demands as part of the decision-making process (Renting et al., 2003). As a result, the main policies at the European level which interact and/or affect the potential multi-functionality of agriculture will tend increasingly to adapt and integrate the traditional model of agriculture in order to meet the new demands for the integrated management of common goods, as well as for the participation of civil society in deciding issues that go beyond sectoral interests, as irrigation (Gomez-Limón et al., 2002).

2.2 The Controversy: between Productivism and Sustainability

Even with the apparent simplicity in describing the multi-functionality of agriculture, this concept generates some controversy. Authors like Dobbs and Pretty (2004) question the transposition of multi-functional attributes without references to the nature of the irrigated system; while others restrict the multi-functionality of agriculture to a transition from productivist agriculture to the more sustainable dimension of how to use natural resources like land and water. According to this, some authors insist on highlighting how irrigated agriculture is responsible for activities and/or attitudes that are not always favourable to the protection of land and aquatic ecosystems: the use (or abuse) of fertilizers and chemicals, overexploitation of aquifers, soil salinisation or loss of soil fertility are some of the effects of incorrect agricultural practices. Likewise, authors such as Cocklin et al. (2006) question whether it is appropriate to design multi-functionality purely in relation to trade liberalisation and the market valorisation of the commons. They emphasize the neoliberal philosophy that contributes to economic considerations of nature and the minimisation of socio-environmental sustainability. Following this argument, other authors believe that the focus on multi-functionality goes beyond the political spectrum and that it requires a balance between the three aspects of sustainability (social, economic and environmental), with an emphasis on sustainable agricultural practices at the farm and territory level. Some authors also recognise the failure to address economic aspects without focusing on the availability and management of natural resources. They also acknowledge that participation is a tool for knowing more about the social demands on agriculture and irrigation, that is, a way to interact with society. This forms the foundations of the criticism against the multi-functionality of agriculture, both at the tangible level –the quantity and quality of water resources, its contribution to food production, promoted environmental services, and mitigating the effects of climate change– and at the intangible level –structuring the landscape, protecting rural heritage, and promoting recreational activities (Khan and Mustaq, 2009).

3. Facing the Challenges of Irrigation: Bases for its Territorial Management

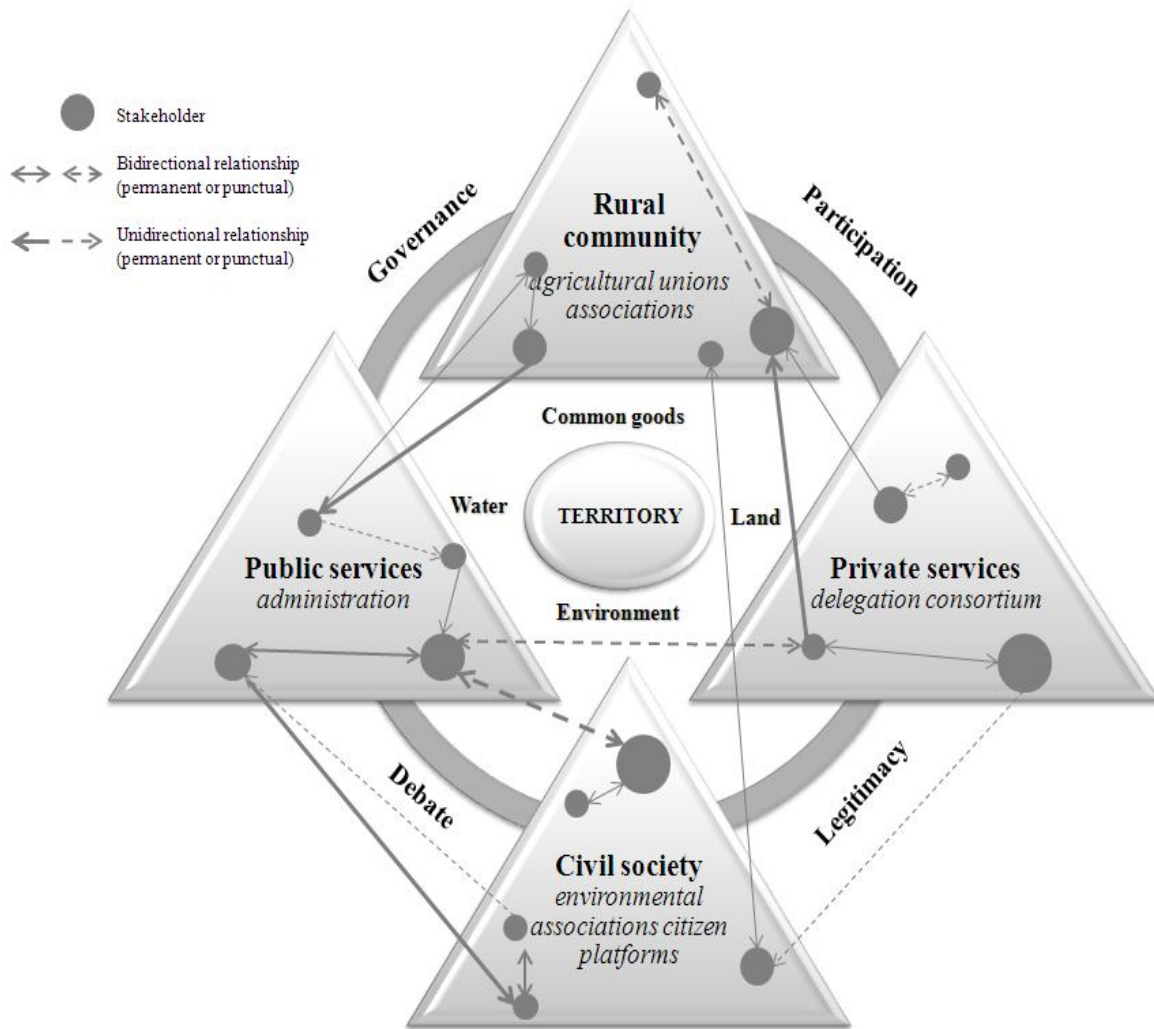
In recent years, most published studies conclude that –compared to those processes in which the inclusion of stakeholders is minimal–, there is a higher probability of success if management is based on collaborative initiatives with broad representation and inclusion of interests, attitudes and the opinions of those who are directly or indirectly affected (Bidwell and Ryan, 2006). The aim is to reaffirm the idea that, given the need to address the inherent complexity involved in managing natural resources, the decision-making processes should focus on the promotion of participation and the inclusion of society's demands (Rap and Wester, 2013). As a way to define the relationships between conflicting points of view, social networks are progressively gaining greater attention as tools for promoting the management of natural resources with an adaptive approach (Fish et al., 2010). Authors like Tompkins and Adger (2004) argue how these social networks can build and improve the resilience of a community and increase their ability to adapt to the environmental challenges.

