

# PRESERVATION OF THE HYDRAULIC HERITAGE IN LANDSCAPES UNDER PERMANENT WATER STRESS: NEW APPROACH TO UTILITY AND SUSTAINABILITY CRITERIA

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## ABSTRACT

The purpose of this paper is to examine the legal sources that allow the organization of the space in areas of water scarcity and affected by weather variations in the Mediterranean basin, offering a comparative and comprehensive analysis of the legal criteria widespread under influence for the eastern part of the Mediterranean. The study approaches the subject from a legal historical perspective, reference to the rules applied in different environments and divisive uses from the legal vestiges preserved as memorial sites, legal sources and customs. A map of sources governed by criteria of the usefulness, sustainability and general consensus. These are all factors key for the coordinated approach in the establishment of a network of hydraulic structures and gadgets in the urban and rural landscape. This lecture makes its own thoughtful contribution to an important ongoing debate to the water protection and management safeguarding hydraulic heritage. In conclusion, the analysis considers specific current situations, policies and institutions that provide solutions to daily problems in public and private spaces combining modernization that are considered such proposals for the future of water management.

*Keywords: water, distribution, sustainability, heritage, tradition, law, al-Andalus.*

## 1 INTRODUCTION

Over the centuries, the territories in which the irrigation techniques of eastern origin were applied – and more precisely as Islam expanded across the Mediterranean – also became recipients of a water law with its own characteristics. Based on its particular structure and hierarchy, Islamic law addresses the right to water use in a transversal manner, at least in what regards the *mu'āmalāt* or Islamic jurisprudence, related to acts involving interaction and exchange among people. The commitment of users, both at the level of consumption for the intake and regarding production and industry – irrigators or manufacturers – constitutes an undeniable fact, pursuant to a legal framework widely accepted from time immemorial.

## 2 LAND TENURE MODES AND THEIR EFFECTS ON ACCESS TO WATER: RULES FOR ACTION THROUGH THE DOCTRINE IN AL-ANDALUS

From a conceptual point of view, the regime of water is defined as *ahkām al-mi'ah* and not as *ḥaqq al-mi'ah*. This nuance becomes especially interesting when it comes to exercising the right on water. The word *ahkām* derives from the root h-k-m and has as its meanings that of ruling or passing a judgment or to give a legal opinion; *ḥakma* [1, p. 161] means being wise, but also learned and sensible. And *taḥkīm* is the arbitration or the act of arbitrating a consensus-based solution between several individuals. Instead, the root ḥ-q-q [1, p. 165] expresses truth, law, duty; *ḥāqq* defines what is perfect, and *ḥaqqānī* conveys the meaning of legitimate and fair. The concept defining the area of law which regulates water use and distribution refers back to the term ‘arbitration’ as the legitimate way to settle any issues

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which may arise in relation to water. This is not a trivial matter, since both the doctrine and the sources of knowledge about water use and distribution, attest the permanent effort to reconcile and find crossroads between opposite positions, with the aim of reaching fair as well as legitimate solutions. Even though the water regime appears as an attractive topic for numerous scholars, the truth is that it has hardly been treated from the perspective of the peculiar Islamic law system (*fiqh*); this theme has an important source: the reports of experts in this field [2], [3]. The interest in the analysis of the legislation governing water use and distribution according to the principles of Islamic law not only lies in the value that water has as a common good but also has to do with the high degree of responsibility and participation in its management and conservation.

The legal framework for water use and distribution in al-Andalus, better known through the preserved infrastructures than from the written vestiges about the rights and obligations, does not go unnoticed by whoever observes the landscape. Tradition has so much weight in the irrigation system for centuries, only justified taking into account the *common law* which has been transmitted during generations, explaining how, when and who could irrigate or use water for their needs; even though this is not a right needing a meticulous description in texts or codes, its validity actually evidences the strength of a legal system characterised by a number of specific features, orality standing out as one of the most effective and significant ones.

The law on water, better the water regime in Islamic law, was supported on the informed opinion of doctors belonging to different law interpretation doctrines; rules, customs and traditions which were applied in the territories governed by Byzantine law and which, after the arrival of new Muslim conquerors who needed lands to be able to survive, were adapted and adjusted to the demands of productive intensification, thus revitalising the lands that they came across. This happened for centuries in the territories irrigated by the Barada river; a river course which serves as a model of projects extrapolated elsewhere [4].

