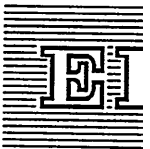




United Nations
Environment
Programme



Distr.
RESTRICTED

UNEP/IG.5/INF.3
20 December 1976

ENGLISH

Original: ENGLISH

Intergovernmental Meeting of Mediterranean
Coastal States on the "Blue Plan",
Split, Yugoslavia
31 January - 4 February 1977

FOOD, AGRICULTURE AND THE ENVIRONMENT

IN THE MEDITERRANEAN BASIN

Note prepared jointly by the United Nations Environment Programme
and the Food and Agriculture Organization (UNEP/FAO)

GE.76-12439

INTRODUCTION

1.1 General Features of Mediterranean Agriculture

This paper aims only to give a broad picture of agriculture and its relation to environment in the Mediterranean basin. The region considered is the coastal area and river basins up to a distance from the sea not exceeding, in principle, a hundred kilometres, and submitted to Mediterranean climate. This climate is characterized by a cold rainy season and a hot dry season in summer.

However, within this definition there is a large variety of subclimates depending on total annual rainfall, mean maximum and minimum temperatures, etc... The Mediterranean climate thus divides, according to EMBERGER's classification, which is the most widely accepted, into humid, subhumid, semi-arid, arid and Saharian sub-climates, altitude being another factor of diversification. There is clearly a corresponding variety of conditions for agriculture, and each bioclimatic zone within the Mediterranean basin has its own specific problems.

However, Mediterranean agriculture taken as a whole shows common original features, the most striking of which are (a) its ancient tradition, linked with the civilizations which succeeded in the Mediterranean basin and resulted in a common, although multifaceted culture and (b) several specific products such as olive oil, wine, citrus fruits, hard grain, sheep, etc.

Another important feature of Mediterranean agriculture, particularly in the drier parts of the area, is extensive misuse and over-exploitation of the natural resources which are (a) limited, due to the fact that there are few areas of good soils with proper rainfall or irrigation water, and (b) prone to degradation due to such factors as irregularity of rainfall and erosivity (or "aggressivity") of climate towards soils which are often on slopes and fragile, periodical fires destroying the woody and herbaceous vegetation and leaving the soil exposed to the erosive effects of the recurrent windstorms and torrential rains. The vital necessity to produce enough food for the increasing population of the Mediterranean basin has led to over-extension of crops on marginal land, resulting in soil erosion, destruction of the woody and herbaceous cover, and reduction of the grazing areas. As animal populations at the same time increased and were restricted to the poorer grazing lands and forest areas, the resulting overgrazing led to vegetation and soil degradation thus aggravating the desertification process.

1.2 Agricultural Production and Food Requirements

Agricultural production has consequently been unable to cope with increasing food requirements of the fast-growing population, with increase rates ranking among the highest in the world in the case of the less developed Mediterranean countries. In most countries of the Southern and Eastern shores there is generally a deficit in proteins as well as in the calorie ration. Most of these countries are largely food importers, and a considerable increase in food demand is expected to occur in the years through 1985 mainly for cereals, meat, sugar, etc.

Therefore the most realistic solution - even assuming that the population rise can be checked in the near future - lies in intensification of agriculture and resources use by implementing proper land use management preserving and restoring resource condition and productivity and raising the level of technology to make optimum use of land and resource capability.

II. ENVIRONMENTAL IMPLICATIONS OF AGRICULTURAL PRODUCTION

Intensification of agriculture (sensu lato, i.e. including grazing land management and silviculture) based on sound land use management and on sustained yield principle generally improves the environment, since it implies banning such practices that might entail degradation of the environment considered as productive capital. It can be said, therefore, that environmental problems that may arise in the process of agricultural development will in most cases be the result of misuse of the natural resources, and the factors contributing to the increase of agricultural production.

Agricultural production activities can be divided into irrigated agriculture, rainfed agriculture, grazing land management, and forestry. These will be examined respectively from the viewpoint of their inter-relationship with the aims of preserving sound environment quality.

2.1 Irrigated Agriculture

This is the most intensive form of agriculture, in which optimized use is made of water, the main limiting factor in the Mediterranean region since it is least available in seasons (Spring and Summer) when solar energy is most available for photosynthesis. Traditional irrigation uses river flooding (Nile Valley), spreading of temporary stream (wadi) floods, and watering from wells. Modern agriculture, apart from extended drilling of shallow and deep wells, has recourse to the building of dam reservoirs on rivers for inter-seasonal storage of water.

Water management problems connected with the creation of new water resources are:

- (a) allotment of water to agriculture, or to alternative uses such as supply of water to towns or industries, and hydro-electric power (cf. Document UNEP/IG.5/INF.6).
- (b) improving utilization of irrigation water, mainly by reducing losses: lined canals or pipelines, sprinkle or drip irrigation.
- (c) pollution of drainage water due to excessive or ill-managed use of fertilizers or pesticides.