3.1 When the Territory is the Protagonist

The analysis of territorial irrigation management focuses on what has been identified as the “geography of actors” or “social geography”, that is, the analysis of territorial structures resulting from the conflicting discourses between the diversity of stakeholders involved in managing a natural resource such as water and, by extension, its impact on the dynamics of irrigation (Bryson, 2004). Other authors such as Bodin and Crona (2009) have analysed the territory through the prism of “environmental geography”, i.e., the study of the interactions between nature and society under a dual purpose: understanding the social behaviours that affect the management of natural resources and understanding how the dynamic of the territory can interact with social demands.

In this context, the promotion of irrigation management with a territorial nature incorporates the social demands (represented by organized civil society platforms) into the traditional scheme of irrigation management, which is composed of public and private services in concert with the rural community. This new approach has to be able to adapt purposefully to the inherent complexity of the duality between natural resources and society, and in addition, the bases for a multi-functional nature of irrigated systems. With this approach, the modelling of the territorial management of irrigation aims –through space and time– to find commonality among all the conflicting discourses over an irrigated system. In addition, it aims to provide new knowledge regarding key, interacting issues for defining and promoting agreements among all the stakeholders, from 1) the identification and characterisation of each discourse expressed by the stakeholders involved in managing one irrigated system, to 2) the analysis of the affinity and/or conflicting relationships among them, to 3) their graphical representation in a dynamic matrix (Figure 1). This will consequently result in reconciling stereotypical views through, existing social learning, identifying latent and permanent disputes, promoting an action plan according to civil participation, and managing differences in a positive attitude (Kallis et al., 2006).

Figure 1: Social Network of the Territorial Management of Multi-Functional Irrigated Systems



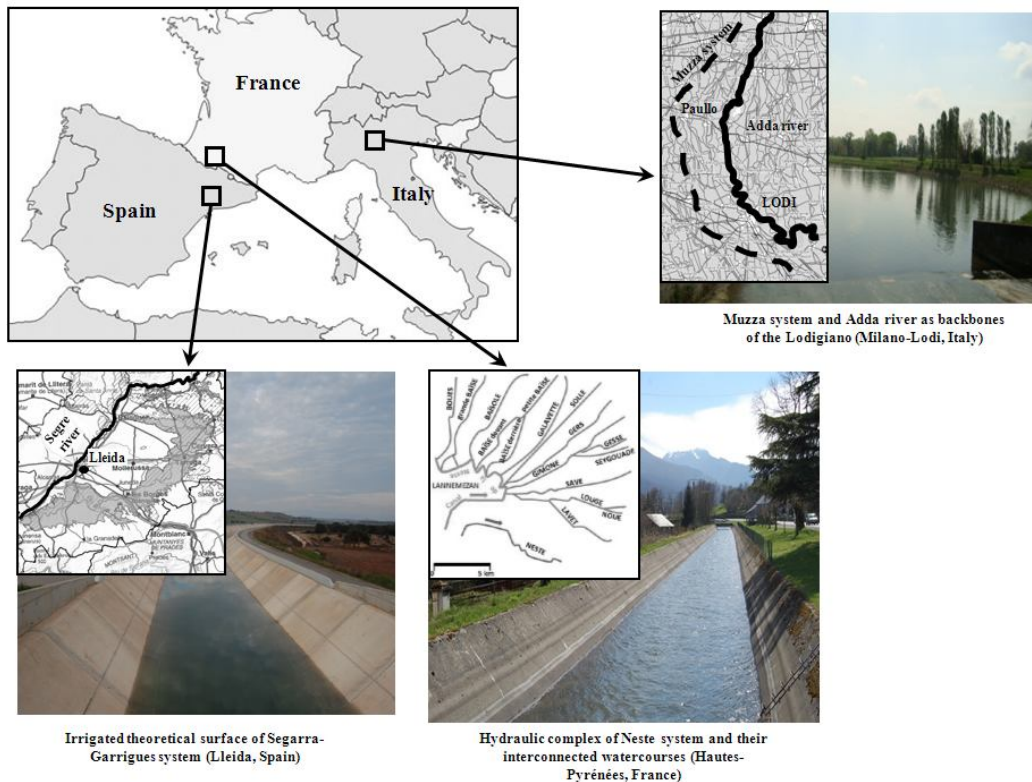
3.2 Data Collection and Methods

Identification of each of the conflicting interests and their categorization are key aspects in understanding the dynamics of the debate and/or conflict, as well as in fostering their mitigation and resolution. The increasing popularity of the Stakeholder analysis approach reflects the interest in analyzing stakeholder characteristics as a mechanism for influencing the decision-making process, especially in reference to those managing the commons, such as the territory.

The application of this approach has allowed us the identification of key stakeholders (from its representativeness at institutional, organisation, or platform level) in each multi-functional irrigated systems, the nature of their participation and their discourses and demands, and the willingness to establish a strategy that can minimize the uncertainty of a participatory process. The pre-selection of the stakeholders groups was carried out through an extensive literature review and an expert group meeting (Gallego-Ayala and Juárez, 2014). The aim was threefold: 1) identify the representative stakeholders in the management of an irrigated system, 2) define the basis of their discourse regarding the multi-functionality of the irrigated system, and 3) characterize their claims on the basis of the dominant stakeholder profile in order to identify their potential or existing links of affinity and/or confrontation. We adopted a semi-structured interview schedule that focused on factual information gathering, while giving stakeholders an opportunity to raise issues of their choosing and develop conversations about points which they thought particularly important (Carr et al., 2011). The face-to-face structured interviews were conducted between March and November of 2011 and March of 2013. Each interview was between one and three and a half hours in duration. Once the interviews were translated from Spanish, French, and Italian to English, the results were analysed using the software Atlas.ti[®] 7 to create a codification system that characterized the selected quotes from interviews and organized them into cognitive maps that represent the keywords of the discourses. A year later, each stakeholder received a questionnaire built by the Survio[®] Platform as a complement to the interview, in order to obtain structured information about confronted local perceptions, attitudes and preferences regarding the management of each multi-functional irrigated system. The questionnaire was organized into three sections: a) intrinsic characterization of the stakeholder and its involvement in the irrigated system; b) evaluation of the affinities and nonaffinities between competing demands; c) the ability to establish alliances to define an agreement that promotes or improves decision-making in the management of the irrigated system. A total of 16 questions are defined and each key stakeholder have to choose the answer from predefined options.