### 2.1 The legal base of land and water for the survival of the people

The conquest initiated by the followers of Muhammad after his death spread across the Palestinian territories causing important changes, both at a cultural and at a religious level and in economic and political terms, as well as from a landscape perspective. This is a process which determined the lifestyle of the Muslims who crossed the Mediterranean.

Already since the beginning of the conquest, the invaders of the new territories received detailed instructions on how to carry out the settlement and were informed of the rights reserved to them as disseminators of a new way of living, based on faith ties. According to Abū 'Ubayd, following a tradition attributed to Marwān ibn Mu'āwiya and to Yazīd ibn Hārūn, in turn heard from Humayd al-Ṭawīl in the words of Bakr ibn 'Abd Allāh al-Muzanī, Muḥammad sent a herald or spokesman to the Emperor of Byzantium, encouraging him to embrace Islam. Faced with the threat, the Emperor as a proof thereof asked that his willingness to remain faithful to Islam be transmitted to the Prophet and sent him a few coins (*dinārs*). At that moment, Muhammad doubted the Emperor's intentions and shared out the coins amongst his followers; when doing this, he did not stick to the distribution into five parts usually applied when assets were obtained after a battle; this action was the one that allowed Muslims to draw a distinction between the profits achieved through war actions and those obtained by means of negotiation [5, p. 253]. This categorical distinction eventually determined the way to access the land, the settlement of the people scattered across the different areas of the Mediterranean basin and the legal relationships with the assets available to them.

The agreements with Christians and Jews were actually carried out on the basis of the sovereignty recognition principle through the payment of taxes specifically designed for that purpose [6, pp. 98–99]. As dictated by tradition, and consequently by the legal doctrine explained by its doctors in Islamic law (*fiqh*), and more precisely Ibn Buḥayr, following what he heard from Mālik, when the latter was asked about the legal obligations of individuals who had to pay taxes, referred to as *ahl al-dimma* or *dimmi*s, to which he answered:

“Nothing I to be taken from them, except what they give out of the goodness of their hearts” It was said to him: “What about the hospitality that their required to extend” he responded, “Even in this the burden was lightened for them (in the conditions)” [6, pp. 98–99].

One of the most remarkable jurist al-Awzā’i expressed the same opinion in response to the question about whether the taxpayers under caliphate and Islamic sovereignty had the right to maintain the production of their fruits, stating that nobody could deprive them of that right; and that prohibition was extended to the soldiers who had helped to conquer the territory – an opinion qualified by Abū ‘Ubayd, explaining that al-Awzā’i justified that Muslims could only appropriate what turned out to be essential for their survival, pursuant to the peace agreements that might have been signed [5, p. 152]. This and other informed opinions were respected and taken as an example by the conquerors, the same as the events that the Muslims ruled by ‘Umar went through when they arrived in Syria. At that time, the status of conquered land was subject to taxation; and likewise, the former owners, after converting to Islam, became taxpayers (*dimmi*s), a situation which actually aroused controversy amongst doctors in law. For some experts in law, once they converted, they deserved protection, both personally and with regard to their properties, with the exception of their lands, which continued to be considered a ‘war booty’ for Muslims [5, p. 156]; the justification lay in the fact that the sovereign that they initially owed faithfulness to had not adhered to Islam during the conquest, despite having been given the chance to do so. The “Christian” sovereign’s refusal to convert voluntarily influenced the relationship of his subjects with the land, which was now occupied by Muslims; in such a way that, if they subsequently chose to accept conversion, nothing changed the obligation to pay taxes for the right to work the land (now under Islam sovereignty), or to develop any industry.

It was precisely this topic that raised the greatest interest amongst experts in Islamic law. The way in which Muslims exercised ownership over the conquered lands determined not only the tax load (*ḥarāḡ*) that they had to assume as residents in a land that was under Abbasid rule but also the economic and fiscal relationships of those who negotiated to remain in their faith, unless an explicit recognition of the new Islamic sovereignty had taken place.

