I would like to make two opening observations:

(1) I will speak as a biologist and as a concerned citizen of a developing country where evergreen shrublands (chaparral/matorral) are an important resource. (2) Although the responsibility for these comments is mine, they were discussed with the other Chilean participants in this meeting and are thus part of a consensus among us.

Whereas there are many striking similarities between the various Mediterranean ecosystems around the world, there are very important differences in sociocultural aspects. Thus, whereas the biology satisfies a convergence criterion in many cases, the history of management, the history of science, and the aims and resources of the people inhabiting those areas do not converge. People in the various Mediterranean areas seem to impact different requirements on their ecosystems. In part, these differences are due to the fact that the use of the Mediterranean-type ecosystems shrublands, from man’s point of view, is not independent from the use of other ecosystems. Thus, for example, the California chaparral is a heavily subsidized system in which the possible uses are only in response to needs of city dwellers: water management, fires, and recreation. The income and resources required by people inhabiting the area of the California chaparral come from sources other than the chaparral ecosystems. This situation is most likely to be different just across the Mexican international border. There, although the biology would probably be very similar to the one we see here, the system is much less subsidized and people have to live out of what the Mediterranean ecosystems can supply them. There, uses are not as much associated with requirements of city dwellers as to people actually living in the shrublands. The situation with California Indians might have been similar to that in developing countries.

In fact, observing across the various Mediterranean-type ecosystems, there is a whole spectrum of these kinds of situations in which California and perhaps South Africa are at one extreme and North Africa, Mexico, and Chile are closer to the other.

In central Chile, for example, the matorral occurs along a 1000-mile-wide altitudinal vegetation belt on the longitudinally extended Andes and on the Coastal Ranges. The central valley between these mountain ranges is occupied by a savanna, and the marine terraces along the coast were occupied by a mixture of evergreen and drought-deciduous shrublands. Further north, drought-deciduous plants dominate. Towards the south, the predominant elements are evergreen forests.

Chilean evergreen shrub lands are thus part of wider management units in which the various altitudinal and to a lesser degree latitudinal vegetation belts offer different resources and impose different constraints. Along the wider valleys where there is irrigation, fruits and other crops are grown. On the dry, flat areas, the main problem now is grazing. Fires seem not to have been part of the natural situation in Chile.

Historical grazing management units seem to have been strips of land that would allow animals to graze at low elevations during the winter and early spring, and the high altitude grasses during the summer and early fall. Today, this is still largely the case, although a more sedentary situation also holds. In both cases, however, management questions could be roughly dichotomized into problems in the dry, flat areas and those on the slopes.

On the flatter areas, continuing research is dealing with substituting the existing shrub cover with more palatable species (i.e., Atriplex spp.). This arrangement should provide grasses during one part of the year with the shrubs buffering the animal’s requirement when the grasses are dry. Animal science, management of plant cover, animal loads, and optimization are key phrases. A poster was presented during these meetings which explains the research efforts and results in more detail.

By contrast on the slopes, potential erosion is high enough so that only animal numbers can be managed. Removal of the shrub cover could cause severe soil losses and is no longer recommended. In fact, during the 19th and early 20th centuries, the removal of shrubs was done and severe erosion followed. Here, along the steeper slopes which is where the poorest people live, the key phrases for us are ecosystems resilience, management of goats, and fuel extraction for domestic purposes.

Earlier in this meeting, J. Simonetti and I presented some results concerning the possible devastating consequences of the introduction of goats into Chilean shrublands. We even posed the question that eventually goats may so devastate the vegetation that they may have to be replaced as a source of income.
However, since there are people living in and out of the Chilean shrublands, biological considerations have to be compromised with studies of human desires and needs. Therefore, as it is likely to be the case in other Mediterranean ecosystem regions, biological research in the Chilean matorral must include collaboration from scientists in nonbiological disciplines. Thanks to the efforts of the Man and the Biosphere (MAB) Program, this collaboration is occurring.

I do not need to refer here to the problems that arise when this kind of effort must be implemented. I believe, though, that symposia such as the one this week will help increase the understanding between people working in various disciplines. Meetings should include not only biological and physical scientists and managers but also social scientists.

In this meeting, as well as in a previous one held in Chile about 10 months ago, I found that there is a "gap" between managers and scientists. This should decrease in the future and instead of being a drawback, it should be a reason for more meetings of this sort—international and diverse. Particularly, as a biologist from a developing country, I think there is need for true integration among disciplines in which the biology of human use is studied and later set into a wider perspective in collaboration with researchers from other disciplines. Within this context, the differences between Mediterranean ecosystems and the aims and uses people make of them could actually become a source of fruitful comparisons and inspiration for us all.