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# An Evolution of Property Rights

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With a close look at water in Syria

By Chaker EL Mostafa – 3991826  
Department of Economics of the University of Ottawa  
In partial fulfillment of the requirements of the M.A. Degree  
Supervisor: Professor Louis Hotte

Eco 7997

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Abstract: Water is a valuable resource that requires that we conserve and protect it from exhaustion as it plays a large role towards our future survival. Yet sometimes, the institutions we use to govern this resource may mismanage it and risk its depletion. It is this paper's aim to find how this can happen through a look at the history of property rights over water in Syria.

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## I. Introduction

Water is a valuable resource from which most life is derived. Its complex entanglement in our ecosystem shows us how vital it is to the survival of most species found on our earth, including our human race. The water cycle, beginning its journey as rain drops landing at the top of mountains then travelling down as rivers while seeping into the earth only to finally rest at sea, brings with it renewed hope and opportunity as it irrigates lands and aids in the cultivation of the soil the world over. It has been the key to prosperity for many of the early civilizations, notably those that lived in the Fertile Crescent, providing the inhabitants of that region with rich and arable lands. Nevertheless, some regions, located within the crescent itself, were less fortunate than others and received a lesser visit from this natural resource during its voyage, stifling the growth and prosperity of life in those areas. Yet, this did not stop small communities, such as the *bedu* of the Syrian steppe, from trying to live under these harsh conditions, where through their need for collective survival they have worked together to devise their own methods of water management to overcome this hardship.

Moreover, look more closely at these civilizations and one would notice the importance of water as a factor to their development. Since, thanks to the abundance of water, agriculture was often observed to shift from being a sustenance activity to a driver of economic growth, thrusting them into becoming recognizable powers on the global scale; a recurring series of events for most of the civilizations inhabiting this region. Nevertheless, it is also important to point out that this transformation only occurred in areas where water was not scarce, leaving out the arid lands of the region. However, the impediment to the development of these arid lands did not last for long, as the constant increase in the population put pressure on these

civilizations to devise new ways to feed their constituents. This need has called forth for the development of irrigation systems which allowed them to deliver adequate water supplies to the arid lands, allowing for their development and cultivation.

Fast forward to our current time and it will be noticed that not much in the approach to agriculturally driven growth has changed. The more people there are, the more goods are consumed, and consequently the more effort is employed to acquire water in order to provide the increasing populations with an adequate supply that will satisfy their need for the cultivation of marginal lands. Couple the latter with the developments in technology and globalization, and the problem sometimes becomes more efficiently handled and less costly to implement. For example, canals have now been replaced by pipelines, which are easier to set up and maintain, and agricultural production faces economies of scale.

As it can be seen, the developments described above rely upon the ability of individuals to manage their water supplies and allocate them to their most effective use. This is either done by a single individual, a small group of individuals, or even a country as a whole (i.e. the government) depending on who owns the right to use the water. Each approach creates its own respective institution through which it manages the resource. Yet sometimes, there are instances when these institutions could fail.

During the last 30 years, the Middle-East has experienced the aforementioned transformation, as most of its arid lands were incorporated in irrigation networks by the region's relatively young states. The countries aimed to develop these lands and use them to further their growth, granting, in the process, the supply of water to all who called for it.

However, in a semi-arid country such as Syria, this shift has brought with it some repercussions as water in that country has started to become very scarce. Moreover, the lack of adequate and reliable renewable sources of water, coupled with the development objectives of the nation, has led to the exhaustion of some of the country's hydraulic resources. Salman and Mualla (2003) state that:

*“Syria had a population of 18 million in the year 2002, and its Total Renewable Water Resources (TRWR) is estimated around 16 BCM<sup>1</sup> per year. In other words, the per capita TRWR is less than the water scarcity index (1000 m<sup>3</sup>/person/year). Experts consider that a country in which the per capita TRWR falls below this index will experience chronic stress that will hinder its economic development and entail serious degradation.” (p. 1)*

In addition, Salman and Mualla (2003) point out that demand for water may soon exceed supply in Syria.

Nevertheless, this was not always the case. Prior to Syria's agricultural reform, water supply was in surplus. Therefore, one may wonder how did Syria, who now uses 80% of its water to support its agricultural sector, reach this outcome. Was it due to the mismanagement of the resource or the failure of its governing institutions? Were there other underlying factors that led the country to this inconvenient outcome? If so, how did they affect the usage of water and why?

It is this paper's goal to attempt to answer the previous questions through the lens of institutional economics. To this end, we will look at the history of the various institutions that

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<sup>1</sup> BCM stands for Billion Cubic Meters

have governed water in Syria over the past century and a half. The aim is then to analyse the possible effects of the various property right regimes on the control of the water resources, by comparing them with existing theories in institutional economics. An overview of the main theoretical results in linking natural resource use and institutions will be required.

We find that various property regimes have existed in Syria due to its rich history and geography, with the most outstanding one in managing water being the collective property right regime of the *bedu*. Furthermore, it will also be ascertained that property rights institutions evolved with the needs of the country as its socioeconomic environment changed. Finally, it will be noted that an inability to quickly adapt to the constantly changing economic environment led these institutions to become inadequate and thus causing them to inefficiently manage the resource.

The paper will be presented as follows: The first section presents the main theoretical results in institutional economics regarding the use of natural resources. The geopolitical context is also considered. The sections that follow will describe and analyse water rights under the various stages of Syria's history starting with Syria under the Ottoman rule, continuing with Syria under the French Mandate, and ending with independent Syria and its current rulers. A conclusion summarizing the main findings will then be presented.



## II. Contextual Settings

### a) Theoretical Setting

Legally viewed, a property right is an individual's claim of possession over a certain tangible or intangible entity often allowing the right holder to claim certain rights over its handling. Depending on the type of property, the right holder is entitled to exact whatever action she sees fit over her possession and could either sell, transfer, exchange, or destroy it. Moreover, property rights play an immeasurable role in everyday economic transactions as they provide the right holder with the means to protect her claim over her property's economic value.

Economically, one can view the emergence of property rights as a response to the increasing effort to extract all economic benefits from an owned entity. Put otherwise, property rights allow individuals to reclaim more successfully the various investments they make over their possession and in consequence encourage a decrease in risk averseness. Demsetz (1967) stated that "property rights develop to internalize externalities when the gains of internalization become larger than the cost of internalization" (p. 350). Externalities here are meant in the sense as any effects not captured in the prices of goods, be them beneficial or harmful, that arise from people's interactions with each other and may in turn affect an individual's estimation when deciding to internalize them which "refers to a process, usually a change in property rights, that enables these effects to bear (in greater degree) on all interacting persons" (Demsetz, 1967, p. 348). He then points out that people would find it advantageous to increase their property rights when it isn't costly for them to do so. Anderson

& Hill (1975) mirror that opinion and go on to claim that in this quest to internalize these externalities, more resources will be devoted to the enforcement and the definition of property rights as long as the benefits outweigh the costs, creating an equilibrium amount of property rights and their respective enforcement efforts once benefits equal costs (Graph 1 – Appendix A).

For instance, a gold prospector would be reluctant to build a mine in a remote location if she were unsure about the security of the revenue stream generated by her mine. Moreover, her uncertainty may be potentially amplified by the prospects of increased susceptibility to theft due to the unclear definition of her property rights and furthermore by the mine's great distance from enforcing institutions (Hotte, 2001)<sup>2</sup>. In this case, the gold prospector would be hesitant to incur any investments on her mine since the cost of setting it up, getting the required logistics, such as drills and labor, and enforcing her own claim over the mine, all without the support of governmental institutions, is too costly when compared to the revenue she will be receiving from the mine. However, if said obstacles were overcome through the proper definition of her rights, coupled with the effective enforcement of these rights by relevant monitors and institutions, her concerns over the returns of her investment would be greatly diminished. In addition, the prospector would further be drawn to increase her rights of ownership as they may entail higher returns to her venture which in turn may lead her to invest

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<sup>2</sup> In his paper, Hotte (2001) looks at the management of land at the frontier of settlement, where land owners are sometimes located far enough from enforcing governmental organizations to have their claim for ownership contested by others. He found that distance from the institutions was correlated with the decision taken upon the manner in which the land owners use their lands and the amount of investment they devote to them. The closer you were, the more your rights were protected and the more the land owners invested in their land and sustainably used it. However, as the distance increased, other scenarios arose that put under question the sustainable employment of the land and in some instances pushed the land owners to overexploit their lands in one shot games as to deny others' claims to their lands' benefits.

more in her mine and similarly in the enforcement of her rights and will continue to do so until the benefits no longer outweigh the costs or are equal to them (Anderson & Hill, 1975). Such a scenario is often observed when the scarcity of a resource is increased, due to the higher revenue streams available from scarce resources.

Another example concerns water property rights in arid lands in the Middle East. In such lands, the definition of appropriation rules tended to be relatively inexplicit when water was plentiful and the population small. In these circumstances, the cost of defining and enforcing property rights was greater than the benefits. However as population size increased, water became scarcer and more valuable, then appropriation rights needed to be made more explicit, to ensure the returns on the investments to procure underground water sources. Here, the benefits of internalization are greater than the costs.

Furthermore, property rights allow the determination of the ownership characteristics of a good which in turn can potentially affect the behavior of individuals towards their property and the manner in which they use it; be it in a beneficial or harmful way. Put otherwise, property rights delineate the exclusivity of a property all the while eventually shaping the manner in which externalities may be internalized. It is in this way that the economic perspective of property rights begins to differ from its legal counterpart, with the latter distinction becoming clearer once we closely observe the realm of natural resources.

The primary feature of natural resources is that they frequently are of a non-renewable nature, and if otherwise, regenerate at a rate that is often inferior to the extraction rate exercised by the right holders of the resource. In consequence, property rights associated with

these depletable resources aim to regulate their use and ensure their sustainability by establishing the appropriate sets of rules and regulations that are suitable for their efficient extraction given the preset surrounding environmental and economic conditions. Many property regimes for natural resources have been observed, of which the most prominent are:

- Private property
- Common property
- Open access property
- State owned property

Each regime has its own consequences on the way the externalities produced by the resource are internalized. Let us analyze each one respectively.

#### **i) Private Property Regimes**

Private property regimes are the most common type of regimes found in our present day. The increase behind their popularity stems from the prevalence of capitalistic ideals that govern most of the economic and governmental institutions of the developed West and have spread the world over throughout the second half of the last century. Furthermore, Demsetz (2002) credits their success to the fact that they provided individuals with the solution to the underlying and ever changing economic problems faced during said time during which “compactness” was reduced. In his view, the latter represented the closeness felt by the members of a group and the manner in which they remained connected; more notably if they maintained face to face interactions. He further elaborates by arguing that it was through this compactness that the resolution of the economic problems of a group brought forth with them

feelings of satisfaction and trust to its members and encouraged collective property regimes, as discussed below. However, as the productivity of modern economies increased, due to technical change and specialization, “compactness” was made irrelevant by the support of these developments for the “production of goods for use by others who, mainly, are outside the boundaries of kinship” (Demsetz, 2002, p. S663). Furthermore, he also explains that this increase in productivity was accompanied by a rise in the complexity of resource allocation, as individuals aimed to appropriate the necessary inputs to maintain their growth, bringing forth many hurdles such as the need for efficient coordination in today’s modern economies, due to the reliance of these developments on time sensitive communications.