Abū ‘Ubayd established the difference between the spoils (*fay*) and *ḡanīma*) granted to conquerors [6, pp. 118–119] as a reward for the support in the battle and the assets (i.e. land and property) taken by the victors which directly came to be owned by the Muslim community [2, p. 319]. The element which made a difference was the direct acquisition of goods originated in the combat. The assets taken from polytheists by the force of arms and war action were regarded as *war spoils* and could consequently be divided into five parts and distributed amongst those involved in the conquest, excluding civilians. Instead, the riches seized after the war came to form part of Islam territory (*dār al-islam*), and considered a war booty, taken by coercion (*ḡanīma*); a nuance difference which resulted in the people who arrived there being entitled to those lands, without the need to carry out the division into five parts [5, p. 156]. This criterion equally applied to the land and movable property taken before the combat, and if surrender occurred before the start of the battle, they could be the object of negotiation; a means of pressure often used by Muslims during the territorial expansion process [5, pp. 260–262].

Another issue closely related to the way of acquiring and working the land referred to the granting of rights on the land and assets. Several concepts were discussed by the doctrine, such as *iqṭā'*, *ihyā'* and *himā*. The granting of lands (*iqṭā'*) which had been barren from time immemorial; according to the Prophet, these were lands the property of which corresponded to God and his Messenger, and consequently owned by the community. This statement generated certain doubts, and when Abū 'Ubayd asked who was entitled to those lands, he was told that they were granted as *iqṭā'* or concessions in favour of the newly-arrived; in fact, Muḥammad granted a land concession (*iqṭā'*) to Sulayṭ belonging to Anṣār; he came to it and returned shortly after to present his suggestion about the allocation of land ownership to Muḥammad, and the latter agreed to take it up, and then al-Zubayr asked the Prophet to grant it to him as a concession, and so he did. This is an account which justifies the power to distribute and grant lands pursuant to the first wording [5, p. 252].

A legal authority which was additionally recognised as well by those who converted to Islam during the first times of expansion in the Palestine area [7]. Tamīm al-Dārī offers an example of this situation since, according to tradition, he recognised the Prophet as the maximum authority on Earth out of divine will; after converting to Islam, he addressed Muḥammad asking the Prophet to "grant" him the city of Bethlehem, and the Prophet did so using the expression "it is yours." A granting that 'Umar recognised too [8]. These traditions, the same as many other sayings and facts of Muḥammad, represented the foundations of law to resolve issues which arose every day about who the ownership of the land and all its accessories belonged to; and water was one of those elements. The traditions attributed to Muḥammad (*ḥadīz*), confirmed by his acts, became a strictly binding law; even though a priority order was established according to the truthfulness of its content and to the credibility of his transmitters; in case of divergence or discrepancy in some of the tradition elements a decision was made to give credit to the traditions suited to the accredited acts. In any of these cases, it became necessary to accept the "unanimous" (*iğma*) agreement between Muslim community members [5, p. 270].

With respect to the possession of land that could be irrigated either through man's action or because they received the water naturally, tradition protected the right to have the ownership. The reason was based on the allocation that 'Umar had carried out, legitimately, as the authority, at the request of 'Abū 'Abd Allāh of the lands situated on the banks of the Tigris. This was the operational model that laid down the foundations for future cases of granting; the granting was accompanied by a justification about the obligation to pay taxes; in the opinion of the aforementioned sovereign, the lands which were not bound by the territorial tax, *ḥārağ*, neither those exempted from paying the capitation tax, *ğizja*, could be granted without any difficulties to people who showed their willingness to work those lands for their crops. A process which had already been performed in favour of the Prophet's five partners [9].

Another of the problems arose was that of the granting or allocation of the so-called "ancient lands"; Abū 'Ubayd expressed his doubts before the possibility of those lands being granted to other owners. In fact, according to prophetic tradition, a distinction could be drawn between the ancient lands inhabited from time immemorial – many of them abandoned – and those which, despite being "ancient" too, were still inhabited. In case of abandonment, the ruler had the discretionary power to distribute them between the new settlers. The same rule was applied to those other lands which had never been cultivated by Muslims or belonged to them, or to anyone bound by a treaty or a peace agreement. However, pursuant to a tradition based on a letter sent by 'Umar a Abū Mūsā, any plot of land without a recognised owner which remained barren could be occupied by whoever had expressed the intention and made the decision to revitalise it, regardless of the rulers' discretionary power. 'Umar claimed that,

unless they were *ġizja* lands (subject to the capitation tax) or lands which were irrigated by waters on that basis, they could be assigned as a “property” deed [5, p. 273]. Consequently, the assignment of a property consisted in an unowned plot of land; a land which was received by the mercy or grace of the sovereign authority, in this case the caliph, the highest authority of the community. The subjection of this estate to the law applicable over the territory where it was located caused immediate effects, the first one being that the competent authority symbolically held the property deed. Umar claimed that the ownership of all the goods in his domains corresponding to the ruler. And the second legal effect was that the right to transfer the land, and to manage it following criteria of utility and benefit for any individual belonging to the community, corresponded to the government authority as well; a power which was exercised on productive or unproductive lands, and on lands regardless of whether they were owned by someone or not. Therefore, the right recognised to settlers was that of usufruct, albeit from a merely formal point of view.