4. Empirical Analysis of three Southern Europe Irrigated Systems

Many Southern European countries have vast experience in the use of scarce and degraded natural resources, such as water and land (García-Ruiz et al., 2011). The European rural mosaic is based on a combination of traditional irrigated systems –areas with extensive agrarian dynamism– and modernised or new irrigation projects –that were promoted under the criteria of water efficiency and food security (Silva, 2012). Countries like Spain, France and Italy largely symbolise the domain of water resources in any economic activity that is able to structure the territory (Malorgio, 2008). In such contexts, hydraulic constructions have played a central role in the attempt to dominate water resources, where the agrarian plains have played a key role in developing irrigation (Ertsen, 2006). In consequence, the construction of dams and irrigated canals has placed the management of natural resources above all productive, rural development and demands for ecosystem conservation (Kaika, 2006). Two main factors justify the interest and representativeness of the three case studies selected. Firstly, by their matching factors: the cultural background of irrigation, the diversity of interests that are represented or not, the prioritization of certain water uses according to availability, and the intensity of citizen participation and/or mobilization. Secondly, by their particularities: an irrigation project recovered after 150 years of demands that must adapt to environmental requirements –the Segarra-Garrigues system; a centennial irrigated canal devoted to corn monoculture but with strong environmental pressure –the Neste system; and an irrigated canal with high multi-functionality that simulates the environmental functions of a river –the Muzza system. These three irrigated systems exemplify the dynamism of irrigation, albeit from differing perspectives (Figure 2): from the rejection of environmental issues to their inclusion on irrigated system; from institutional promotion of irrigation to private management of water uses; from competing demands to co-management of water uses; from examples of participation to their inclusion in the decision-making processes (Ricart et al., 2013). All these elements summarize the current and future debate taking place with varying intensity in each of the analysed irrigated systems. It also puts irrigation management in the spotlight concerning issues such as water availability and the cost of accessing and using natural resources, the prioritization of competing demands through time and space, food strategies at the regional and/or national level, and the environmental externalities generated by agricultural practices and their social recognition.

Figure 2: Location and Magnitude of the three Multi-Functional Irrigated Systems

4.1 The Segarra-Garrigues System

Conceived in the mid-nineteenth century and designed in the mid-1990s, its construction would not start until 2002. At 85 km in length from the Rialb reservoir to the L'Albagés Dam, this irrigated canal brings together a total of 70,150 hectares, affecting 73 municipalities across six counties: La Noguera, La Segarra, L'Urgell, Pla d'Urgell, Garrigues and Segrià. Its legitimacy was influenced by the debate on water availability and the priority of use, the economic viability of the infrastructure, an existing conflict of interests between irrigators and environmentalists –which motivated a significant reduction in the irrigated potential surface– and the social mobilisation around the water uses of the canal. The factor that differentiates this irrigated system from the other two irrigated systems is, precisely, the social mobilisation it has generated since its launch, which is remarkable in two respects. On the one hand, there is the environmental nature of the mobilisation, which was driven by conservational organisations and endorsed by the declaration of Special Protection Areas (for births). On the other hand, there is the social nature of the mobilisation, which is reflected in the signing of the Manifest de Vallbona, an agreement to defend the irrigated infrastructure as a tool for integrating the diversity of interests –productive, environmental and cultural– recognized by the Lleida society.

4.2 The Neste System

Opened in 1862, this 29 km navigation canal carries the water within the Neste system by gravity from the Neste River –a tributary of the Garonne River– to the Plateau de Lannemezan, near to the city of Sarrancolin. It is a hydraulic complex of seventeen rivers that are artificially interconnected in order to overcome periods of water shortage. When the canal was built its main purpose was navigation, irrigation was then only secondary. Irrigation remained mainly only a discourse in Gascony and the Garonne valley until the 1960s (a discourse with material effects since it justified the construction of dams and canals but farmers did not irrigate much). In addition to its agricultural function, this canal plays a strategic role in promoting environmental services, like ecological flow, and also in hydroelectric energy production (Ricart and Clarimont, 2013). Since its inception, this project has had a multi-functional use: navigation, drainage, irrigation, urban use (and with less intensity, hydroelectric power). The current debate regarding the Neste canal is about whether or not there is a need to build a reservoir in Charlas to increase the availability of water required by agricultural production in the area, and how this affect the environment and water resources availability.