All the same, private property regimes usually imply that there is a single “owner” of the property who can manage it in the manner that suits her needs and objectives regardless of those of another person. Moreover, they bestow upon the right holder the power to exclude individuals from the use of the resource. These regimes are often associated with the neoclassical notion of economic efficiency, through their assumption that each individual’s maximization of her needs will lead to the optimum outcome by the voluntary exchange of the surplus gained through these regimes (Demsetz, 2002); hence further justifying their preference over the other types of recognized regimes.

However, their vindication as the correct regime of choice is often open for debate, especially when considering resources that are scarce and/or are virtually non-excludable (i.e. common pool resources such as fisheries or water). Private property regimes often fail in properly managing such resources since they overlook the transaction costs involved when such

resources are privatized (Coase, 1960). In other words, while the owner may be capable of extracting revenue from his resource, he may not be gaining much in economic benefits due to the high costs ensued when attempting to internalize the externalities of a common pool resource. While some of these costs have been skimmed over in the paragraphs above, it is useful to clarify what transaction costs are and how they may arise in order to better view the distinction amongst the currently discussed regime and the ones to follow.

## ii) Transaction Costs

Transaction costs regarding property rights were first conceptualized in 1937 by Coase and later developed by him in his famous 1960 paper “The Problem of Social Cost”. In it he portrays transaction costs as a tool used in assigning property rights, explaining that in a world of perfect competition, where there are no transactions costs, property rights do little in efficiently allocating resources as the market will take care of their distribution. However, as soon as these costs are positive, the distribution of rights becomes an important factor towards the optimum allocation of the resources, since their definition delineates who must incur these costs. This could be thought of in the following way.

Imagine a lighthouse whose light causes the residents of a coastal town to stay up at night, leading to damages of about \$100,000. The lighthouse could be shut down, but the lack of a clear navigation path for boats will lead to accidents that will cost the town \$75,000. The townsfolk could install thicker blinds for \$50,000 and curtail once and for all the inconvenience caused by the lighthouse. With no transaction costs, the efficient outcome here would be to let the townsfolk install blinds as it is the least costly outcome. Now assume that \$30,000 of

transaction costs are introduced in the form of estimation costs, negotiator fees, contractor fees, delivery fees, and so forth. Furthermore, assume that the rights to the use of light at night were assigned to the townsfolk. Following the Pigouvian approach to externalities, which dictates that a tax should be levied on the party that is causing the damages in order to restore efficiency, it would be found that the townsfolk would demand total reparations of \$80,000<sup>3</sup> leading the lighthouse managers to halt the operation of the lighthouse as the cost of keeping it running is greater than that of shutting down. Nonetheless, this is an inefficient outcome since the shutting down of the lighthouse yields a net benefit of \$25,000 while installing blinds yields a net benefit of \$50,000. Yet, if Coase's implication was followed and the property rights were reassigned to the lighthouse then a better outcome may emerge for this community where the townsfolk would install the blinds and the lighthouse may continue its operations<sup>4</sup>. This example portrays the importance of transaction costs when determining the distribution of property rights and their efficient use.

Moreover, Allen (1999), defines transaction costs as the costs incurred when establishing and maintaining property rights. Costs associated with the establishment of property rights are many and may arise through an individual's efforts to have her property rights recognized and clearly defined, characterized by the many procedures she must undergo to have her rights documented and may incur costs such as notary fees, application fees, and transportation fees. Moreover, if the relevant governmental institution is inefficient in the handling of these procedures, in turn leading to significant delays, then the individual may incur

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<sup>3</sup> The cost of negotiator fees, contractor fees, delivery fees, and so forth plus the cost for installing the blinds.

<sup>4</sup> This example was inspired by a lecture given to the author by Louis Hotte.

further costs in the form of opportunity costs incurred due the idleness of her resource or the need to pay bribes to have her application progress within the system. In addition, other costs may arise in the form of effort spent in studying and understanding the needs of the parties, lawyering costs, and so forth.

As for costs associated with the maintenance of the property rights, these are costs that are usually faced when monitoring and enforcing an individual's property. Such costs, as discussed above, depend on the efficiency of the governmental institution to protect the claimant's property rights. The lack of protection may lead the individual to incur large monitoring and enforcement costs as she would have to employ independent agents that would act as her monitoring and enforcing entity. On the other hand, if the government provided the individual with this monitoring and enforcement, then the costs incurred by the individual would be significantly reduced and would allow her to better manage her resource. Here we notice again Coase's idea of adequate allocation of property rights and better outcomes, where the right in question is that of protection and the better outcome relying on its implementation by the government.

Moreover, other monitoring and enforcement costs arise when an individual tries to enclose her property by the erection of fences and surveillance systems. While this may not be a great deal when managing minor properties, such as small plots of land, the tables are turned when considering a common pool resource such as water, since attempting to fence a large lake and monitor it may impose great costs upon its owner. Also, similar concerns arise when dealing with rivers as they are free flowing water sources. In these cases, one cannot exclude



individuals without facing significant costs, which, when taken up by a single person, tend to be a significant endeavor. In addition, these large costs may make private property regimes non-optimal for the management of common pool resources. In such cases, since the costs far outweigh the benefits, the management of such resources is often given up, calling forth for different sets of property rights distribution.

### iii) Common Property Regimes

Experience in managing common pool resources has shown that common property regimes are sometimes more efficient than private property regimes (Ostrom, 1990). Property rights under said regimes are usually not owned by any single individual but are rather shared amongst several persons who are able to exclude outsiders and collectively manage and share the resource amongst themselves. Such circumstances are often found in difficult and uncertain environments that are located on the outskirts of settlement and are somewhat alienated from the relevant regulating governmental institutions. Much of these environments involve resources that are shared by very small and closely knit groups of individuals, echoing Demsetz's (2002) notion of compactness. These uncertain conditions led to the emergence of norms and rules that dictated the behavior of these individuals towards each other and the resources under their possession.

To further clarify the last few statements on the success of common property regimes, it must be understood that the prevalence of such a setting came from the fact that the individuals found in such groups shared close relationships through which they usually made transparent each other's actions and preferences. In addition, they tended to interact

frequently amongst themselves, making, therefore, their past, present, and future viability dependent on the trust and respect they had established within the group, henceforth setting the cost they placed towards losing their standing and place in the community as the largest deterrent to the abuse and violation of their agreed upon norms, seen though a decrease in their social capital and reputation. Said loss in social standing may then put in jeopardy the individual's ability to efficiently appropriate the necessary resources required for her survival providing incentive enough for her to continue to cooperate rather than deviate from the norm. Moreover, given their remoteness from governmental institutions, cooperation was encouraged over selfishness, hence providing these communities, with low cost methods to monitor and deter behaviors harmful to the group and the resources (Ostrom, 1990).

These norms stand as the primary reasons for the efficient management of common pool resources by small groups of individuals since the costs of exclusion and monitoring that were to be internalized by the private right holder are virtually eliminated and/or are dissipated amongst the individuals of the group.

Ostrom (1990) points out that other underlying factors of collective ownership regimes helped establish favorable conditions for the competent management of common pool resources. Such factors included clearly defined boundaries, congruence between appropriation and provision rules and local boundaries, collective choice agreements, monitoring, graduated sanctions, conflict resolution mechanisms, and minimal rights to organize.

Clearly defined boundaries refer to the setup of means that ensured the returns on investing in the resource, such as recognition of the claim to ownership by other groups and individuals through their relevant institutions. Congruence between appropriation and provision rule and local conditions, implies that rules be set to determine the time, place, and amount of resource that could be extracted. Collective choice refers to the fact that these rules need to be tailor made for the community in question. Those affected need to be involved in the creation and monitoring of these rules. Such involvement makes these rules flexible, less costly to implement, and open to changes in the group's socioeconomic environment. The factor that Ostrom (1990) believed contributed the most to the dominance of collective action regimes is the presence of graduated sanctions that took the crime, put it in context, and served a punishment that was deemed adequate for the infringement which was further compounded by the high cost associated from being punished in these communities. Finally, the recognition of their rights by governmental authorities allowed for their rules to be applied without contestation and helped avoid redundancies that may have translated as extra costs for the governmental institution.

Ostrom (2000) then further points out that the existence of persons, such as conditional cooperators, "persons that are encouraged to cooperate as long as a sufficient number of collaborators cooperate back" (p. 141); and willing punishers, "persons willing to cooperate if punishment is instilled once deviation from the agreed upon norm is violated" (p. 141) also aided in the success of collective regimes when managing common pool resources.

However, collective institutions have unfortunately displayed a kink in their armor with this weakness recently brought forth by the increase in the world's population and their overwhelming demand for its natural resources.

#### iv) Open Access Property Regimes

This rise in the world's population has placed increased demand on common pool resources, creating in turn a separate kind of property regime where no one owns the resource and can't exclude others from using it, as the costs for doing so have also increased. While a small group of individuals may be able to exclude one person at little cost, the contestation of their rights by a significantly larger number of persons may lead them to forego their ownership claims, as it would be too costly for them to protect their rights then. Also, forfeiture of rights becomes more probable if these individuals are located away from enforcing institutions and have to bear the entire cost themselves. Under these circumstances, all individuals have the right to access and benefit from the resource.

Such a regime has come to be known as open access, and was first described by Gordon (1954). He explains the latter as a setting in which an infinite number of people begin to compete over a common property resource and observes that due to this competition all economic rent from the resource is exhausted. The reason for the total dissipation of all surpluses from the resource comes from the fact that individuals operating under open access tend to make their decisions based on observed average productivity, calculated by comparing total effort versus their total yield, rather than on marginal productivity, as is expected in neoclassical maximization theories. For example, if a hunter was given the choice between

hunting in grounds A or grounds B, which yields half as much as A with constant average hunting costs, the hunter would be drawn to A rather than B since his average productivity would be doubled if he did so. However, this will only go on until the average productivity of both grounds is equated. Gordon (1954) then argues that if this outcome is extended to other hunting grounds, all the while maintaining constant average hunting costs, the hunters would eventually equate the average benefits of all the hunting grounds to the average cost, thus eroding all surpluses from the grounds (Graph 2 – Appendix A).

Moreover, a great number of people signals that less is available for more, echoing the conundrum so eloquently explained by Malthus in his essay on population (1798), and thus eventually encouraging individuals to engage in selfish behaviors as a means to assure their future survival. Couple the latter with the extra effort exerted under an open access regime and it will pave the way to a scenario known as the tragedy of the commons. Hardin (1968) explains that the extra effort, although directly beneficial to the person exerting it, will in fact indirectly harm the commons as a whole, due to the individualistic attempts of utility maximization exercised by each collaborator of the resource, in turn creating negative externalities that decrease the whole's overall benefits and productivity.