## 2.2 Ways to put the land into production: the model applied in al-Andalus

As for the lands which could be revitalised, the doctrine also made a distinction between three modalities. The first one corresponded to barren lands revitalised by individuals with the aim of making them inhabitable; access to the land was subordinated to an order dependent on when the settler had come to it, in such a way that, if a newly-arrived person wanted to grow something or build new infrastructures, he had to respect the order of arrival in the piece of land. The second case referred to the granting of barren lands by the competent authority under the modality of land assignment, albeit reserving the “property”. And the third one had to do with the individuals who took possession of a land and, for that purpose, fixed the limits by means of pillars, or digging a ditch or a moat or any other option which suggested the space that they owned; in this last case, the abandonment of the land and the explicit prohibition for anyone else to work it for the fact of being its owner and having it under his protection and custody generated controversy within the doctrine. Indeed, Mālik did not admit such legal restrictions, established by means of fences or any other similar modality. And in fact, the subsequent doctrine, through Abū ‘Ubayd, justified these prohibitions unviable when the effect caused was poverty or deprivation of resources. This case arose, for instance, between people who, having access to a water course in the urban context, dug a well and deprived other neighbours of water based on the fact that they were the ones who had the possession and custody over water; nobody could deprive another individual of vital resources, the origin of which was in the will of Allāh, as the maker of the Universe and of the goods that all human beings were able to enjoy [10].

However, the arrival of Muslims in the new occupation areas not only meant changes in term of land ownership but also triggered a visible and undeniable renovation of infrastructures. They were constructions meant to improve the irrigation of lands subject to fluctuations of the necessary water level for reasons associated with climate and the environment. The most important changes in this respect occurred during the Ummayyad government; Abū l-Ṭayyib al-Ṭabarī reports the building of a large irrigation ditch in the lands of Jordan (*Jund Urdunn* [5, p. 286]); its construction was ordered by Walid II around 743. Orchards were also planted and infrastructures renovated under the rule of ‘Abd al-Mālik to ensure that crops could be irrigated by means of canals; a technique which was used in order to be able to obtain water from the Jordan river [4, p. 112].

The arrival of Muslims in al-Andalus meant the irruption of the Syrian doctrine (*maḏhāb*) of al-Awzā‘i (m.774) [4, p. 108], an expert in Islamic law and traditions, *muḡtahid*, of Yemeni origin, and hence the knowledge that this author had about the practices followed

amongst the tribes of that territory in the aspect under study here: water. His strand of thought and interpretation of Sunni tradition remained current until Abū Zar'ah Muḥammad ibn Uṭman, belonging to the *Šafi'i* school was appointed judge of Damascus.

Therefore, it was during the first waves of Syrians that the rules and principles of land tenure and allocation, the revitalisation of barren lands, and consequently, water allocation and distribution became established in al-Andalus. For more than a century after the first moments of the conquest, the rules and provisions about this matter were those proposed by al-Awzā'i; his merit and wisdom were highlighted by Mālik: "al-Awzā'i was the imam that everybody followed." The same opinion was expressed by Sufyan ibn 'Uyayna – who appears on the list of masters of Yaḥyā ben Yaḥyā in Mecca, on the occasion of his pilgrimage [11], [20] – and for whom "al-Awzā'i was the imam of his time". And Muḥammad b. 'Ajlan said this about him: "I have not known anyone who has advised Muslims more than al-Awzā'i ..." And Yaḥyā b. Ma'in considered him to be one of the four most important jurists of that period: al-Tawri, Abū Ḥanīfa, Mālik and al-Awzā'i..." [12].