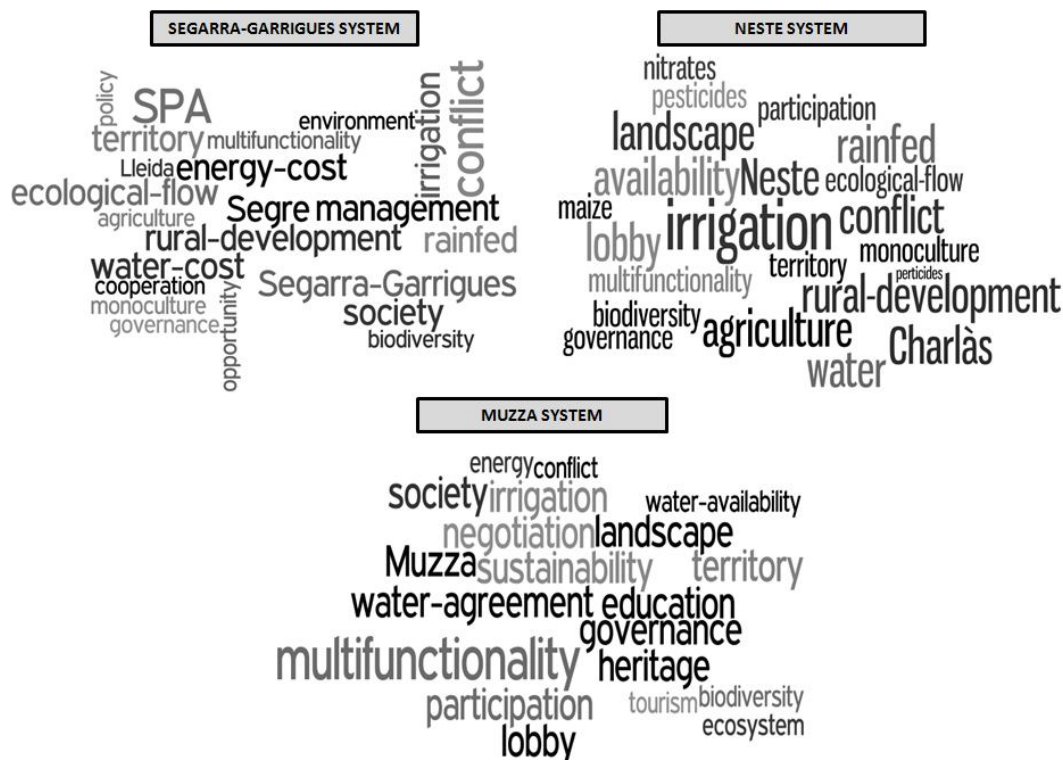
4.3 The Muzza System

Located in the heart of the Lombard plain, the Muzza canal is major work of hydraulic engineering that has shaped the Lodigiano territory. Designed in 1220 as a derivation of the Adda River near Paullo, this canal runs 61 miles through 69 municipalities and distributes water through four secondary canals. Promoted to improve agronomic conditions in the valley by draining groundwater and the modernisation of the traditional irrigated systems, both functions remain priorities with the passage of time but share the limelight with other economic functions –such as the production of hydropower and thermal energy– and with social services –such as area for recreation and environmental education. This multi-functionality will be managed from the integration of water demands and water users in a participatory framework structured by the Consorzio dell’Adda and the Consorzio Bonifica Muzza Bassa Lodigiana. With its role as mediator between the competing water uses in conflict, the first manages the priority of water use between irrigation demands and the hydroelectric power industry, while the second manages the priority of water use (consumptive or not) between all the water interests of the valley, depending on the needs of the territory and according to the season. Since 2003, both agencies have contributed to the proposition of the Patto per l’Acqua (Water agreement), signed in 2007 as a response to episodes of extreme drought occurred in the Lombardy plain.

5. Discourses Exposed by the Key Stakeholders in each Irrigated System

The discourses characterized in the three irrigated systems have revealed the conceptual diversity of the concerns that underlie the postulates of the key stakeholders (Figure 3). In this regard, the existing discourses in each multi-functional irrigated system agree on the importance of water for rural development and its key role in the future development of the agricultural practices. Being in the Muzza system, this recognition is more noticeable. The conceptual analysis also highlights the existing conflict between the stakeholders demands in the Segarra-Garrigues system as opposed to the participation issues that exists in the Neste and Muzza systems. This difference can be justified by the fact that the Segarra-Garrigues canal was built in the 21st century and this has made the environmental discourse more notorious (with the promotion of environmental platforms and associations) than in the other two irrigated systems. Both irrigated systems also share concerns about the pollution of soil and water, while in the Segarra-Garrigues interest in safeguarding the ecological flow of the Segre River becomes relevant.

Figure 3. Key Concepts in the Debate between Stakeholders of the three Irrigated Systems



The qualitative analysis of semi-structured interviews for each irrigated system has allowed us to define those key elements in the dominant discourses as quotations, that is, parts of speech that can summarize the issues that concern, interest and/or mobilize each key stakeholder.

5.1 The main Discourses Expressed by the Stakeholders from the Segarra-Garrigues System

The analysis of the Segarra-Garrigues system is based on the performance of the semi-structured interview and the digital questionnaire sent to a total of 17 key stakeholders from their representativeness and organized according to 4 interest groups: (1) public services (public administration, water agency, regional government); (2) private services (irrigation consortium, construction company); (3) rural community (syndicates and professional organizations); and (4) civil society (environmental, social and territorial platforms). The following quotes symbolize the topics that generate greater interest in the debate and conflict in the Segarra-Garrigues system:

“The Ebro basin is a basin with a very strong agri-food tradition where, since the last century, administrations have pushed for the agricultural and rural sector as a strategic factor in preventing depopulation and to respond to the demand for food security” [Confederación Hidrográfica del Ebro – public services]

“The fact that people do not adhere to irrigation because they cannot pay for water suggests that the canal is a political rather than territorial project” [Agència Catalana de l’Aigua – public services]

“A project like the Segarra-Garrigues canal, as all canals, was born as an irrigated infrastructure, but in reality it is a tool for rural development” [Departament d’Agricultura, Ramaderia, Pesca, Alimentació i Medi Natural i Subdirecció General d’Infraestructures Rurals, and Infraestructures de la Generalitat de Catalunya – public services]

“The prospect of irrigation is better than drought, but not a panacea” [Oficines Comarcals del DAAM and Oficina del Regant – public services]

“This is an entropic landscape... these crops and these plains, suitable for all steppe birds, really are products of farming” [Aigües del Segarra Garrigues S.A – private services]

“Water is culture, is industry, is food, is influence, is power... is everything. Water is a strategic element in our land where droughts abound” [Comunitat de Regants del Segarra-Garrigues – private services]

“Around the Segarra-Garrigues canal has been imposed a land bubble that moves many interests... If this canal were believed to benefit the territory, institutions would have provided more facilities to the potential of irrigation in order to adapt to this change” [Unió de Pagesos – rural community]

“The conflict has arisen between agricultural and environmental viewpoints. There has been no meeting to boost an agreement, not even the most minimal” [Associació Agrària de Joves Agricultors, Associació d’Empresaris Agraris de Lleida – rural community]

“The purpose of the canal was to settle people in the territory, and that is not happening” [Joves Agricultors i Ramaders de Catalunya – rural community]

“It is not imperative to stop irrigating a number of hectares to protect some birds that are already protected at the national level. The same birds that serve as an excuse to justify that we cannot irrigate with the Segarra-Garrigues canal are in the neighbouring Urgell canal...” [Institut Agrícola Català de Sant Isidre – rural community]