#### v) **State Owned Property Regimes**

State run properties are sometimes available to all citizens, with the state reserving the right to exclude whomever it desires depending on the ideology of the government. All decisions regarding the use of the resources typically fall back on the respective regulations of the state (Demsetz, 1967). Usually the resources controlled by the state tend to be those that

are regarded as valuable to the growth, development, and security of the nation and are often exploited in manners which are in accordance with these objectives. Nevertheless, their efficient exploitation is not always guaranteed under state regimes since the state's management efforts may fall prey to transaction costs that arise as it tries to shift from the inefficient institutions towards the optimum ones (Coase, 1960). These transaction costs may materialize in the form of negotiation costs or the need to erect and employ specialized monitoring and enforcing institutions. Also, states are often faced with information asymmetries which may lead them to face forgone opportunities. Finally, states often end up placing common pool resources with little access to them under open access regimes and may lead to the resources over exploitation and eventual depletion.

### **b) Geopolitical Setting**

The modern state that is currently known as Syria (Figure 1 – Appendix B) is a relatively recent creation that was established by the French in 1918 after the First World War. Syria remained under French control for close to three decades until finally gaining its independence in 1947. Prior to the French Mandate, Syria was a prominent state in the Ottoman Empire (Hourani, 1991). Currently, Syria is run by the Baathist party that took control through a coup d'état in 1963 and established a socialist regime, with many aspects of the country closely monitored and controlled. Located between  $32^{\circ} 19'$  and  $37^{\circ} 30'$  N and  $35^{\circ} 45'$  and  $42^{\circ}$  E, Syria's geography is quite diverse (Figure 2 – Appendix B). It is a Mediterranean country with coastal, arable, and steppe land. The primary use of the latter zones two are for agriculture and grazing respectively. Syria's climate is characterized by short spring and fall seasons coupled with long summer and winter seasons. Rainfall is quite scarce and varies between 600-350mm in the

northeastern and southern regions known as Al Jazeera and Al Hawran, to less than 200mm in the steppes, located at the center and eastern part of the country. The steppes account for most of the type of land available, making water a very valuable and scarce resource (Masri, 2001).

Therefore, given the rich history and diverse geography of the region characterised mainly by its large arid lands, a look at the previously discussed property regimes will be made possible with their evolution explored as Syria's rulers aim to manage the water resources in the area.

### III. Water Rights and the Ottoman Rule (15<sup>th</sup> century – 1918)

Emerging from a period of unrest and having just survived the black plague, the Arabic peninsula found itself at the end of the fourteenth century in a very fragile conundrum. With most of its physical and human capital destroyed and its economies mired in stagnation, it saw its regional power slipping from its grasp. The latter was further aggravated by the rise of the textile industry in Europe coupled with the development of new shipbuilding technologies that led to the supremacy of European ship merchants over the Mediterranean Sea. These overwhelming developments shifted the epicenters of trade away from the Arabic controlled regions and left most of their respective governments vulnerable to challenge as they scoured in difficulty to secure the resources needed for their populations' survival (Hourani, 1991).

The *Mamluk* Dynasty, which controlled the Levant region of the Middle East at the time (i.e. modern day Syria, Lebanon, Jordan, The Palestinian Territories, and Israel) and weakened by these series of unfortunate events, saw its sovereignty put at risk by a group of Turkish tribesmen called *Al 'Osmanlieh*, named after their tribal leader '*Uthman*. The latter, emboldened by their successful campaign in their local byzantine region, were in the process of expanding their conquests to the south east of the Mediterranean only to successfully control the entire Levant and replace the *Mamluks* by 1516. They later pushed west conquering most of North Africa reaching all the way to *Al Maghrib* (modern day Morocco). This series of conquests led to the creation of what became known as the Ottoman Empire, the largest to emerge after the Roman Empire, remaining in existence well into the beginning of the twentieth century (Figure 3 – Appendix B).



Syria, on the other hand, did not exist as a distinct entity at the time. However, the regions which are now known as the provinces of Damascus, Aleppo, and Tripoli were important components of the Empire providing valuable tax revenue to the Ottoman government (Hourani, 1991). In addition, population growth in the region was encouraged under the Ottoman rule, thanks to their successful maintenance of regional stability and the effective enforcement of law and security.

Given such conditions for economic prosperity, it would be reasonable to deduce, following Anderson & Hill (1975), that property rights at the time must have begun to become relatively well defined. Indeed as shown later, they were. Nevertheless, before venturing into an inquiry on the nature of water property rights under Ottoman rule, it is useful to understand the origin of the Ottoman view on water property rights through a look at said property rights under *Sharia'* law, since the former was adapted from the latter (Heyd, 1973).

#### **a) Water property rights under *Sharia'* law**

It is a common misconception to think that Islamic *Sharia'* Law was conceived as a set of rules and regulations implemented to deal with the difficult life set in the midst of semi-arid lands. In fact, *Sharia'* law was founded upon the pre-existent laws of the land widely known as '*Urf*' (commonly agreed upon verbal laws that governed the life of the peoples of the region) and set prior to the conception of Islam only to be later consolidated with Islamic teachings to shape the former (Bates & Rassam, 2001; Hourani, 1991). Under *Sharia'* law, water is considered as a sacred good due to its scarcity. As a result there are three possible outcomes of water possession as put forth by Faruqui (2001):

- Private property: basically this is water that is owned exclusively by one person, who possesses the right to use, trade, or sell it. Such water is actually procured from a common source and then stored in private containers such as reservoirs and distribution systems. The sale of this water may be justified as a way to recuperate the costs incurred while collecting the water.
- Restricted private property: this is water found in lakes, streams, and springs located on private land. However, if a land is annexed to this type of source, the owner of the land doesn't have exclusive ownership over the water, but rather only priority in its use. That said, she still has the power to trade the water as any other economic good.
- Public Property: mainly water found in rivers, large lakes, and the sea and is held in common property with no individual excluded from its use. Moreover, there is an absence of the privileges needed for its sale and trade found in the previous two regimes. Nonetheless, if effort has been exerted in trying to extract some of that water, say using some type of infrastructure which could be interpreted as sunk costs (i.e. well digging, water pumps), the extractor gains the right to sell or trade the collected water to reclaim these costs and therefore the water becomes similar in nature to water governed under the private property regime.

Furthermore, the law urges its followers to conserve the resource as it an important element in their environment.

As it can be deduced from such laws, water sources were the possession of no specific individual, but were rather common property with the privileges pertaining to its use

depending on certain conditions that accommodated the environmental and economic conditions of the time. In addition, these laws made possible the emergence of potentially independent water markets through their view on private property, which allowed for the storage and sale of water (Forni, 2003; Faruqi, 2001). Yet, given the contemporary setting of the Ottoman period, such a distinction was less observed due to the needs of the urban populations of the empire and its governors.

### **b) Water property rights in the Ottoman Empire**

As previously mentioned, the Ottoman Syrian provinces saw a rise in their population under the Empire's rule. This increase was made possible by the enforcement of law and order, hands on management of public services to ensure their equitable and fair use amongst the population, and close supervision by provincial governors known as *Al Qadi* (Hourani, 1991). To further support this growth, adequate control of natural resources was needed. Therefore, given the immediate benefits of arable land to the development objectives of the Empire and the semi-arid nature of the Syrian region, the government perceived these lands as their most valuable resource. The laws implemented were prioritized to regulate the use of arable land leaving water rights and its management implicitly defined by them (Bates & Rassam, 2001). Yet water rights are not to be thought of as ignored during the Ottoman period. In fact a close look at the *Mejelle*, the transcript of the Ottoman caliphate's civil law, would show water rights evolving from broad definitions as seen under the *Sharia'* law to more detailed legislation.

First off, it is clearly stated in the laws that there is no single owner of water; it is free, and the public are the joint proprietors of this resource. This definition applies to both surface and

ground water<sup>5</sup> with similarities observed between the Ottoman and Sharia' Law through their shared view that water is a common resource. Secondly, keeping in spirit with Sharia' law, water under the Ottoman code may become excludable and placed under a private property regime, with such exceptions mostly applied to wells and rivers as they are the most commonly found sources of water on land (Hooper, 1989).

With regards to wells, they remained free and open to the public if they were not claimed to have been dug by a certain person. However, if stated otherwise, these wells then became the private property of the individual that has invested the effort in digging them<sup>6</sup>. On the other hand, rivers tended to be somewhat trickier to define, since they are non-static sources of water that flow over vast areas of land and thus require more detailed laws. The ownership of rivers under the *Mejelle* is classified into the following categories<sup>7</sup>

- State owned rivers, which are river beds that do not pass on any privately owned plots of land. These rivers are considered to be public property and exclusion from their use is prohibited.
- Privately owned rivers<sup>8</sup>, which are rivers that are owned by an individual or a certain small group of individuals. Such rivers are divided into two classes that are defined by the location of its runoff. Effectively, if a river passes through privately owned plots of

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<sup>5</sup> Articles 1234, 1235, and 1237 of the *Mejelle* Book X – Joint Ownership - Continued (Hooper, *The Mejelle: Book X: Joint Ownership (Continued)*, 1989)

<sup>6</sup> Article 1236 of the *Mejelle* Book X – Joint Ownership - Continued (Hooper, *The Mejelle: Book X: Joint Ownership (Continued)*, 1989)

<sup>7</sup> Articles 1238 and 1239 of the *Mejelle* Book X – Joint Ownership – Continued (Hooper, *The Mejelle: Book X: Joint Ownership (Continued)*, 1989)

<sup>8</sup> Easier to think of privately owned rivers as streams.

land but ends its run with an adequate amount of flow<sup>9</sup> in commonly held land, it is then considered as public property and is to be shared by the owners of the private land and the public with no rights of preemption bestowed upon the former. However, if the river doesn't end its run on publicly claimed land then its contents are the sole property of the owner(s) of the land over which the river flows and rights of preemption, not exclusion, are allowed.

These laws echo and clarify the views of restrictive private ownership over water expressed in Sharia' law, where the individual(s) in ownership of land on which the water flows are conferred with privileges of extraction given that certain conditions are met prior to the execution of these privileges. Moreover, appropriation of water by one individual should not interfere with that of another in order to assure the equivalent use of the resource<sup>10</sup>. In addition, while we notice the ongoing theme of keeping water under communal property, it is indeed still possible to exclusively own water. Yet, it must be noted that this prerogative is only applicable to water stored in containers or, as mentioned above, in wells. Such methods of appropriation coupled with the intent of collection allow for the claim of private ownership over said resource, as stated in Book X of the *Mejelle*<sup>11</sup> (Hooper, 1989).

Notwithstanding these laws, one should not exclude the possibility of their abuse by the population facilitated by the existence of certain loopholes and lack of proper enforcement. In particular the constant violation of the conditions preset for restrictive private ownership. Land

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<sup>9</sup> What is meant by an adequate amount of flow here is one that is enough to sustain the works of other individuals after having initially served those of the land owners.