When the aforementioned jurist fell from grace, the settlement of those first Muslims was already a fact, and so was the development of irrigation. The substitution of the Syrian's doctrine took place as a political response to a persecution around the Islamic world of the time. In fact, the "substitution" or, rather, the application of a new criterion supported on the doctrine of the *maḡallid* – and consequently not of kadis, who were the ones who could impart justice because of their knowledge about Koran and the Sunna of al-Buḥārī [13] – was the decision made by the Umayyad emir of Cordova in al-Andalus, al-Ḥakam Ibn Hišām Ibn 'Abd-ar-Raḥmān I (d.796/822).

The replacement of opinions supported on Awzā'i's sunni doctrine by those of Mālik in al-Andalus came as a result of what happened on the other side of the Mediterranean, more precisely in Syria; this change was triggered by the falling from grace of this *muḡtahid* and the imposition of the *Šafi'i* school. This change affected all those issues raised and settled by his followers with regard to any legal matter, including all that had to do with property and immovable assets; and accordingly, water law too. Thus, for example, Awzā'i and his followers upheld the principles listed below in terms of allocation and distribution (*qisma*):

- Koranic provisions prevailed in matters of asset distribution and allocation – and therefore were applicable to water as well. In other words, nobody under any circumstances could appropriate and good which was, by divine will, a right for everyone, and of everyone, by his intention (Kor. 24:43).
- Community members, without any exceptions, could benefit from communal goods and take advantage of them; in this sense, water had that nature and could thus be exploited by everyone and for everyone; even non-Muslims, although prioritizing Book people in this case (*ahl al-Kitāb*) [14].
- It did not matter what use was given to the communal use good; everyone was entitled to its use. Water consequently deserved the same fate, even to clean objects considered impure. The doctrine expressed that the water of a river which flows constantly does not become impure, neither was it corrupted because Book people, and more specifically the Jews, extracted water to clean their impurities, or to wash their clothes; the justification given by al-Lakhmi relied on the fact that, if water proved useful to remove impurities, regardless of the religion professed by the person extracting the water, the purpose of this action was sufficiently good and valid to permit its utilisation. And to corroborate this opinion, he justified that Muslims also used water for the same purpose, washing off their impurities [15], [16].
- Certainly, no attention was paid at the time to the "interest" of water as an issue regulated by law; water had by no means the "value" to be transferred and was consequently placed

out of the legal business, water – at least by itself – was not subject to any transactions. Speculation with water did not exist, and neither was it possible to give it a value by itself which meant entering the commercial traffic.

- One could only gain access to water as a right inherent to every member of a community that, pursuant to Islamic law, would allow them to benefit from the aquifers existing in the land owned by an individual. Or to benefit from, or to use the accumulated or surplus water in a piece of land, but always provided that this was done for lawful purposes. Priority in the access to the hydric resource thus became essential to determine the order assigned to the applicants according to the purpose of the water; and in this case, when several individuals claimed the right to the same resource, access was fully covered by guarantees, seeking to ensure that the utilisation of water was fair and equitable for everyone.
- In short, water allocation was a right which abided by the legal provisions based on prophetic tradition; however, it was the sovereign authority that exercised supervision and was competent over this action. The allocation was additionally made between the users that had really taken part in the process and in the achievement of the aims fixed, with the aim of ensuring water utility or profitability.

Nevertheless, when it comes to the community and the maximum benefit that can be brought by water, one must refer back to the general principles of Islamic law. Therefore, in the event of conflict between general or public utility interests and the private interest of a person or a small group, the utility for the community always prevailed (*maṣlaḥa* [2, p. 271]); this principle was not only upheld by the Mālikī school but also ratified on the basis of another subsidiary criterion found in Islamic law sources, legal reasoning, to justify that whatever is done to ensure the benefit of the highest possible number of individuals had to be considered licit [6, pp. 223–224].



Figure 1: Runoff waters after cleaning *tarquin* (Partida Lo Sallavera-Rojales-Spain).

