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Biological Resources

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The Mediterranean region was the cradle of the modern world; the so-called "western culture" was born there, and even the fast developing economies of the Far East are strongly based, in those aspects concerning technical achievements, on a cultural Mediterranean origin.

The region attracted for millennia a huge number of peoples whose effects can be appreciated from very different points of view: on one hand, they provided a highly variable human types which proved excellent for cultural achievements; on the other hand, there was a permanent confrontation in the waters, near the coasts and adjacent areas, provoking the depletion both of human and biological resources.

Although human resources are not examined in the present work, it is impossible to avoid mentioning them as biological resources which have to be handled by man. The prospects are not optimistic. The expected increase in population is not evenly distributed in the Mediterranean region: the rate of increase in the final period of this century is 2.5% for the Near East and North Africa, and 0.6% for the northern shore; still wider is the gap concerning the agricultural population: for the southern rim, it will be 0.6%; for the northern rim – 4.5%. These indices do not show the whole picture; concerning agricultural products, both the demand and production will be rather constant in northern Mediterranean countries, whereas in southern Mediterranean countries, the demand will increase while production will decrease. For example, the expected demand for cereals in the year 2000 will be twice as important as that recorded in 1985 for the Near East and North Africa. Of course, these data were calculated before the actual world crisis, but events at the beginning of this decennium do not allow to be more optimistic nor to foresee any hopes of drastic economic change.

Such are the people who will use and take care of our biological resources: People crowded in megalopolis while the farms are being abandoned; people with more needs and less capacity for producing food.

I – The Sea

The Mediterranean has always been a rich sea, and still is. Although most fish consumed nowadays in the "fish countries", like Spain, does not originate from the Mediterranean Sea, Mediterranean fleets are active, especially coastal ones. Some Mediterranean products are very much appreciated as delicacies and, up to the present time and generally speaking, have no substitute coming from other seas, although this situation can change in the future. Some other products of potential interest (e.g., algae whose use is only occasional) have not been studied from a practical point of view: their potential remains intact.

The coasts are overpopulated, and the provisions for the next century suggest that this trend will be even stronger, with a pernicious effect on the soils, the waters (both continental and maritime) and, forcibly, on the biological resources. In some places, more than in others, over-exploitation of resources have depleted them and modern policies try to limit the number of captures in order to protect these resources. Although these regulations may slow the pace to exhaustion, unless a positive action in other fields is undertaken through research, the same negative result will be reached in the next future: fish can be domesticated in the same way as sheep, cows... ten thousand of years ago in the same broad region. Very likely, fish breeding will be possible only for a few species, but if these are the critical ones (e.g., those most appreciated as delicacies), it will be a giant step forward in the conservation and even the increase of natural products.

However, the excessive exploitation of Mediterranean fish is not the only problem. Less water from rivers is now poured in the Mediterranean compared to the past. Agricultural needs led to gigantic irrigation schemes and more people need more drinkable water. Besides, this smaller amount of water is more polluted than before: due to more factories, and more waste poured in the rivers. In addition, large rivers are controlled by dams which retain most of the organic matter they usually transported to the sea (the Nile is a paradigm, but not the only example), a fact that causes two important effects: a tremendous loss in food for the marine life and a change in the coastal environment. The open sea is also polluted by an excessive maritime traffic, oil spills and other catastrophic events.

How to resolve these problems is hard to say. International treaties on trade, industry and agriculture have to be perfectly well implemented, as well as sound national policies concerning fisheries, coasts, but also rivers, irrigation schemes, deforestation, etc. It will not be an easy task to convince farmers asking for water, or forestry industries, that a mismanagement will affect the marine environment.

II – The agricultural resources

Agriculture, broadly speaking, was born in a part of the Region, the Fertile Crescent, and spread very soon to both sides of the Mediterranean. The wealth of species and techniques increased in the course of the ages as the whole region was the focus of attention for the western world for millennia. Crossed by Phoenicians, Greeks, Romans, Arabs and Berbers, Christians and traders of all races and religions, it was an authentic "melting pot", more than any other existing "pot". Fruits from India and China were known several centuries B.C. The New World species became acclimated so soon that maize was known for a long time as *triticum turcicum*, but this is not the only example of rapid adaptation. Many crops are felt as native in the region, and some of them **are** crops because they were either domesticated or re-domesticated here: tomato, sunflower (before the oil-rich Russian varieties), etc. This absorption of crops is taking place since ancient times: rice, lemon, orange, sorghum, cotton, the pre-American bean (at the present time, *Vigna unguiculata*), even sugarcane, banana, etc. The same happened with domesticated animals; not only thrive here the old Mediterranean species, but also alien ones such as the water buffalo and the horse. (Who would think that the horse was domesticated in Central Asia?)