<sup>10</sup> Article 1265 of the *Mejelle* Book X – Joint Ownership – Continued (Hooper, 1989)

<sup>11</sup> Articles 1248 and 1250 of the *Mejelle* Book X – Joint Ownership – Continued (Hooper, 1989)

owners, at the time, often separated their land rights from those respective to water, a possibility under the *Mejelle* ( (Hooper, 1986); (Hooper, 1988))<sup>12</sup>, and sold one without the other. This led to the monopolization of water sources which consequently led to the eventual obtrusion of individuals from their land due to lack of easy access to water (Warriner, 1948). Furthermore, another possible form of infringement stemmed from the fact that land under joint ownership could be split between the owners, with each exerting his wishes over his property. As stated in the *Mejelle*:

*“Each of the joint owners becomes the independent owner of his own share after partition. No one has any further interest in the share of the other. Each one of them may deal with his own share precisely as he wishes [...]. So that if a house jointly owned by two persons is divided, one of them obtaining the buildings and the other the vacant land, the owner of the land may dig wells, or make a channel for water, [...] and the latter is powerless to prevent the former from so doing” (Hooper, 1989, p. 2)<sup>13</sup>*

The loophole emerges in the last sentence which explicitly claims that “the latter is powerless to prevent the former from so doing”. Such a statement stands in contradiction to the principles of restrictive private ownership in the sense that the individual can potentially obstruct the water flow of his partner in ownership with the other unable to stop him, effectively making him “powerless”. Hence due to said law and the lack of extensively defined

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<sup>12</sup> Articles 235 and 216 of the *Mejelle* Book I – Sale (Hooper, 1986) and article 1015 of The *Mejelle* - Book IX - Interdiction, Constraint and Pre-Emption (Hooper, 1988)

<sup>13</sup> Articles 1162 the *Mejelle* Book X – Joint Ownership – Continued (Hooper, 1989)

rights of preemption<sup>14</sup>, the violator may impose unexpected costs on the affected party, who may need to procure his water elsewhere, incurring transport costs, or need to purchase it from his partner at a mark-up.

Finally, excluding individuals from water sources was a discouraged activity under the *Mejelle*. However, some scenarios may have arisen when exclusion was necessary<sup>15</sup> and under such cases the burden of the costs was to be taken by the owner of the resource rather than the state (Heyd, 1973).

As it can be deduced from the previous paragraphs, water rights in the Ottoman Empire were relatively well defined and allowed for various scenarios of ownership. In addition, water was managed under a semi-communal type regime that looked for the most equitable use of the resource while aiming to conserve it since in Islam wastefulness was perceived as a sin (Faruqui, 2001). Moreover, the laws allowed for the separation of water and land rights with the possibility of transferring or exchanging one without the other creating, in the process, separate owners of each resource, which has unfortunately led to the misallocation of the resource through its monopolization. Nevertheless, water was never under the threat of overexploitation.

As well defined as the *Mejelle's* laws were, it must be noted that they did not apply in the Syrian steppe due to a couple of reasons. First of all, the steppes and mountains were hard to govern due to their geography. Secondly, they were of less interest to the governing rulers

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<sup>14</sup> The *Mejelle* only states who has access to the water but doesn't explicitly define what governs said access other than claiming that one person shouldn't harm the other through his actions (Hooper, 1988) and (Hooper, 1989).

<sup>15</sup> This could be seen as an attempt by the joint owners of a plot of land to protect their rights of pre-emption to a privately owned river. Under such circumstance only the owners share pre-emption rights amongst them but not outsiders.

due to the lack of the arable land. In other words, the transaction costs associated with monitoring and enforcing the Empire's property rights in the steppe far outweighed the benefits gained. This absence of control was further acknowledged by the rulers through their recognition of the various tribal leaders located in these regions and granting them jurisdiction over their claimed territories (Hourani, 1991). And so with the lack of the universality of the *Mejelle*, different water property rights emerged in these regions.

### c) Water property rights in the Syrian Steppe

Unlike the controlled urban areas of the Ottoman Empire, property rights over water and land in the steppe were seen as inseparable since the benefit of possessing the rights to one was virtually non-existent without the ownership of those respective to the other (Forni, 2003). This insistence over ownership of both land and water will stand as the prime distinction regarding water property rights in the steppe when compared to those found in the Ottoman run areas. Furthermore, tribes in these isolated regions claimed sole ownership over a spring or well and the land that surrounded it and shared the resources amongst its members by collectively managing it all the while excluding outsiders (Rae, Arab, Nordblom, Jani, & Gintzburger, 2002). However, it must be pointed out that natural resources in the steppe were considered under Ottoman law as *mushaa'* and *mawat*, which in essence are commons that are accessible to all; contradicting with the bedu's adapted regime (Heyd, 1973). Moreover, the enforced law of the steppe was that of *'urf* which also claimed that water in the region was the possession of all. Hence, to further understand why such a collective ownership regime was adapted, it is useful to understand the conditions under which such a regime arose.



The steppe is a vast land located in the east of modern day Syria and bounded by the natural paths of the *Al Khabur* and Euphrates rivers (Figure 2 – Appendix B). It is an area that is deprived of the abundant rain fall that coastal and mainland cities close to the humid airs of the Mediterranean Sea enjoy. Water in these regions is therefore a scarce resource and its lack of supply poses a great obstacle to the development of the land, making survival difficult. Furthermore, water sources are only found in isolated locations in the steppe, on land that is difficult to exploit, making agriculture a capital intensive activity that may entail large costs. For this reason grazing is the only economically viable process (Hourani, 1991; Bates & Rassam, 2001; Lightfoot, 1996).

Grazing was adopted by the various tribes that resided in the region, known commonly as *bedu*. An important characteristic of grazing on the steppe was its dependence on the availability of water sources, which in turn determined the type of livestock embraced by the tribe. Closely situated water sources encouraged the raising of sheep and goats, while the need to travel long distances favored camels.

One can even compare the *bedu* to the cattle herders of the American West, with the latter also resorting to claiming grazing lands in order to support themselves. All the same, an outstanding distinction between the cowboys of the west and the nomads of Syria was the westerners' indifference towards specializing in grazing since they often possessed cultivated lands on which they simultaneously raised livestock (Bates & Rassam, 2001)<sup>16</sup>. Some

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<sup>16</sup>Another distinction was that the cowboys also shared views over water that were in tune with those of the *Mejelle*. Anderson and Hill (1975) state the water rights of the great plains as laws which :

"1. Granted to the first appropriator an exclusive right to the water and to later appropriators rights conditioned upon the prior rights of those who have gone before

agricultural tendencies were observed with the *bedu*, but were seldom practiced due to their view that agriculture was beneath them (Hourani, 1991; Zakaria, 1983). Furthermore, *'urf* customs, which governed the behavior of the *bedu*, and Sharia' law, which was also followed, dictated that water first be used to quench the thirst of humans, then that of animals, and then use whatever remained for irrigation (Faruqi, 2001). This set of priorities may further explain the *bedu's* disdain towards agriculture and preference for pastoralism.

With that said, such a high valuation of one's self is often encountered when dealing with the *bedu*. Furthermore, it is through the high estimation of their position in their society that they were able to survive for a long time, since the community was often used as security (Forni, 2003). This translated such sentiments into a proper tool used for the management of their economic issues, such as the sustainable use of a water source.

In this regard, the *bedu* have developed a collective ownership regime that is similar in nature to the generic one described in the contextual theory part of the paper. Under said regime, the *bedu* controlled their appropriated properties as common pool resources with access restricted to only the members of the tribe. In addition, they did not aim to over exploit the resource as its conservation guaranteed their long term survival. Thus, their set up appeared to fulfill most of the conditions postulated by Ostrom.

First of all, all the tribes' boundaries were well defined and enforced by the tribe members themselves. Furthermore, each tribe controlled a part of the steppe (Figure 3 –

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2. Permitted the diversion of water from the stream so that it could be used on non-riparian lands
  3. Forced the appropriator of water to forfeit his right if the water was not used, and;
  4. Allowed for the transfer and exchange of rights in water between individuals." (pp. 16-17)

Appendix B) and reciprocally respected the others' claims, thus ensuring each tribe's respective returns to the land and water resources they controlled.

Second, the *bedu* tribes were constructed in a hierarchal manner that put the matters of the community in the hands of their leader known as *al sheikh*; which literally translates to the elder. The *sheikh* oversaw all concerns that emerged within his tribe and outside of it, with all decisions reliant upon his consent. Moreover, it was his responsibility to mediate the disputes of his tribesmen and lay whatever judgment he saw fit, but only after seeking the tribe's opinions and hence creating an environment of collective choice while providing conflict resolution mechanisms (Zakaria, 1983).

Third, these tribes lived together in remote areas of the steppe and therefore based their continued survival on their ability to coexist with each other. This was made possible by the norms and rules that governed the tribe which allowed for their sustainable coexistence. The norms' efficacy was further amplified by the pride and reputation they bestowed upon the tribesmen that abided by them in turn granting him, and his respective tribe, with much revered social capital (Rae, Arab, Nordblom, Jani, & Gintzburger, 2002). A consequence of the latter was the incentive to monitor the implementation of the rules, offering a cost effective method of enforcement, as mentioned in the theory section.

Forth, infractions upon the agreed upon norms were not taken lightly, since, as argued by Zakaria (1983), *sheikhs* preferred to instill austere punishments such as prison, hard labor and in some cases execution to maintain order and security within the tribe as they believed that fines were unsuitable for the task. This enabled the *sheikh* to maintain the bargains placed,

as these punishments caused significant depreciation of an individual's social capital due to their indiscrete nature.

Finally, due also to their remoteness and the reluctance of the Ottoman Empire to govern the steppe, the tribes of the region were given minimal rights to organize since the Ottoman rulers recognized their authority over their claims (Hourani, 1991).

In addition, this success was also achieved through the existence of individuals within these tribes who were not rational egoists. The *bedu* tribesmen were conditional cooperators in the sense that they had to work with one another to survive under the difficult conditions of the desert. Also the *bedu* were willing punishers, as they had to instill sanctions, such as ostracism, to maintain cooperation and discourage the violation of the norms.

However, it must not be assumed that all tribes lived in constant peace with each other. Conflicts did exist, but cooperation often prevailed to ensure the collective survival of the whole. This was observed when the far eastern Camel herding *bedu* sought refuge in the camps of sheep herding tribes during the months of drought and accessed the usually restricted water sources of the sheep herders; a possibility due to the trust and reciprocity obtained through their shared norms (Rae, Arab, Nordblom, Jani, & Gintzburger, 2002). This accommodation highlights the importance of the social capital acquired through these shared criterions and the flexibility of their property regime to adapt to their economic problems<sup>17</sup>.

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<sup>17</sup> Rae et al (2002) state that "given the nature of the arid environment and the size of one territory, herders need to maintain flexible, reciprocal arrangements with other groups to maintain mobility".