“It is true that the Segarra-Garrigues canal has been promoted in a context where the agricultural sector is more aged than ever, but it is also true that the people of the territory have not moved enough to defend its implementation” [Federació de Cooperatives Agràries Catalanes – rural community]

“We understand people... most of them have been waiting for water over one hundred and fifty years... but there has been no political will to explain to people that, unfortunately, the project cannot be completed and it is necessary to find alternatives for the agricultural activity” [Sociedad Española de Ornitología/BirdLife – civil society]

“What is not justified is that the Segarra-Garrigues canal promotes a model of agricultural production opposite to the availability of water resources” [Institució de Ponent per a la Conservació i l’Estudi de l’Entorn Natural – civil society]

“It would have been more logical to work with large areas of landscape to define the Special Protected Areas and distinguish those farmers who do not want water from those who do. However, the management of the situation has encouraged land speculation” [Institució per a l’Estudi, Gestió i Recuperació dels Ecosistemes Lleidatans – civil society]

“The Segarra-Garrigues canal is an opportunity for the country to propose a new model of rural development that incorporates environmental issues” [Lleida Ambiental – civil society]

“The Segarra-Garrigues canal was a recurring project in the collective imagination of the society... those who live here have embedded the project in genetics... Politicians leave and we remain” [Compromís per Lleida – civil society]

“The Segarra-Garrigues canal is a deception to the Lleida territory because it is an infrastructure that has arisen to justify transferring water to Barcelona... this is the only way to finance a project that would otherwise not be feasible” [Plataforma en Defensa de l’Ebre – civil society]

5.2 The Main Discourses Expressed by the Stakeholders from the Neste System

The analysis of the Neste system is based on the performance of the semi-structured interview and the digital questionnaire sent to a total of 10 representative stakeholders. The following quotes represent the topics of greater interest in the debate/conflict in the Neste system:

“In recent years the rational use of water in agriculture has been promoted by implementing best practices in gravitational irrigation, because we do not have a counterproposal capable of regulating the volume of water used” [Direction Départementale des Territoires Hautes-Pyrénées – public services]

“The AEAG financed works and techniques to modernize irrigation efficiency and imposes taxes on water consumed... we have a control role” [Agence de l’Eau Adour-Garonne – public services]

“The Neste system is a simple system where there is water available, [along with] socioeconomic demands and ecological flow... the hardest thing is to gather people around a table to discuss it” [Chambre Départementale d’Agriculture Hautes-Pyrénées – public services]

“Water availability is managed from the Neste Commission by bringing together representatives of the different uses of water, as an example of governance in the decision-making process” [Compagnie d’Aménagement des Coteaux de Gascogne – private services]

“Farmers have already accepted the existence of environmental factors that must be taken into account, and they are primarily interested in ensuring their implementation on farms” [Syndicat d’Irrigation des Coteaux de Gascogne – private services]

“In the Neste system the construction of water reservoirs is not considered to be negative, as they are considered useful for meeting the common demands of different water sectors” [Association Syndicale Agricole – private services]

“We agree to make technical and cultural improvements in order to include the environment in the production process, but the profitability of the farm cannot be impaired” [Fédération Départemental des Syndicats d’Exploitants Agricoles Hautes-Pyrénées – rural community]

“The discourse on global nutrition that the promoters of irrigation use is not valid when you are wasting tons of food and are unable to manage the distribution sector” [Confederation Paysanne Hautes-Pyrénées – rural community]

“There are people who want to irrigate and improve the profitability of their farm, but cannot do it because the environmental pressure is very strong and limits all options for irrigation” [Coordination Rurale Hautes-Pyrénées – rural community]

“For us, water is a common heritage while for both the agricultural sector and the energy sector it is just a business” [France Nature Environnement – civil society]

5.3 The Main Discourses Expressed by the Stakeholders from the Muzza system

The analysis of the Muzza system is based on the performance of the semi-structured interview and the digital questionnaire sent to a total of 15 representative stakeholders. The following quotes represent the topics that generate greater interest in the debate/conflict in the Muzza system.

“The system of lakes, rivers and irrigation canals in Lombardy is a model of connected reservoirs that we cannot lose... It is true that the infrastructure is old, but it is technically efficient and helps to maintain the good environmental status of natural resources” [Regione Lombardia, Ambiente – public services]

“Much of society considers agriculture to be responsible for soil pollution with nitrates, although nitrate pollution also has an urban character and it becomes difficult to separate the two origins” [Regione Lombardia, Territorio – public services]

“For many people, irrigators are those who consume and waste water instead of seeing the function of returning water to the soil, drainage management, and landscape conservation” [Regione Lombardia, Agricoltura – public services]

“In the case of the Muzza canal, it is true that the permeability of the canal makes it look more like a river and not an infrastructure that supports agriculture, and this facilitates their integration into the landscape” [Regione Lombardia, Sistemi Verdi e Paese – public services]

“The history of irrigation in Lombardy is inseparable from land management, and that helps us understand the Muzza canal as another element of the landscape” [Autorità di Bacino del Fiume Po – public services]

“In managing the Muzza canal, there will always be someone who does not have a global view about water resources and those who defend their interests above the common good” [Consorzio dell’Adda – private services]

“While the irrigators use water up to eight times before returning it to the ecosystem, the Lombardy Region is pursuing a policy that penalizes the use of water for agricultural purpose... this is not being serious” [Consorzio di Bonifica Muzza Bassa Lodigiana – private services]

“The Patto per l’Acqua (water agreement) was driven by the Lombardy Region in order to encourage different interests to sit at the negotiation table in times of water emergency: hydroelectric industries, municipalities, farmers, environmentalists, experts... A water agreement which did not serve to promote integrated water resource management because it was not binding” [Unione Regionale Bonifiche Irrigazioni e Miglioramenti Fondiari Lombardia – private services]

“It is very easy to promote environmental issues when the results are quantifiable... if not, everything remains at the level of good intentions” [ENEL – private services]

“The agricultural sector is not a lobby, although part of the environmental sector believes that agriculture is the source of all water problems” [Confederazione Generale dell’Agricoltura Italiana Lombardia – rural community]

“In Lombardy, water management has always been considered a cultural heritage of agricultural practices” [Confederazione Nazionale Coldiretti Lombardia – rural community]