The previous paragraph tries to show that almost every living being can be grown in the region. However, this enormous potential is very much limited nowadays compared to the past. On one hand, there is the critic factor represented by human resources; on the other hand, there are the barriers imposed by physical constraints which can be dealt with separately, but has to be mentioned here.

The Mediterranean climate, with its alternating rainy and dry seasons, drought and wet cycles, represented a challenge, and not surprisingly agriculture and civilization arose in the region. But the same physical factors make difficult the maintenance of the created items. The environment is very fragile, in a perpetual unstable equilibrium. The ever increasing population of the Region required a continuous increase in food production, both of vegetal and animal origin. In order to obtain more food there were several possibilities; among others: land reclamation at the expense of forests, more intensive soil exploitation (for example, by irrigation) and increasing the number of grazing animals. The consequences are well known: the fragile equilibrium was lost. Many marvels can be said about the richness of our biological resources, and all of them can be true, but their real possibilities depend on our faculty to regenerate the environmental lost equilibrium.

Although many cultivated species were thought to be lost since ancient times, modern recollections and screenings, or simply good agricultural knowledge, have demonstrated that many of them are still in use. Their cultivation and use are local or marginal, but they are still in the farmers' fields. For how long? It is impossible to say as they can be swept by market or political decisions. To these species, many more can be added which were never cultivated *sensu stricto* but could be domesticated if they could find a suitable market. These are mainly medicinal and aromatic plants, but also fruit trees and shrubs and even potential vegetables.

The richness in cultivated plants and domestic animals is only paralleled by the variety of environments that can be found in the Mediterranean Basin which has to be briefly mentioned because the amount of resources is dependent on these environments. They can be described as follows:

- Intensive cropping in river valleys and coasts: vegetables, fruits (including exotic ones), flowers. The number of species of possible use is almost unlimited. The southern rim of the area is increasingly important in this sense.

- Extensive farming in rainfed zones: lowlands, open landscapes; the productivity is high, but at the present time there are strong market regulations, especially in EEC countries, with a likely but illogical reduction of the number of profitable species to be utilized.

- Intermediate zones between the rainfed ones and the mountainous areas: olive, vine, *Quercus* forest or parkland (the Spanish name, *dehesa*, refers to the latter). These species are perfectly well adapted to their environment. The number of species could increase in olive and vine plantations through a change in farming technics, for example in the direction of a minimum tillage which enhances the use of the vegetal soil cover. The *dehesa* has to be totally recovered for modern exploitation, following a period of absurd land reclamation in such an environment.

- High altitude areas: they are very important and as diverse in the region; research on the possibilities they offer is carried out in some countries. Their biological resources are also very variable; generally speaking, they are left for grazing or for forestry.

- Rangelands, steppe and desert: biological resources are limited, but still here there is need for more intense research as in many cases; arid conditions are favoured by, if not derived from, obvious human mismanagement.

These zones represent a gradient in biological resource richness. The theoretical potential to be assessed in each of these regions is largely unknown. Figures obtained in specific places are available, but they do not represent the authentic potential more than the experimental breeder's plot. Besides, maximum yields do not seem to be the solution for the future; they are an important factor in explaining the actual situation of agricultural resources, i.e., the low number actually utilized in a region that can absorb almost everything. The words for the future are not "monoculture" and "high yielding" but "poly-cropping" and stable production. In this sense, the Mediterranean Basin will be in a privileged situation provided the human and the physical resources are recoverable.

III – Forestry

The dense population living in the region led to the transformation of forests into agricultural or, more frequently, pasture lands. The wood was used as fuel or burnt; rangelands appeared in the place of Mediterranean forests. Other forests served to build immense trade ships and war armadas, leaving bare soils and ecosystems which degraded very quickly. The loss of the political centre of gravity in favour of Central or Western Europe also meant a loss in agricultural technology, with a strong impact on the conservation of the, until then, rich Mediterranean farming.