Finally, such valuation of norms can also be seen as a manifestation of the low discount rates put forth by the *bedu* towards the existing natural resources in the region, and were only allowed to remain low thanks to the effective control of these standards over the management of these resources (Ostrom, 1990). Put differently, exhaustion of the available surrounding resources would have been an inevitability if the *bedu* saw their future survival put under great uncertainty due to the lack of proper enforcement of property rights which these standards undoubtedly provided and also ensured the conservation of the resource over time.

This form of resource management and property rights had been in effect since before the Ottoman Empire and was maintained well throughout their rule. However, their collective regime later came into contestation at the end of the 19<sup>th</sup> century and the beginning of the 20<sup>th</sup> century, with the growing interests of Europeans in the region. At this time, the French and the British sought access to the region, as it provided them with viable trade routes to most of their territories (Hourani, 1991). Moreover, their interests led to the introduction of efficient modes of transportation across the Syrian steppe, consequently affecting the livelihood of the camel herders of the region who gained their living through the long haul transportation of goods across the steppe. This development created a significant change in the economic environment, causing the camle herders to shift their efforts towards the herding of sheep and goats. In consequence, these groups relocated to the edges of the steppe in order to support their newfound activity (Rae, Arab, Nordblom, Jani, & Gintzburger, 2002). This resettlement brought problems to the incumbent tribes, displaying the frailty of the governing property rights and their inability to adapt to new circumstances. With limited water sources in the area and a significant increase in demand, clashes between the entrants and the incumbent tribes had

erupted, as they competed for the resources to ensure their survival. Moreover, the sudden increase in the benefits of appropriation led the tribes to seek the already standing legal institutions of the Ottoman Empire to write down and clearly define their respective property rights and claims, since the existing set of institutions was no longer adequate for the management of the resource. Converting to written property rights was unprecedented, since the previously regime was purely verbal down (Zakaria, 1983).

Meanwhile, as the *bedu* were struggling to adapt to the new economics of the time, the Ottoman Caliphate was in decline and was undergoing several reforms to “catch up” with the west by employing European inspired policies. Nevertheless, these reforms failed to be successful (Hourani, 1991).

#### IV. Water rights and the French Mandate (1918-1946)

With the collapse of the Ottoman Empire and the establishment of the French mandate in Syria following the First World War new laws and regulations were put in place to control water and its use, consequently revoking the long standing laws of the *Mejelle* that had governed Syria for almost four centuries.

Under the French regime, water was considered state property thus differing from the commonly owned view under Ottoman rule (Longrigg, 1972). Nevertheless, it remained available to the public for use and subject to the decisions of a special oversight committee. The committee allocated the use of water resources through the award of licenses. One type of license was for periods of less than one year and permitted the erection of non-permanent structures for drawing water in exchange for royalties. A second type of licenses was for periods varying between one and forty years and permitted:

*"1. the erection of permanent works for the drawing of water or for damming up of water resources; 2. the use of water power; 3. the drainage of marshlands and their reclamation; and 4. the use of ground, artesian, mineral or thermal waters."* (Caponera, 1954, p. 147)

However, non-artesian wells with a flow of less than 100m<sup>3</sup> per day were exempted from these license requirements.

Caponera (1954) explains that these licenses endowed the holder with rights equivalent to those found under private property, therefore the holder was allowed to manage his pre-empted share of the resource any way he saw fit. Moreover, if the conditions pertaining to the procurement of the license were not fully agreed upon by the committee and the licensee, then

the individual was also capable of gaining the aforementioned private property rights by presenting the committee with a down payment covering the value for the water used while the resource was under the individual's private ownership.

Nonetheless, Caponera (1954) also points out that some restrictions applied in order to keep the use of the resource equitable between all of its users. First of all, any impediment of flow of the waters of the public domain was strictly prohibited. Moreover, any alterations to the existing waterways or illegal tapping into water springs and artesian ground water was not permitted. Secondly, the government reserved the right to revoke and expropriate the water rights of any individual.

These laws show how the French view of water deviated from that of the *Mejelle*, since under the new laws individuals could be excluded from its access if they did not have the appropriate licenses. The application of effort, collection and intent were no longer sufficient to gain water rights. While this entailed costs on the appropriators, in the form of licensing fees and time spent validating their claim, it gave the government the opportunity to better manage the resources and, in their view, allocate them to their most efficient use. However, since Syria was a newly formed country, much effort was devoted by the government to define, study, and delimit the properties to assure their correct distribution and assignation (Longrigg, 1972). As discussed by Allen (1999), these efforts would materialise as transaction costs faced when establishing these new property rights and, given the fact that the country just underwent an overhaul of its rules and regulations, the costs were expected to have been high as the government needed to erect new institutions and assign new personnel to manage them and



enforce their rules. Moreover, the move to commit the management of water to governmental institutions can be seen as a validation of the value of water as an input to production and the growth of the country as perceived by the French. Nonetheless, while these costs may have been high, the licensing procedure offered the government a way to recover them, to some extent, through the fees and later the royalties that these licenses provided.

Moreover, as the world was changing, with the rise of the French and British powers, so was the economic environment of Syria and the role it played for the French. As argued in the theory section, a change in economic conditions is often accompanied by a change in property rights, which is what was observed with the new laws enacted by the French. The long term licenses, which offered rights similar to those under private property regimes, showed that the French understood the importance of the sustained assurance of property rights in order to productively use the resources and better internalize their benefits, and more so, the fact that the communal ownership of water with rights to pre-emption, as stated by the *Mejelle*, were no longer fit for the tasks at hand. Furthermore, resources procured thanks to these newly assigned property rights were no longer only used to produce goods that were consumed locally but also goods that were exported internationally. This new export orientation meant that benefits exceeded the costs the French had to undertake to set up the new system.

All the same, leaving the realm of codified water laws and observing the actual manner in which the population practiced their water rights at the time, one would notice that, other than the need for licenses, not much had really changed from the time of the Ottoman Empire since water found on privately owned land, as brought forth by Caponera (1954), was still the private

property of the land owner. Also, he describes that customs often still governed water resources that have been licensed to be collectively managed by a small band of individuals. Such water resources were kept under open access if the water flow was sufficient to support the community or placed under collectively agreed upon regimes, such as those found with the *bedu*, or in the form of a time share, where if the flow was limited each individual had access to water at certain pre-determined times during the week; as found in some of the small villages located away from urban centers (Caponera, 1954). More so, Caponera (1954) observes that newly developed irrigation projects have gained access to the use of state water through metered weekly dosages that were given out by the government. Nevertheless, he also claims that some situations arose where a certain group of individuals may have obtained more rights through their high status in society. This was portrayed by the fact that a significant portion of the arable land in Syria, with adequate water supplies, was owned by a small group of elites who were favoured and supported by the French (Caponera, 1954; Keilany, 1980; Longrigg, 1972); putting into question the equitability the newly assigned laws were trying to implement.

These laws remained in effect and governed water resources well into the 20<sup>th</sup> century, a period in which major changes happened all over the Middle East and especially in Syria. The most outstanding change of the time was the sudden increase of the population in the area, encouraged by the advances in technology, which rendered many of the rural workers redundant due to the introduction of new methods of farming in the marginal lands of the country, increasing productivity, and further justifying the decision to control the country's water resources and shift to a regime of private property rights made possible by long term licenses. Moreover, the expansion and countrywide application of railways and trucks in the

trade of goods put at risk, as previously mentioned, the livelihood of the Syrian pastoralists, pushing them to relocate to the edges of the steppe and eventually turning them later, due to further economic pressure, into sedentary folk (Hourani, 1991). Finally, progress in the domain of health services and medicine increased the life expectancy of the population.

This swelling of the population entailed with it an increase in the demand for consumable goods and therefore a rising need to satisfy it through the increase of the effective yield of the local agricultural sector, which had already used up all of the arable land available and had begun expanding to the marginal lands further to the east of the country (Hourani, 1991). This transition into the more capital intensive lands required the implementation of sophisticated irrigation systems, which, as discussed above, were supplied and licensed by the government. However, while the water supplied to these systems was still regarded as state property, and although its provision was sometimes limited to a specific day of the week depending on the location of the land, it remained openly accessible when it was running. And since most of the costs of water delivery were shouldered by the state, farmers had little incentive to conserve water. This situation established the necessary conditions for the tragedy of the commons.

## V. Water Rights and The Syrian Arab Republic (1946 – present)

### a) Water property rights during 1946-1970

Matters were further aggravated in the 1940s, when Europe's recovery from the Second World War made profitable the investment in the cultivation and exportation of cash crops (Longrigg, 1972), such as wheat, barley, and especially cotton. By their nature water intensive, these crops put further pressure on water demand, risking overexploitation of water due to its cheap cost.

Throughout the thirties and forties, the local rulers of Syria sought to gain their complete independence from the French mandatory power. They first attempted their claim to independence in 1936 and succeeded in achieving their goal in 1937 through the Franco-Syrian Treaty of Independence, with *Hashim Al-Atassi* as the first president of the republic. Nonetheless, the French did not ratify the treaty and therefore Syria was maintained as a French mandate.

However, with the fall of France to Germany in 1940, Syria was placed in a fragile situation. Consequently, the British and Free French conquered the country in 1941. Upon their invasion, Syria was declared an independent country but was not officially recognized as an independent republic due to the reluctance of the French and their ongoing plight to gain their own independence from the Germans.

Yet finally, after further pressure from the local authorities, Syria was officially recognized as independent on April 17, 1946. Syria then found itself under the control of the nationalist government of *Shukri Al-Quwatly*. The following years were riddled with political

instability, with more than twenty dissolutions of the governing cabinet, until finally stabilising under the *Ba'ath* regime of *Hafez El Assad* in the 1970s.

During this time not much changed in the terms of water property rights, with most of the laws of the French mandate carrying through into the newly formed republic (Caponera, 1954). However, changes in the political stance of the country did affect the level of water usage. With the ever growing influence of communist Russia on the country and the frequency of military coups, Syria has found its political spectrum initially dominated by nationalistic views that later morphed into socialism (Syrian Consitution, 1973). Under these influences, water remained the property of the state, in accordance with the socialistic views of the regime. Moreover, regional turmoil, including the Suez crisis and the Israelo-Arab conflict, placed a demand on the domestic resources of the country. In addition, continuously increasing population and Syria's regional aspirations pushed the state to increase its economic output.

In 1958, a land reform policy was put in place to address these concerns looking. Its main objective was to grant the landless their own lands. Prior to this reform a small number of elites held the rights to most of the arable lands of the country. Moreover, most of the already newly installed irrigation systems were only found on these privately owned lands. As a consequence, the poor either had to work as labourers for those land owners or attempt to cultivate their own non-arable lands with little or no access to water (Longrigg, 1972; Keilany, 1980). Given the nature of the Syrian geography and climate, one can see how water stood as the greatest obstacle towards the development of the country's agriculture sector (Garzouzi, 1963). Therefore, the government, thinking on the same lines as Coase, believed that the

redistribution of land property rights could achieve a more socially optimum outcome.