Irrigated agriculture in the predominantly semi-arid and arid areas of the Mediterranean region induces environmental problems, the most common of which are the following:

- (a) salinity or waterlogging in the soils, stressing the paramount importance of proper water management and of drainage, which is as essential as irrigation itself;
- (b) health problems due to parasites spread by irrigation water (e.g. bilharzia).

2.2 Rainfed Agriculture

Rainfed agriculture comprises two main groups: annual crops (here mainly cereals) and perennial tree (or shrub) crops: olive trees, vines, and fruit trees such as fig, apricot, almond, etc...

Soil erosion may often be a problem in rainfed agriculture. It can take the form of wind erosion (e.g. in olive plantations in the Tunisian Sahel), and more often of water erosion, when cultivation is extended on unsuited soils and slopes, although it occurs even on land with a very gentle slope (1 to 2 per cent). Erosion and soil degradation can be enhanced by wrong cultivation practices and by insufficient integration of livestock in agriculture, when monoculture of cereals excludes fodder crops in crop rotation, relying on grazing on stubble and fallows as main source of fodder.

Measures to be taken in order to increase food production and ensure preservation of the productive capital should be centred on intensifying agriculture on suitable soils rather than extending cultivated areas, by:

1. Using more productive plant varieties. Best examples of this are the Mexican wheat strains in North Africa, which are currently replacing the Florence-Aurore variety that had itself brought in a decisive improvement in wheat production some forty years ago. However, such varieties with a high production potential are also more exacting in terms of fertilizers and pesticides, machinery and energy, and technical ability of the farmers.
2. Using better agricultural techniques, including soil tilling, crop tending, crop rotation implying crop diversification.
3. Recycling the organic matter, especially by processing animal manure in closed tanks allowing the recuperation of methane as a by-product which is a most valuable source of energy for the farms as well as contributing to more rational use and management of the woody vegetation.
4. Controlling soil erosion. In this respect, erosion control methods once developed in North Africa (Algeria, Morocco and Tunisia) and now accepted as classical, should be critically revised since they do not appear on the whole to have been very successful nor to be satisfactorily adapted to both traditional and modern agricultural systems. Emphasis should be put on protective measures on soils with a gentle slope: contour ploughing, alternate contour strips, stubble mulching, crop rotation including temporary pastures, etc..., soils with a steeper slope being better allotted to permanent pastures for intensive animal husbandry, or reforestation. Roman terraces with loose stone walls, as found in Lebanon or South-East France (where they are locally called "restanques") are a perfect erosion control system which should be restored in many places especially for tree crops. Building such terraces is a labour intensive work.
5. Planting wind-breaks. These are generally accepted as necessary in irrigated schemes. However, there is reluctance in recognizing their usefulness in rainfed agriculture because they facilitate nesting and reproduction of sparrows and other bird species harmful to agriculture.

2.3. Grazing Land Management and Animal Production

Countries of the Southern and Eastern shores of the Mediterranean experience a severe deficit in animal food products, especially meat and milk. Apart from the huge potential production offered by possible integration of animal husbandry in both rainfed and irrigated agriculture, a point which should be stressed is the wide scope for the

establishment of permanent pastures and intensive animal husbandry especially on heavy soils on slope under good rainfall (humid and subhumid zones), which have a very poor potential for wheat production and are subject to severe gully erosion and landslides. The Riff region in Morocco, the Khroumir and Mogod regions in Tunisia are good examples of such areas. Restocking these slopes with well-adapted local fodder grass and herb species such as Sulla (Hedysarum), Phalaris spp., Fescue-grass, Orchard grass, etc. will create good pastures that will stop soil erosion even on very steep slopes as well as permit development of intensive animal husbandry. In such areas of the humid and subhumid zones, forest grazing generally practised under poor animal and grazing management is unproductive and thus is frequently an uneconomic land use in the long run; under these conditions forest grazing is definitely harmful to the forest stands (compacting of soil, reduction of ground cover and destruction of young regeneration). Thus the establishment of productive pastures would provide a sound alternative, as well as create a bumper zone between agricultural crops in the plains and forests on the hill.

A basic problem is the lack of understanding of grazing management practices and principles, which is true also for more extensive grazing land in drier zones. An extension/education programme is needed to help eliminate the general problem of overstocking and overgrazing, which has led to deterioration of the forage production capability of many lands in the Mediterranean basin.