“The agricultural sector has evolved in a clear and compelling way to incorporate environmental issues into traditional practices, but it is obvious that EU policies emphasize these aspects, and this has implications for the sector’s viability [Confederazione Italiana Agricoltura Lombardia – rural community]

“The main problem of the water management model at the national level is the diversity of involved stakeholders who have some type of responsibility” [WWF Lombardia – civil society]

“For politics at the national level, water is not a relevant issue... we did not observe concern for water resources at the quantitative or qualitative level” [Legambiente Lombardia – civil society]

“At the political level, there is no debate about agricultural water. On the contrary, silence on the issue of irrigation dominates, and that means that each interest intensifies its water demand without an integrated water management approach” [Forum Italiano dei Movimenti per l’Acqua Pubblica – civil society]

5.4 Comparative Analysis of the Discourses Expressed in each Irrigated System

In parallel to the analysis of the citations taken from the semi-structured interviews, the analysis of the responses obtained through the questionnaire allowed us to set the basis of the discourses from each stakeholder group: public services, private services, the rural community, and civil society (Tables 1-4). This allows comparing the degree of affinity and/or confrontation between different stakeholders and identifying of those patterns favourable to an agreement between competing water uses.

Table 1: Comparing the Obtained Results from Public Services Stakeholders Group

Public services	Segarra-Garrigues system	Neste system	Muzza system
Your inclusion on the irrigation canal management is...	Complementary	Necessary Complementary	Necessary Essential
Do you feel represented in the canal?	Yes	Yes	Yes
What is the feeling of (not) being represented?	Be part of the decision-making process	Be part of the decision-making process	Be part of the decision-making process Be influential
What level of representation do you have?	High level	Medium level Sufficient level	High level Medium level
What is the reason that explains your (lack of) representation?	Institutional recognition	Stakeholder recognition Expertise recognition	Institutional recognition
What is your assessment of the other stakeholders?	Essential Necessary	Necessary Essential	Necessary Essential
Rating received by stakeholders (1-5)	2,9	2,7	3,2
Are you looking for an agreement?	Yes	No	Yes
What factors make the agreement possible?	Compatible discourses Fluid negotiation	Favourable political strategy	Fluid negotiation
What kind of agreement?	Permanent	By subject	By subject Punctual
Types of relationships	Bidirectional	Unidirectional	Unidirectional
What factors can benefit the agreement?	Predisposition to collaborate Mutual recognition Ability to listen Fluid negotiation Midterm synergies	Mutual recognition Ability to listen Predisposition to collaborate Midterm synergies	Institutional recognition Predisposition to collaborate
Do you have influence?	Yes	Yes	Yes

Table 2: Comparing the Obtained Results from Private Services Stakeholders Group

Private services	Segarra-Garrigues system	Neste system	Muzza system
Your inclusion on the irrigation canal management is...	Essential	Necessary	Essential
Do you feel represented in the canal?	Yes	Yes	Yes
What is the feeling of (not) being represented?	Be part of the decision-making process	Be part of the decision-making process	Be a leader
What level of representation do you have?	High level	High level Minimum level	High level Sufficient level
What is the reason that explains your (lack of) representation?	Social recognition	Stakeholder recognition Institutional recognition	Institutional recognition Stakeholder
What is your assessment of the other stakeholders?	Necessary Essential	Essential Necessary	Essential Necessary
Rating received by stakeholders (1-5)	2,9	2,8	2,9
Are you looking for an agreement?	Yes	No	Yes
What factors make the agreement possible?	Fluid negotiation	Favourable political strategy	Compatible discourses Fluid negotiation
What kind of agreement?	Permanent	By subject	By subject
Types of relationships	Unidirectional	Unidirectional	Unidirectional
What factors can benefit the agreement?	Fluid negotiation Predisposition to collaborate Midterm synergies	Ability to listen Ability to understand the others Midterm synergies	Midterm synergies Mutual recognition Fluid negotiation
Do you have influence?	Yes	Yes	Yes

Table 3: Comparing the Obtained Results from the Rural Community Stakeholders Group

Rural community	Segarra-Garrigues system	Neste system	Muzza system
Your inclusion on the irrigation canal management is...	Necessary	Necessary	Essential
Do you feel represented in the canal?	No	No	Yes
What is the feeling of (not) being represented?	Non recognition as stakeholder	Not be part of decision-making process	Being influential
What level of representation do you have?	No representation	No representation	High level Medium level
What is the reason that explains your (lack of) representation?	Lack of political interest	Environmental pressure	Stakeholder recognition
What is your assessment of the other stakeholders?	Necessary Complementary	Necessary Complementary	Complementary
Rating received by stakeholders (1-5)	2,5	1,7	2,4
Are you looking for an agreement?	Yes	No	Yes
What factors make the agreement possible?	Compatible discourses Fluid negotiation	Mutual recognition between stakeholders	Compatible discourses Political strategy
What kind of agreement?	Permanent	Permanent	By subject Permanent
Types of relationships	Bidirectional	Unidirectional	Unidirectional
What factors can benefit the agreement?	Predisposition to collaborate Ability to understand the others Mutual recognition	Midterm synergies Predisposition to collaborate	Midterm synergies Mutual recognition
Do you have influence?	No	Yes	Yes

Table 4: Comparing the Obtained Results from Civil Society Stakeholders Group

Civil society	Segarra-Garrigues system	Neste system	Muzza system
Your inclusion on the irrigation canal management is...	Essential Necessary	Necessary	Essential Complementary
Do you feel represented in the canal?	No	No	No
What is the feeling of (not) being represented?	Non recognition as stakeholder	Non recognition as stakeholder	Non recognition as stakeholder
What level of representation do you have?	Minimum level	Medium level	Sufficient level
What is the reason that explains your (lack of) representation?	Lack of institutional recognition	Lack of institutional recognition	Lack of institutional recognition
What is your assessment of the other stakeholders?	Complementary Necessary	Dispensable Necessary	Dispensable Complementary
Rating received by stakeholders (1-5)	2,4	2	2,3
Are you looking for an agreement?	Yes	Yes/No	No
What factors make the agreement possible?	Compatible discourses Fluid negotiation Political strategy	Compatible discourses	Mutual recognition between stakeholders
What kind of agreement?	Permanent	By subject Punctual	Punctual
Types of relationships	Unidirectional	Unidirectional	Unidirectional
What factors can benefit the agreement?	Mutual recognition Predisposition to collaborate Ability to listen Ability to understand the others Midterm synergies	Mutual recognition Ability to listen Midterm synergies	Ability to understand the others Predisposition to collaborate Midterm synergies
Do you have influence?	Yes	Yes	No