There are alpine forests in the high altitude areas in the Mediterranean region, but the typical Mediterranean woodland is very different in nature: a *Quercus* forest or parkland with a flora very rich in shrubs (especially in the former) and herbs (especially in the latter). The parkland was always used in the past for grazing. The Spanish *dehesa* is a good example; if it is mentioned here as well as in the last section, it is because the *Quercus* parkland is in between extensive farming or pasturing and forestry. This Mediterranean *Quercus* forest is also very rich in wild animal species; hunting is an important industry in many countries in the region. If wisely exploited, these are natural resources that can complement those of agriculture and forestry *sensu stricto*.

The typical Mediterranean forest has been largely neglected by European scientists and professionals likely, as a consequence of "school addiction": the impact of the German founders of the European silviculture, based on a completely different pattern of species and habitats, is still alive (this fact could be another consequence of the loss of the political centre of gravity long time ago). However, the secular

exploitation of this forest (again the Spanish *dehesa* is a good example) is a perfect example of authentic sustainable agriculture, involving a complex system of crops, trees and animal interaction.

This kind of forest is not appropriate for timber. Its only commercial product in this sense is cork. Its use could better be classified under agro-forestry, an old technique actually increasing in importance within the frame of a sustainable agriculture. Neglected for a long time, even cleared in many places for farming (although their soils are rather poor for this activity), its rational use should be strongly reinforced. *Quercus* forests should not be transformed in parklands just because the latter can be managed from an agricultural point of view; their importance from an environmental point of view is outstanding, in addition to their use as both hunting and fishing reserves and natural parks for recreation. The *Quercus* parklands should be well managed and replaced if partially cleared. Nobody has yet tried to breed selected varieties of *Quercus*, whether for cork, acorn or looking for any other characteristic as, for example, a more rapid development; nor has there been much effort placed on other aspects as fertilization, rejuvenation, etc. (with the exception of *Quercus suber* in Portugal). Such an important Mediterranean resource, as well as all its environment, should not be neglected any more.

IV – Other resources

In the above paragraphs, the main sets of biological resources have been briefly described. There are more habitats, such as lakes, ponds, marshes with all their rich flora and fauna. Many wild terrestrial animals have disappeared forever, but still many other survive. Their existence is linked to forests and other more fragile natural habitats, as those just mentioned. These "natural reserves", even protected by law, can be saved only by strong measures of protection (they would be much better protected by an increase in the educational level) as they suffer the bad consequences of the "popularity effect" as well as from the wave of "natural life" produced by an ecological (and frequently misunderstood) vogue.

V – Concluding remarks

Is the Mediterranean region prone to a total exhaustion of biological resources? Fortunately, this **is not yet** the case. Biological resources are still abundant in the region: The sea is still rich in species from bottom (coral for example) to surface. Fish and seafood still resist human pollution and indiscriminate exploitation. The whole Region is rich in aerial fauna and an essential station for migratory birds. Many important bird sanctuaries are located here, although a constant fight against tourist, agricultural and spurious interests challenge their permanence in the long term. This richness is important not only in itself but also as an index of habitat diversity. Besides, the region hosts a wide variety of endemic vegetal species, probably ranking second after the tropical rain forest.

It could be thought that the past richness in agricultural species was largely lost. Recent surveys show a different picture. Many are still known and cultivated; it is true that most of them can only be considered as marginal crops, but they are largely recoverable for traditional or new uses. The so-called New Agricultural Common Policy is the most serious menace for these species, as well as for many actual crops that can become marginal and for many traditional agricultural systems whose potential value has to be redefined within the frame of a sustainable agriculture.

The Mediterranean Sea was for long time a link between peoples. Several facts of very different origin broke these links. The subsequent absence of intense exchanges between the northern and the southern Mediterranean shores for centuries played a negative role in the actual pattern of both human and physical resources. Both of them are essential in determining the existence and maintenance of biological resources. Hence, to recover the old fluid links between the northern and the southern Mediterranean rims should be considered the first priority in any programme trying to maintain and to use the Mediterranean biological resources now and in the future.

The Mediterranean countries are obliged to maintain an invaluable wealth whose loss the modern world cannot afford.