### 3 THE CONCEPT OF UTILITY REGARDING WATER

In order to understand this concept, it is important to put firstly to questions. The first question which arises in this regard is “what does the term ‘utility’” (*fā’ida* [17] فائدة useful *mufaid*) mean in Islamic law?” – and, more specifically, in terms of water law. A second question was: did jurists in the early times of Islam draw a distinction between the utility of water and the benefit, profit or interest (*manfā* [1, p. 602] منفعة) that it produces? Note that utility is the quality that water has to favour or bring an improvement or profit either to people or to the domains or lands which receive that water; it is precisely this nuance difference which permits to distinguish the specific use of one term or the other by the legal doctrine. In fact, the doctrine justified the need to protect water as an asset with intrinsic value, a common good (*mubāq*) and out of the commercial traffic precisely for its public utility nature. Water resources, according to one of the Islamic law sources, *qiyās*, had the rank of permanent water emanations; the legal regulation applied to this type was also extended to other assimilated resources. By virtue of this theoretical-legal consideration, water constituted a common right for all human beings, and it could only be appropriated by occupation (*ihrāz*); similarly, the rain water hoarded by whoever received it was perceived to be his own. And in this sense, the doctrine expressed itself in favour of protecting the water linked to any piece of land or area that could be revitalised, since the early times of Islam expansion in new settlement territories; a protection which consisted in limiting and avoiding the sale of water separately from the land.

In al-Andalus, experts in water matters – from which the jurist al-Wanšārī compiled consultations of great value to understand water management – made an effort to transmit the importance that water had for being a variable good, subordinated to factors and circumstances linked to its own nature, though also to man’s action. And such an effort had as its aim to make those who came to jurists asking for justice or seeking an informed opinion aware of the need to manage water following principles of fair allocation and a balanced use proportional to users’ basic needs, and to the supply of water for as many people as possible with the aim of favouring and benefiting on a general basis; both quantitatively and in qualitative terms. In short, the doctrine attests that there was more interest in protecting the legal good (water) than in specifying its characteristics and defining elements in more depth.

As a matter of fact, doctrine opinions had their origin in well-founded approaches to which both Abū ‘Ubayd al-Qāsim ibn Sallām and al-Māwardī refer in their works. More precisely, the division of water courses – regardless of their origin, which can be in rivers, wells or springs – into three different categories (larger rivers; smaller rivers; and water courses or man-made irrigation ditches [1, p. 776]) favoured a specific regulation of the right to water use, based on the continuity and profit which may eventually be obtained from it; in other words, two factors (time and benefit) with the aim of guaranteeing water access for the user. It deserves to be highlighted that, during the early times of Islam, the water of large rivers was regarded as endless and its fluidity said to stem from Allah’s will. This category included the Tigris and the Euphrates, and by analogy, all those with a similar size and volume of flow. At the time, nothing suggested that they might be exhausted or diminish more and more until they disappeared; anyone could obtain water both for drinking and for irrigating, without any fear of shortage situations; all in all, nobody was prevented from using and extracting water for legal purposes, since they were considered “tributary” rivers and, therefore, the benefits which might be obtained with water could be used to ensure the community’s welfare.

The abundant volume of flow as well as the size of these rivers was in sharp contrast with other courses regarded as smaller, also of divine grace, but which required a more detailed regulation. In this case, attention was paid to determining the defining features of smaller

ivers, for which two essential elements were combined: utility; and necessity. A first characteristic that distinguished larger courses from smaller ones was that the latter had to bring enough water to need people's needs, for their consumption; for these purposes, the volume of water flow was estimated taking its utility for drinking and producing as a reference, without the need for legal regulation. The water course was deemed as sufficient also for new users to be able to access water, and to take advantage thereof, without any fear of shortage. In this case, it was the users, the consumers of water, who assumed the starring role and the responsibility in relation to the equitable allocation and the surveillance over the distribution of this common good.

The second differentiating characteristic was that the access to these smaller water courses – largely – depended on the action of human beings. Even if nature had decided that water would flow across a specific place, the devices and retention systems to increase water levels and favour a proportional allocation were considered essential for other potential users close to the piece of land or property of the first beneficiary to be able to enjoy water too. In this second case, based on the experience of Muḥammad and his followers, the jurists from the early times of Islam defined a number of general coexistence rules able to ensure a balanced use adapted not only to individual needs but also to the existing volume of flow. In this respect, the tradition attributed to Ubāda ibn aṣ-Ṣāmit justifies the regulation made by the Prophet about the right of those situated upstream of a water course, and their priority to receive it so that they could irrigate their date palm trees; a priority right which, once made, was assigned in favour of the users located downstream, up to the last of the water applicants.

It was already said above that two factors – time and benefit – combined to determine the amount of water needed to meet the needs; indeed, the water which could be retained by each one of the users or applicants, taking as its reference a tradition from Muḥammad transmitted by Muḥamad ibn Ishāq [18].