However, this policy placed heavy transaction costs on the government, as it worked to maintain the newly redistributed rights. In particular, the government subsidized the costs of the land through its distribution to the poor farmers in return for low payments paid over 30 years, with an often insignificant interest rate (Salman & Mualla, 2003; Keilany, 1980).

Furthermore, as another form of subsidy, and to further encourage cultivation of marginal lands, water was supplied to these newly appropriated properties at little or no cost to the farmer. Water continued to be managed by the same entity as under the French mandate (Ahmad, 2001). Also, the government established new institutions, such as co-ops, that were supposed to complement the already existing ones. However, conflicts arose, notably with the *bedu*, as their rights to their collectively owned resources were abolished and placed under state control. This change placed additional costs on the *bedu*, as they attempted to change the lifestyle they have lived with for centuries (Rae, Arab, Nordblom, Jani, & Gintzburger, 2002).

The reform was declared completed by 1970 (Tuma, 1979). However, not much redistribution of land had occurred despite the fact that more than 1.5 million hectares had been expropriated over the period of the reform (Keilany, 1980). Moreover, the portion of irrigated land remained unchanged. This was made clear by the preference to invest in the already existing irrigation systems, since expansion of the water network entailed larger costs and lesser returns when compared to the already proven revenue generated by the already developed land. Furthermore, some peasants preferred to lease their land to private entrepreneurs as they could not support the costs of maintaining such lands. Most of them were prior to the reallocation of land, either working for a land owner or sharecropping and

therefore making enough revenue to sustain themselves and their family (Bates & Rassam, 2001; Keilany, 1980). In effect, they remained stuck in a poverty trap, where they had enough to get by, but not enough to save and invest. In addition, when confronted with the costs of maintenance of arid land, its development, irrigation, cultivation, and required governmental payments, coupled with the lack of experience to manage the production process, trips to the market, and lack of proper information about market prices, many farmers found it advantageous to lease their land. Furthermore, the additional investments, made by the already established land owners, in the arable land's infrastructure made harder for the new land owners to compete.

Moreover, as the productivity of the original arable lands increased, water sources became more susceptible to depletion. Couple this fact with the artificially low price of water set by the government and it would be found that the land owner was producing at a level where his marginal benefit was lower than the actual marginal cost. This situation was inefficient and led to the overuse of the water resource.

Displeased with the outcome of the 1958 land reform, the ruling Ba'ath party decided in 1970 to expand the country's water network (Keilany, 1980). In accordance with their goals, they increased the amount of irrigated land by claiming all water as the property of the state.

### **b) Water property rights 1970-Present**

The past efforts of the Syrian government to manage their hydraulic resources portray a stance in which they aimed to increase and assure the supply of water to the populace in order to achieve their development objectives and the successful cultivation of the national land.

They looked to control the public resource through the creation of government institutions which in turn took it upon themselves to manage, deliver, and bear all the costs relating to the redistribution of its rights, which could be seen as a form of supply management. Furthermore, their approach was perceived as the most effective at the time as it coincided with the philosophy of the ruling government. It also allowed, in their view, the effective employment of the resource into the its most profitable uses, since most of the national land was underdeveloped and the population inhabiting these lands lacked the necessary capital for their transformation. And although successful<sup>18</sup> in some respects, they unfortunately placed great pressure on the water sources of the country; through the lack of adequate pricing. Moreover, Syria found itself in a situation where state control ended up placing common pool water resources with little users into open access properties with an increasingly large number of individuals.

Over the next two decades, Syria began to experience the first signs of the exhaustion of its water sources. Many groundwater wells became polluted and salinized from over pumping and the chemical pollution from their employment in heavy industrial uses (Salman & Mualla, 2003). This series of events was made possible by the failure to properly set the price of water for only then can water be allocated efficiently and conservatively used over the long term (Hildering, 2004).

Syria's water management regime is no longer seen as sustainable due to the decreasing marginal benefits and high costs it places on the government (Ahmad, 2001). With the

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<sup>18</sup> Keylani (1980) states that the outcome of the reform was favourable due to the government's commitment to the equitable distribution of income which had improved, while not significantly, the livelihood of most peasants and integrated them into the national identity.



increasing scarcity of water and its importance as an input to production in the agricultural process, which uses up to 80% of the country's water resources, new reforms are needed. And in fact, the Syrian government has now shifted its water policy from one that managed its supply towards one that is concerned with demand management (Salman & Mualla, 2003). An effective demand policy must include:

- The pricing of water according to its costs. Such a policy would allow for the government to curb the demand for water by causing individuals to re-estimate their costs versus their benefits. This would permit the efficient use of water since a more adequately set price for water will need to reflect the actual costs faced by the government when supplying the population with water, the opportunity costs faced when devoting their resources for the provision of this water, and the user cost on future consumption. Such a policy would lead to efficient production procedures. Moreover, the policy should be phased in gradually and must include the full cost of water provision in the long run, since failure to do so may misrepresent the actual scarcity of water and potentially lead to further misuse (Ahmad, 2001).
- The taxation of the resource, justified by the fact that unregulated and openly accessible resources are often susceptible to being overexploited and that government intervention is needed in order to ensure their conservation (Carruthers & Stoner, 1981). Such a policy would allow for a moderate and relatively low cost method of controlling the use of water as it may be used as an exclusion tool if the tax significantly increases the farmer's costs.

In order to better address their demand management strategies and also the conservation of the country's water resources, the Ministry of Irrigation passed Law 31 in 2005, which clearly defines the waters that are under the public domain and explaining each state owned water source in detail (Law 31 - Water Legislation, 2005). Moreover, it establishes the manner in which water rights can be acquired, and provides greater transparency in their distribution to ensure no conflict of interest. In addition, Law 31 requires that licenses be acquired for all kinds of wells and for the installation of pumps. The ministry of Irrigation reserves the right to employ the conditions it sees fit when awarding licenses such as the compulsory instalment of counters, specification of the amount extracted, and the uses that the water could have. The Ministry also gives itself the prerogative to revoke licenses without compensation if a licensee violates the pre-set conditions of his contract or fails to satisfy them. Serious offenses are punishable by significant fines and jail time.

Although Law 31 places more power in the hands of the government, it also entails more costs, as the government will need to better monitor the licensees. In addition, Salam and Mualla (2003), point out that Law 31 fails to specify how it will be implemented and who will implement it. Moreover, the government also faces information asymmetry when it comes to finding out the exact demand levels for water, as it is unaware of the exact conditions of all water markets across the country. This unknown information will lead to several trials and errors and will cause the government to face further costs as it tries to find the correct price for water's efficient use.

Nonetheless, there is also a camp of individuals that support the decentralization of the water rights through the establishment of water markets. They believe that the erection of perfectly competitive markets would allow through the free trade of these rights the emergence of the true price water and in turn fully reflect its scarcity, curtailing the pricing problem of the government (Salman & Mualla, 2003). However, as discussed by Coase (1960), this is only possible if transaction costs were non-existent, a tall order since to enforce these proposed policies, property rights over water need to be properly defined and vigilantly enforced. Moreover, none of the above stated solutions would efficiently work under a regime of poorly defined rights and therefore require the emergence of positive transaction costs that may possibly lead to incorrect water pricing if not taken into account.

## VI. Conclusion

In conclusion, it has been observed that water is a very crucial element for the survival of individuals in Syria. Its domestication was the key to their prosperity as it allowed them to transform agriculture from a subsistence activity to that of a driver of economic growth. It has also been seen, throughout this paper, that Syria had gone through various institutions that governed water over the past century and a half, with the latter changing based on the socio-economic needs of the time in question.

As with regards to the conservation and sustainable use of water, it is in the author's belief that the collective regime of the *bedu* was the most successful. However, as argued by Demsetz (2002), we observed these regimes fail as the Syrian economy became more productive and complex, calling forth new institutions. Under the new system of property rights, water resources were governed through a supply management approach, which allowed for its exploitation to satisfy the objectives of the ruling power and address the period's economic problems. Nevertheless, these institutions failed to sustainably use the water sources as they neglected to take into account the user cost on future consumption. This problem required a change in approach towards one that is demand oriented and which takes in account the ignored user cost.

This paper has only brought forth the reasons, through the evolution of property rights, why the water sources in Syria have become degraded and over exploited. Since we now know that the problem is due to the failure of its institutions, it would be interesting to further explore how Syria will cope with this problem and if it will be successful in doing so.

## Glossary

**'Urf:** The past law that was set before Sharia' law in the Middle-Eastern land and was rarely written down.

**Al Maghrib:** Arabic word designating north western Africa. And currently the Arabic name of modern day Morocco.

**Al Mamluk:** Ruling Dynasty in the Middle East during the 12<sup>th</sup> to 14<sup>th</sup> century

**Al Quadi:** Provincial ruler set by the ruling Ottoman family.

**Bedu:** Nomadic people of the Syrian steppe

**Mawat:** Literally translates to dead and representing the status of life on steppe land.

**Mejelle:** Ottoman civil code.

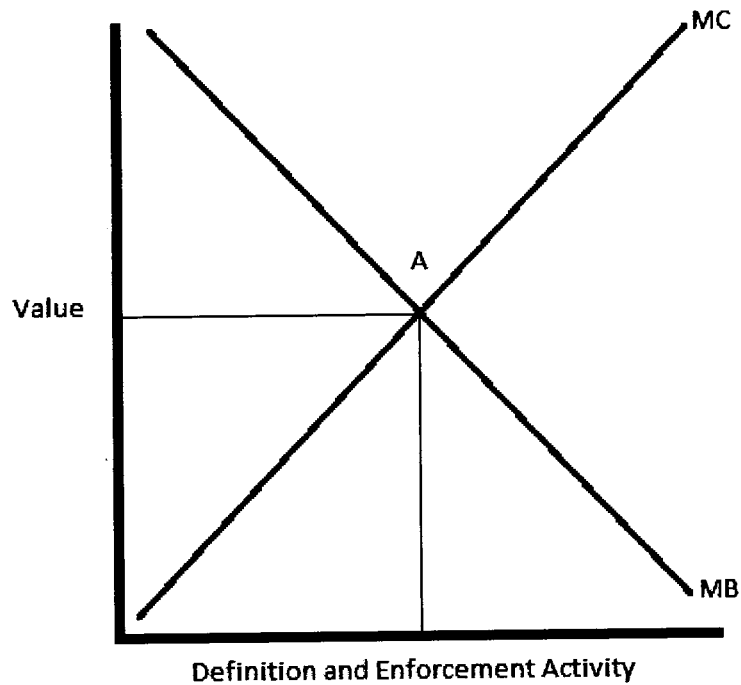
**Mushaa':** Common lands.