In the steppic zone which comprises extensive grazing areas (arid sub-climate), sedentarization of livestock has often been advocated as a solution to help solve the problems facing traditional pastoralism. This, however, meets with insuperable obstacles, and a sounder alternative would seem to be maintaining or restoring transhumance together with traditional association with settled agriculture. As far as possible, this should be done under improved forms including cultivation of fodder crops, and such specialized productions as lamb meat using industrial cross-breeding of local livestock with high potential improved sheep breeds for instance. FAO is, for instance, organizing an expert consultation meeting on this subject, concerning Mediterranean cattle and sheep, which will be held in Rome in the first half of 1977. In co-operation with UNEP, FAO is also implementing a programme on the ecological management of arid and semi-arid rangelands (EMASAR) and, in co-operation with UNESCO, the MAB 3 programme to stimulate attainment of the above implied goals of sound, integrated resources management.

2.4 Forests

Mediterranean forests are on the whole very degraded, due to excessive offtake of wood (mainly for fuel purposes), overgrazing and fires.

Since they play an essential role in the protection of watersheds, forests should by all means be protected against the destructive factors mentioned above:

1. Against abusive forest grazing, the consequences of which are soil compacting due to trampling by animals, destruction of the protective herbaceous cover and of the young regeneration, the best means of control is to offer the local populations better economical prospects, particularly by creating permanent pastures and developing intensive animal husbandry outside the forests (see above).

2. Control of forest fires offers wide scope for efficient action. Since a symposium on forest fires in the Mediterranean region is due to take place in France during the Spring of 1977, it will not be dealt in more detail with this point here.
3. In order to reduce offtake of firewood, emphasis should be put on developing the use of alternative fuels and domestic energy sources such as kerosene, natural gas, butane, bio-gas, solar energy, etc... This is the very theme of a project proposal submitted in November 1976 following a consultancy carried out by UNEP (Firewood and Substitutes in the Sahelian Zone and North Africa). See also Document UNEP/IG.5/INF.10.

Heavy deficit in wood products supply in the Mediterranean zone should encourage optimized utilization of the existing forests, the productivity of which, although generally low, is not negligible. This will greatly contribute to their preservation. Main species are Cork Oak (only in Western Mediterranean area), and Aleppo Pine which can be used for particle boards. Other potential production are the wood of other Mediterranean forest species, and those offered by proper management of wildlife resources (e.g. wild boar hunting).

There seems to be a preference among foresters, especially in developing Mediterranean countries, to concentrate efforts on afforestation schemes rather than the protection of existing forests. Though this tendency is quite natural under the institutional and infrastructural conditions prevailing in those countries, measures should urgently be initiated to change conditions in order to halt and possibly reverse the trend.

Protection of the existing forests and related management if it can be ensured for a sufficiently long period, will result in their self-rehabilitation, often more quickly than usually assumed, at the same time conserving valuable forest genetic resources.

Within such a basic approach, forest plantations should be established on the best available sites, for mass production of industrial wood for pulping and wood-based panels, as village or farm plantations yielding round wood (e.g. building poles, some industrial wood, firewood) or for improving the quality of the human environment.

III. CONCLUSION

The primary objective of the Blue Plan is to achieve better "environmental management". In the agricultural context sound environmental management is the rational and integrated application of good practices in land allocation, agronomy, animal husbandry and in the management of grazing and forest lands. Socio-economic structures and conditions often impede implementation of sound land use planning and rural development projects which could help release the pressure on impoverished natural resources and reverse the process of degradation to rehabilitation of the environment. Efforts are needed to overcome this handicap and develop more productive agricultural systems adapted to the ecological conditions prevailing in each individual zone, watershed or management area.

A general guideline should be to aim at maximum possible development of agricultural production for both meeting increasing food requirements of the Mediterranean populations, and exporting valuable foreign exchange earning products such as olive oil,

citrus fruits, early vegetables, etc.... Emphasis should be put on concentrating investments, given the choice, on regions and sectors where they will induce the maximum possible return. To take an example, increasing yield of wheat in fertile areas will better repay for a given investment than would the same action in marginal areas that would be better converted to pasture, thus improving grazing opportunities and rehabilitating the environment.

Careful attention should of course be given to avoiding adverse side-effects of agricultural development such as pollution by chemicals, to take only this single controversial example. Concerning more particularly the use of pesticides, increased efforts are needed to investigate the integration of non-chemical with chemical methods with a view to decreasing reliance on the latter, to monitor the distribution and impacts of pesticides when used on any substantial scale, to raise the standards of registration and other regulatory services governing their introduction and use, and generally to extend and improve advisory and extension services relating to the control of pests and use of pesticides. FAO is implementing programmes with these objectives. These include project activities in association with UNEP and UNDP.

A last point which deserves special mention is the preservation of the genetic resources of the Mediterranean region, which are often impoverished or in danger of disappearing if relevant measures are not taken in time, for instance in the case of cereals, pasture species, livestock (especially sheep and goats).