The compared results obtained from the questionnaires reveal a prioritization for including the civil society stakeholder group in the decision-making process in order to analyse irrigation challenges. In this sense, both public and private services are considered to be represented in the management model of each irrigation system, while part of the rural community and the entire civil society are considered to be out of the decision-making processes. Regarding to the factors that explain the presence or lack of representativeness of each stakeholder group, these include weak recognition from institutional agencies and environmental platforms. Regarding the potentiality of an agreement between confronted stakeholders, the public services of the three irrigation systems positively appreciate and recognise the necessity to include all the stakeholders groups into the decision process as a mechanism for improving the collaboration between them. Meanwhile, the private services of the different irrigation systems coincide in receiving the recognition their tasks as they were public services, and they agree on the need to define medium-term strategies between the existing confronted discourses into the canal. A comparison between the behaviour of the rural community of each case study has to differentiate between their lack of representation in the management of the Segarra-Garrigues and Neste irrigation systems and their recognition in the management of the Muzza system, in which they have influence and/or the ability to apply pressure in the decision-making processes. All three groups of stakeholders agree that the predisposition to cooperate is among the favourable factors for an agreement, although two of them hold a privileged position of influence that conditions how they are perceived by the others. Finally, civil society justifies the lack of prioritizing agreements with other parties for two reasons: first, because there is no political guarantee that they will be recognized as interlocutors; and second, because other groups of stakeholders do not consider them to be necessary stakeholders. On the contrary, they are considered complementary or irrelevant. Both aspects determine their position regarding the possibility of an agreement.

6. Discussion and Conclusions

The analysis of the dynamics of irrigation development is inherent to managing the territory, which is in itself complex. This requires taking into account the availability of natural resources, the interpretation of changing demands of those who live from, benefit from, and/or enjoy it, as well as the existing and potential conflicts that arise between consumptive and non consumptive water uses. The aim of this research was to provide new knowledge about the stakeholder attitudes toward irrigation management and, more specifically, the competing demands and challenges related to multi-functional irrigated systems. In this sense, one of the key aspects of this research has been the participation of the main stakeholders involved in the debates and/or conflicts that revolve around the functions and the management of three Southern European irrigated systems. Consequently, this study has focused on stakeholder attitudes towards and preferences for irrigation management in an agricultural area dominated by competing water uses and demands. The three irrigated systems presented in this paper framed much of the concerns, speeches and overlapping demands and can be extended to Southern European contexts. Their comparison has begun from contrasting the attitudes, demands, criticisms, affinities, and ultimately the discourses defended by the diversity of selected stakeholders. Despite not sharing origins or evolutionary aspects, the three irrigation systems agree on a narrow set of related topics. Thus, common factors among most of the stakeholders involved in managing irrigation systems are: the role of irrigation as a creator and manager of landscape and territory; the concept of water as a strategic factor of rural development, and the need to establish agreements beyond periods of water scarcity. That is, the three irrigated systems face similar challenges: to legitimize their multi-functionality as much as their development, to become essential in the development of the territory. In this sense, the research results have shown that, if stakeholders do not feel adequately represented or engaged in a real analysis of alternatives, decision-making leads to controversy, and the resulting proposals will generate strong opposition that will simply translate to the infeasibility of the project itself. In order to minimize the potential risk of a conflict between competing water uses, some strategies can motivate the evolution toward a territorial management of multi-functional irrigated systems: Encourage the recognition of others (civil society) by assessing and validating their interests and overcoming preconceived images; Analyze the public-private services link in the irrigation management model to delineate the boundary between private and public interests; Conceive discussion spaces to responsibly engage discourses rather than representativeness. That is, promote tools that minimize selfishness and encourage the passage of “I want” to “we want”, as well as to “what do they want”; Manage the medium- and long-term decisions, because the constraints and current problems do not involve major challenges and complexities in the future; or Provide knowledge from technocracy and sociocracy; that is, data, discourses, and agreements are based on technical and social validation.