**Qanat:** Roman style wells

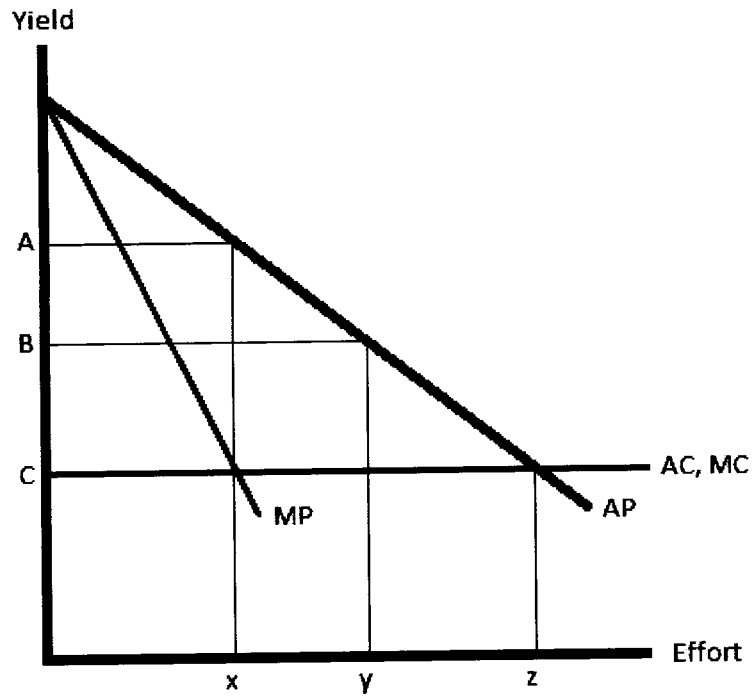
**Sharia':** The Islamic law and its way of life.

**Sheikhs:** Elders of the Syrian steppe's nomadic tribes.

## Appendix A - Graphical Representation of Select Property Right Models



Graph 1 – Anderson and Hill (1975) theory of property rights model. In this graph we see that we will be at an equilibrium amount of definition and enforcement activity as soon as marginal cost (MC) equates marginal benefits (MB). The marginal benefit curve is affected by changes in productivity, where an increase in productivity would shift it rightwards while a drop would shift it leftwards. The marginal cost curve is affected by the amount of resources needed to define the property rights where a increase in these costs would shift it upwards and a drop in them would shift it downwards.



Graph 2 – Gordon (1954) private versus open access model. In this graph, we see that under the efficient outcome, where marginal cost (MC) equals average cost (AC), the level of effort,  $x$ , is much smaller than that which is exerted under open access,  $z$ , where AC is equal to the average product (AP) and all economic rent has been totally dissipated. Moreover, it can also be argued that the effort exerted at point  $y$  may be that found under a collectively managed regime where AP is greater than AC.

## Appendix B – Maps

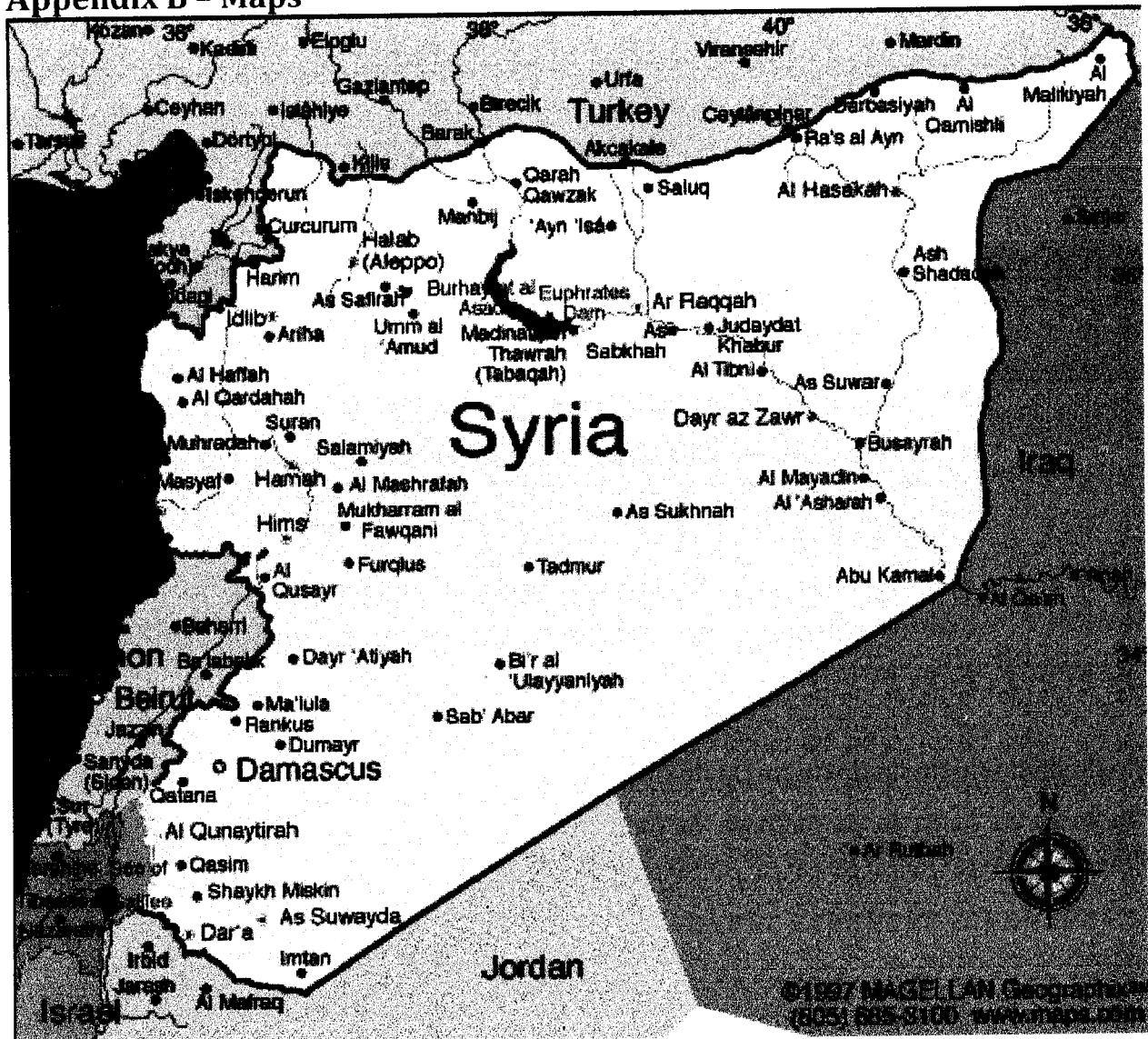


Figure 1 - Map of Syria (Syria, 1997)



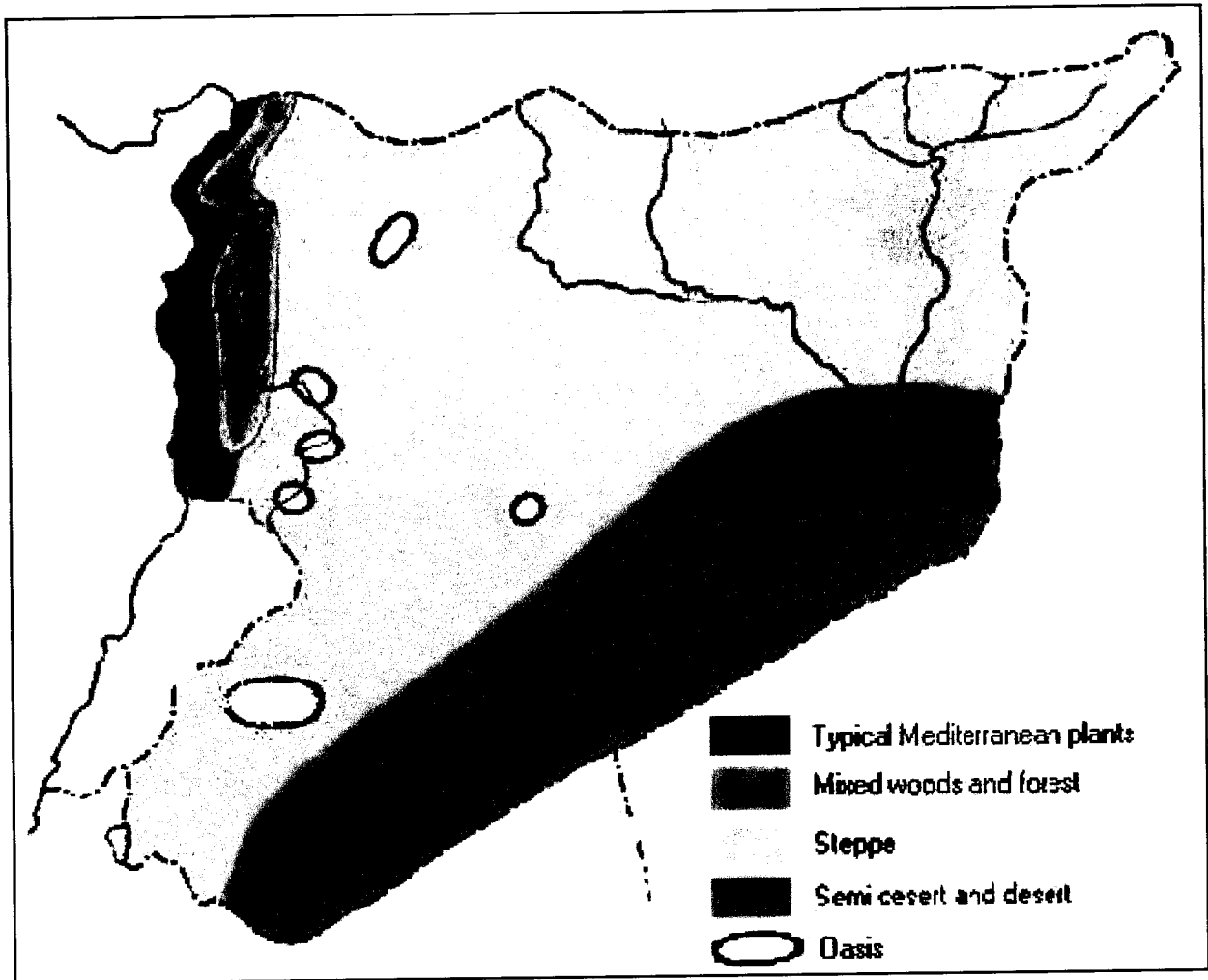


Figure 2 – Vegetation Map of Modern Day Syria (Masri, 2001)