Therefore, *necessity* was the quality applied to water without which neither human survival nor land production and crop achievement were possible. In this sense, water had an inherent – and consequently higher – value, due to the fact that its shortage or decrease triggered a series of negative effects, not always unforeseen; hence the convenience to specify how much water was needed and in what conditions as much as possible. The greater or lesser need for water depended on five factors: the characteristics of the soil, that it could retain more or less water because of its edaphic conditions. Secondly, the characteristics of each crop, insofar as the need for water varied according to evapotranspiration and capillary absorption for the good development of plants and trees in general. Thirdly, the season of the year in which water was required, a constant being that shortage constituted a prevailing feature throughout the Mediterranean basin during the summer period, in view of the consultations unceasingly made by users. And in relation to this circumstance, crops could be affected depending on whether they were vegetables or fruits, or other trees or crops which needed a smaller amount of water for their production, such as palm trees or prickly pear plants, to quote but two examples. And finally, the fact that water flowed constantly or intermittently, depending on the climate, which made it necessary to develop foresight actions that guaranteed the use of water only once or on several occasions in a controlled manner. These five aspects, beyond the rules fixed by Muḥammad, were the object of specific consideration for events occurred in certain places and times; and it is in this regard that custom was accepted as a legal criterion to accommodate and adapt users' needs to the water available in their environment. Nevertheless, in any case, the cases raised protected the landowner's right to obtain the maximum benefit without reducing the utility that the same water might directly or indirectly bring to other neighbouring users; and even to those in drainage areas who extracted water, including fish that bred therein.

According to the origin of water, the doctrine regulated the right to use water which was obtained thanks to man's intervention, over courses with a smaller or a variable volume of flow. The irrigation ditches dug to drive and steer water had as their aim to serve the land owned by whoever needed to put it in production. Unlike larger-sized rivers, the doctrine determined that the water which circulated along these ditches was a communal property, of those who needed it and utilised it to obtain a benefit [19]. And this is the topic that the doctrine dealt with in greater detail, giving priority to benefit and utility over theoretical considerations; attention was paid to determining the guarantees for the right to use water, in favour of the highest possible number of persons, according to what appears in the cases examined and known by experts in this matter.

By analogy, and as a conclusion, that ownership for the use of water was recognised in the same way as the right of the people using a street or a lane of a town that was not owned by anyone in particular, but by all those who lived in its margins. In the case of waters driven through these canals or irrigation ditches, everyone could benefit from water; in the same way as the inhabitants of the Basra river made use of water when its level rose due to the tide; consequently, when there was plenty or a surplus of water, anybody could benefit without needing to limit or restrict its use; neither was it necessary to prevent it from flowing freely by means of "stops" or contraptions meant to contain the water. Once again taking as an example what happened on the banks of the Basra river, the doctrine laid down as a general rule that the water belonged to those who had made it possible for the water to arrive thanks to their wit and effort; they could by no means be regarded as owners with an exclusive right, but they did have a priority right of use. Whoever had not helped in these constructions or devices was forced to be dependent on the remaining waters, or on the water coming from the draining of the fields situated closer to the water course. The right of access to water by those who had not taken part in the building of the irrigation ditch could be achieved by building other sorts of devices which raised water level; and by gravity and a different pressure level, they could be taken to new pieces of land, even though they needed the authorisation and consent of the first ditch builders, as main users, in this case. Such circumstance made it necessary to determine the extent to which water was needed, and the utility that it would bring to the follower applicants; since a different preference level existed even in such cases, depending on whether the water was extracted for human consumption or for new crops. And once more, the premise, based on analogy, that made it possible to find a solution in this respect was the fact to have the consent of the other neighbours or users, forbidding to open a door or to build a rain gutter, flaps or any other infrastructure.

For summarize, the concept of water sources laying down in this regard the right that each user had to a number of hours depending on the turn which had been established, proportional to the land that the user had to irrigate, then water was subordinated to the same allocation criterion in both cases, divided among the subjects who took the turn (*dawlah* or *dūlah*). Secondly, the expectation of a right to water arose for the owners either of lands or of houses or other immovable property. In third place, irrigation ditches had as their purpose to provide and facilitate access to water. And finally, specific issues related to sustaining and covering the expenses that might be incurred as a result of the use and distribution of waters through a variety of contraptions. All these were cases of applications in the territories where Muslims remained, despite conversion, farming the lands and developing the tasks inherent to the countryside using both circulating and standing water.

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