References

- Abernethy, C.L. 2010. Governance of irrigation systems: Does history offer lessons for today? *Irrigation and Drainage*, 59, 31-39.
- Aumand, A., Barthélemy, D., Caron, P., Hadynska, A., Hadynska, J., & Hediger, W. 2006. Definitions, references and interpretations of the concept of multifunctionality in France. *European Series on Multifunctionality*, 10, 5-39.
- Bidwell, R. D., & Ryan, C.M. 2006. Collaborative partnership design: The implications of organizational affiliation for watershed partnerships. *Society and Natural Resources*, 19(9), 827-843.
- Bodin, Ö., & Crona, B. I. 2009. The role of social networks in natural resource governance: What relational patterns make a difference? *Global Environmental Change*, 19, 366-374.
- Brunstad, R.J., Gaasland, I., & Vardal, E. 2005. Multifunctionality of agriculture: an inquiry into the complementary between landscape preservation and food security. *European Review of Agricultural Economics*, 32(4), 469-488.
- Bryson, J. M. 2004. What to do when stakeholders matter. *Stakeholder identification and analysis techniques*. *Public Management Reviews*, 6(1), 21-53.
- Bues, A., & Theesfeld, I. 2012. Water grabbing and the role of power: Shifting water governance in the light of agricultural foreign direct investment. *Water Alternatives*, 5(2), 266-283.
- Carr, G., Potter, R. B., & Nortcliff, S. 2011. Water reuse for irrigation in Jordan: Perceptions of water quality among farmers. *Agricultural Water Management*, 98, 847-854.
- Cocklin, C., Dibden, J., & Mautner, N. 2006. From market to multifunctionality? Land stewardship in Australia. *The Geographic Journal*, 172(3), 197-205.
- Dobbs, T. L., & Pretty, J. N. 2004. Agri-Environmental stewardship schemes and “multifunctionality”. *Review of Agricultural Economics*, 26(2), 220-237.
- Dono, G., Giraldo, L., & Severini, S. 2012. The cost of irrigation water delivery: An attempt to reconcile the concepts of cost and efficiency. *Water Resources Management*, 26, 1865-1877.
- Ertsen, M. W. 2006. Colonial irrigation: Myths of emptiness. *Landscape Research*, 31(2), 146-167.
- Fish, R. D., Ioris, A., & Watson, N. M. 2010. Integrating water and agricultural management: collaborative governance for a complex policy problem. *Science of the Total Environment*, 408, 5623-5630.
- Folke, C. 2007. Social-ecological systems and adaptive governance of the commons. *Ecological Research*, 11(1), 14-15.
- Fuller, A. M. 1990. From part-time farming to pluriactivity: A decade of change in rural Europe. *Journal of Rural Studies*, 6(4), 361-373.
- Gallego-Ayala, J., & Juárez, D. 2014. Integrating stakeholders' preferences into water resources management planning in the Incomati River Basin. *Water Resources Management*, 28, 527-540.
- Garcia-Ruiz, J. M., López-Moreno, J. I., Vicente-Serrano, S. M., Beguería, S. 2011. Mediterranean water resources in a global change scenario. *Earth-Science Reviews*, 105, 121-139.
- Garrod, B., Wornell, R., & Youell, R. 2006. Re-conceptualising rural resources as countryside capital: The case of rural tourism. *Journal of Rural Studies*, 22, 177-128.
- Giannoccaro, G., Pedraza, V., & Berbel, J. 2013. Analysis of Stakeholders' attitudes towards water markets in Southern Spain. *Water*, 5, 1517-1532.
- Godfray, H. C. J., Beddington, J. R., Crute, I. R., et al. 2010. Food security: the challenge of feeding 9 billion people. *Science*, 327, 812-818.
- Gómez-Limón, J. A., Arriaza, M., & Berbel, J. 2002. Conflicting implementation of agricultural and water policies in irrigated areas in the EU. *Journal of Agricultural Economics*, 53(2), 259-281.
- Iglesias, A., Garrote, L., Diz, A., Schlickerrieder, J., Martín-Carrasco, F. 2011. Re-thinking water policy priorities in the Mediterranean region in view of climate change. *Environmental Science & Policy*, 14, 744-757.
- Kaika, M. 2006. Dams as Symbols of Modernization: the Urbanization of Nature Between Geographical Imagination and Materiality. *Annals, Association of American Geographers*, 96, 276-301.
- Kallis, G., Videira, N., Antunes, P., Pereira, A. G., Spash, C. L., Coccossis, H., et al. 2006. Participatory methods for water resources planning. *Environment and Planning C: Government and Policy*, 24, 215-234.
- Khan, S., & Mushtaq, S. 2009. Regional partnerships to assist public-private investments in irrigation system. *Agricultural Water Management*, 96, 839-846.

- Knox, J. W., Kay, M. G., & Weatherhead, K. E. 2012. Water regulation, crop production, and agricultural water management: Understanding farmer perspectives on irrigation efficiency. *Agricultural Water Management*, 108, 3-8.
- Le Gal, P. Y., Dugué, P., Faure, G., Novak, S. 2011. How does research address the design of innovative agricultural production systems at the farm level? A review. *Agricultural Systems*, 104, 714-728.
- Malorgio, G. 2008. L'agriculture, l'agroalimentaire, la pêche et le développement rural en Italie. *Options méditerranéennes*, 61, 265-293.
- Marsden, T., & Sonnino, R. 2008. Rural development and the regional State: denying multifunctional agriculture in UK. *Journal of Rural Studies*, 24, 422-431.
- Morgan, S. Ll., Marsden, T., Miele, M., & Morley, A. 2010. Agricultural multifunctionality and farmers' entrepreneurial skills: A study of Tuscan and Welsh farmers. *Journal of Rural Studies*, 26, 116-129.
- Namara, R. E., Hanjra, M. A., Castillo, G. E., Ravnborg, H. M., Smith, L., Van Koppen, B. 2010. Agricultural water management and poverty linkages. *Agricultural Water Management*, 97, 520-527.
- Nilsson, P. A. 2002. Staying on farms. An ideological background. *Annals of Tourism Research*, 29(1), 7-24.
- Pahl-Wostl, C., & Kranz, N. 2010. Water governance in times of change. *Environmental Science & Policy*, 13, 567-570.
- Potter, C., & Tilzey, M. 2005. Agricultural policy discourses in the European post-Fordist transition: neoliberalism, neomercantilism and multifunctionality. *Progress in Human Geography*, 29(5), 581-600.
- Randall, A. 2002. Valuing the outputs of multifunctional agriculture. *European Review of Agricultural Economics*, 29(3), 289-307.
- Rap, E., & Wester, P. 2013. The practices and politics of making policy: Irrigation management transfer in Mexico. *Water Alternatives*, 6(3), 506-531.
- Rawat, M. S. 2014. Integrated watershed management: An alternative approach for sustainable development in Nagaland. *Journal of Agriculture & Life Sciences*, 1 (1).
- Renting, H., Marsden, T. K., & Banks, J. 2003. Understanding alternative food networks: exploring the role of short food supply chains in rural development. *Environment and Planning A*, 35(3), 393-411.
- Ricart, S., & Clarimont, S. 2013. De la gouvernance appliquée à la gestion de l'irrigation: le cas du canal de la Neste (Hautes-Pyrénées). *Sud-Ouest Européen*, 35, 69-84.
- Ricart, S., Ribas, A., & Pavón, D. 2013. La participación en la gestión del regadío como mecanismo para afrontar el conflicto territorial: algunos ejemplos de ámbito sur-europeo. *Mediterránea*, 120, 73-86.
- Silva, R. 2012. Claves para la recuperación de los regadíos tradicionales. Nuevos contextos y funciones territoriales para viejas agriculturas. *Scripta Nova. Revista Electrónica de Geografía y Ciencias Sociales*, 16 (412).
- Strzepek, K., & Boehlert, B. 2010. Competition for water for the food system. *Philosophical Transactions of the Royal Society Biological Sciences*, 365, 2927-2940.
- Tompkins, E. L., & Adger, N. W. 2004. Does adaptive management of natural resources enhance resilience to climatic change?. *Ecology and Society*, 9(2), 10.