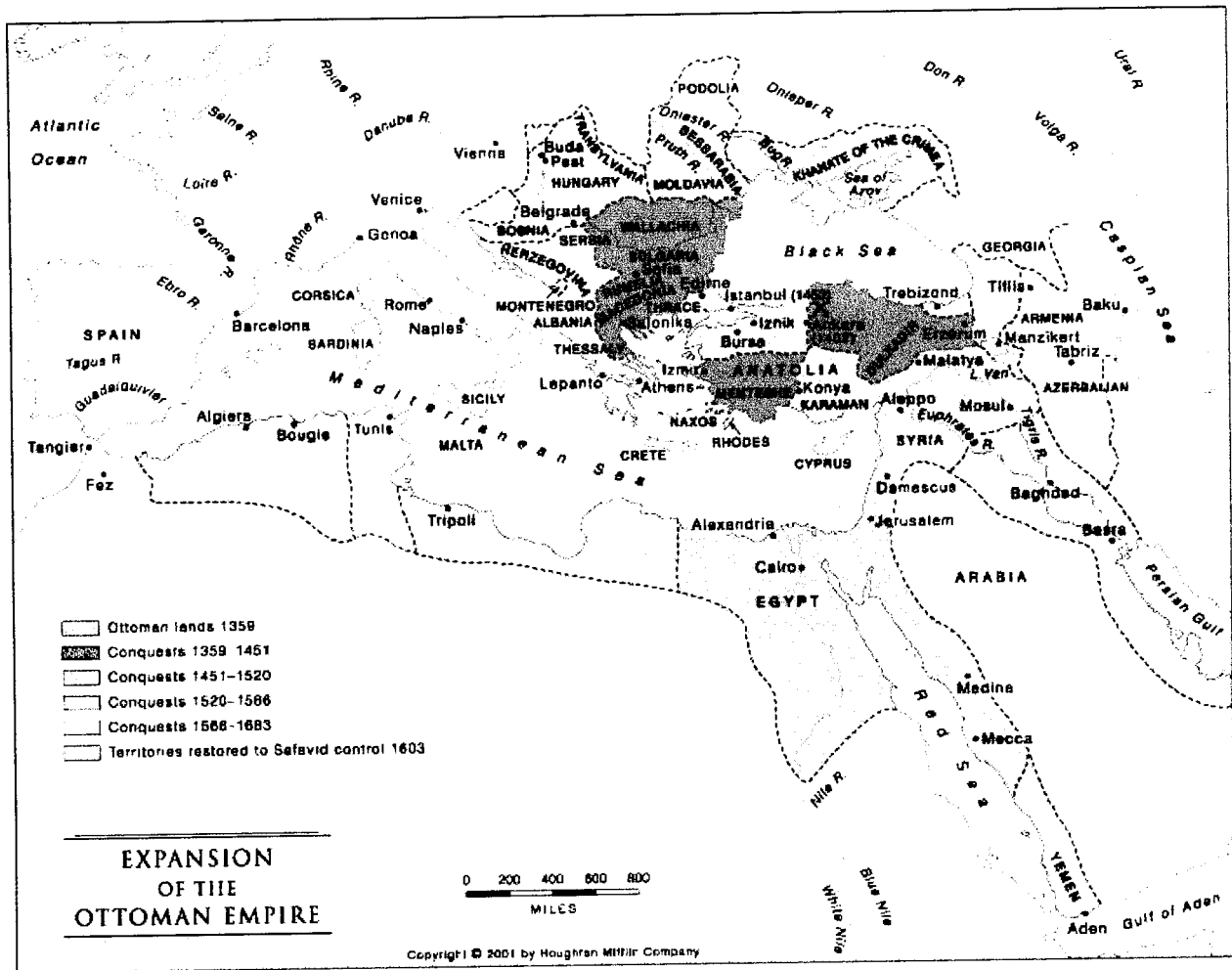


Figure 3 – Map Showing the Expansion of the Ottoman Empire (2001)

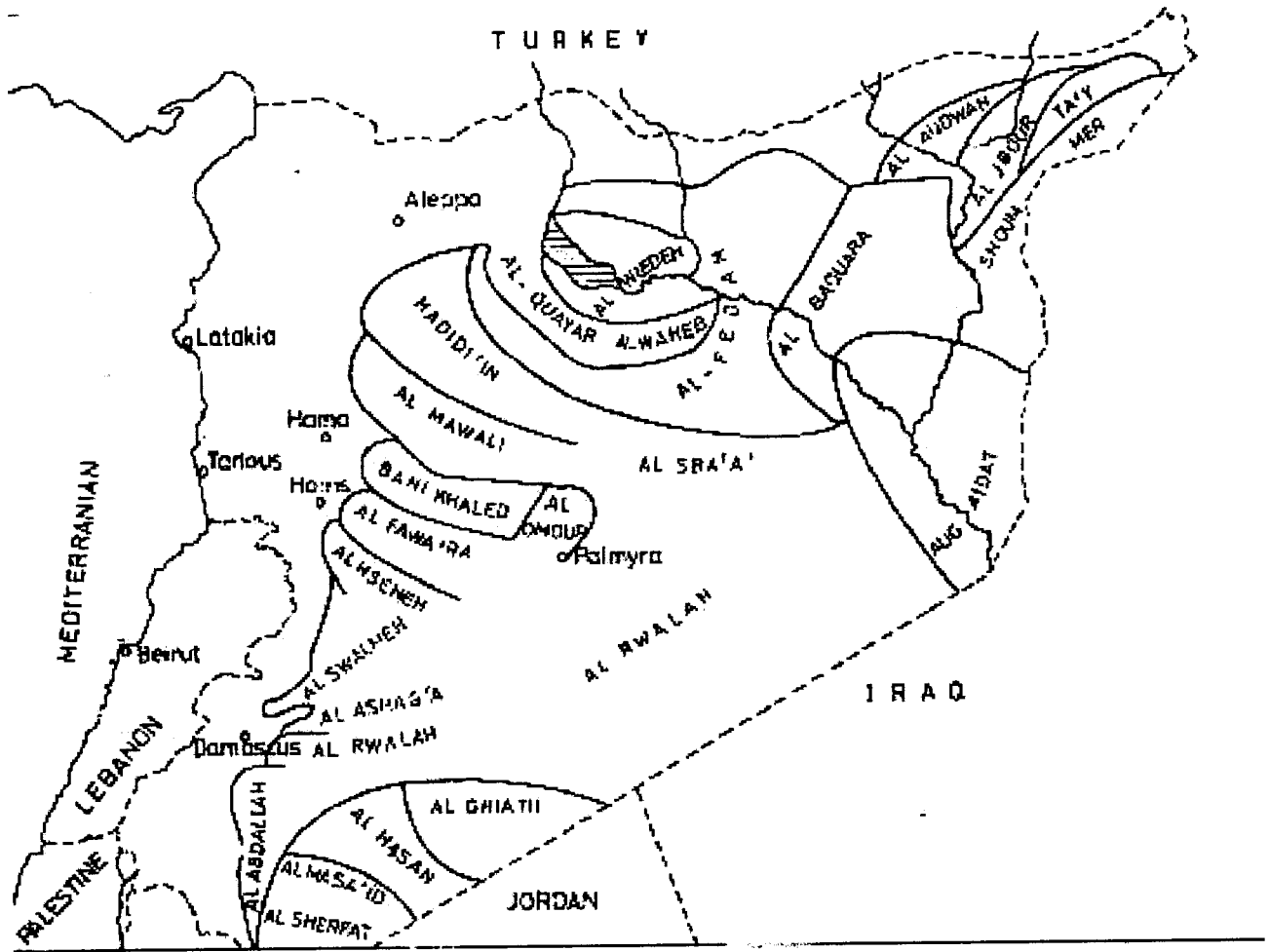


Figure 4 - Map Showing the Major Pastoral Tribal Boundaries. Badia Dept. 1964 by A. Masri (Masri, 2001)

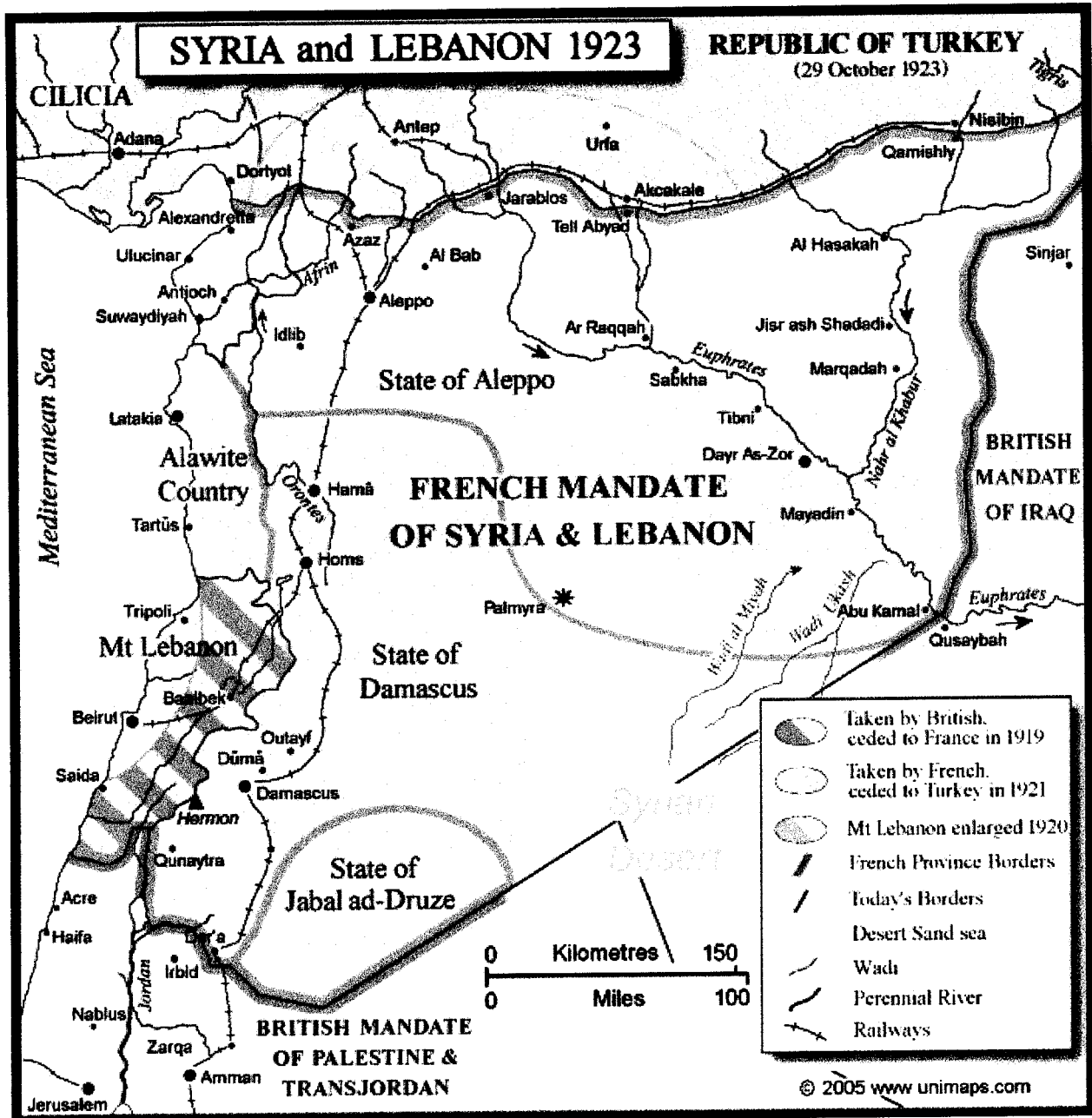


Figure 5 – Map Showing Syria Under the French Mandate. (Syria and Lebanon, 1923, 2005)

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