The role of Agriculture in the Maltese Islands

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Background

It is thought that prior to human settling and intervention, the Maltese Islands had vast areas covered with Mediterranean Sclerophyll Forest with an undergrowth of smaller trees, shrubs and climbers. In sheltered areas such as on hillsides and in valleys, the olive (*Olea europea*), the carob (*Ceratonia siliqua*), the bay laurel (*Laurus nobilis*) and several others dominated. The tenth-century Arab chronicler Ibn Hauqal wrote that Malta was inhabited only by savage donkeys, numerous sheep, and bees. Human settlement resulted in the falling of trees for their wood and the clearing of land for agriculture and habitation and in the management of best practice as permitted by the availability ob natural resources. Although today agriculture is the largest land user (47.8%) it is under constant treat of land sealing and urbanization, rural to urban migration and loss of local agricultural genetic resources. Having achieved an artificial area occupying 28.6% of the total land mass, the influence of human activity is strongly evident and further underlying the significance of the island's agricultural areas as a green lung.

Natural resource limitations

Malta is handicapped by a number of structural constraints limiting its agricultural prosperity. The most obvious is the severe scarcity of land, followed by and equally severe scarcity of water. Malta's climatic conditions, including low and erratic rainfall patterns, that are not favourable to rain fed production, which together with the effects of climate change, will impose further severe disadvantages on productivity. All areas of utilisable agricultural land are affected by one or more of the following natural handicaps: unfavourable soil chemical status as a result of alkalinity and the calcareous nature of the soils, soil salinity, unfavourable soil physical characteristics, shallow depth to bedrock, low soil organic matter, high soil stoniness, and unfavourable water regime as a result of an impermeable surface crust. The consequences of the semi-arid climate are of particular relevance to water management. These include: variability in inter-annual and intra-annual rainfall, high-intensity, short duration rainfall events, seasonal scarcity of precipitation when the water requirements of the agricultural sectors are highest, frequent occurrence of low rainfall years when groundwater recharge is likely to be low and finally, frequent occurrence of high rainfall years when runoff is likely to be high. Additionally, the grazing of once abundant populations of sheep and goats caused damage to mature trees but more importantly prevents them from regenerating. Deforestation, especially followed by overgrazing with soil compaction, can be considered as the principal anthropic cause of land degradation. Over time, this intense human activity has resulted in a quasi complete deforestation of the islands, and in many cases with large denuded and exposed surfaces characterised by sporadic patches of thin layers of soils alternating with outcropping rock exposing and subjecting the soil to the elements. Consequently, Maltese soils are vulnerable to erosion by both water and wind and are acknowledged as a significant problem increasing the threat of long-term land degradation. Concurrently, the island ecosystem is undergoing a "tropicalisation" trend due to effects of climate change. Land degradation coupled with complications as a result of climate changes are a threat to natural ecological dynamic equilibriums with repercussions on environmental and social stability.

Landscape

Human reaction to this harsh and demanding environment was to evolve the typical terrace landscape to capture and reduce soil and water loss, thus increasing the capacity of husbandry. These walls have a complexity of functions by: retaining naturally evolved soil, act as ramparts behind which man made soil accumulates slowly to form artificial fields, and as part of a larger technological structure involved in rain water management and harvesting. As a result of centuries of farming activity, including extensive terracing and moulding of the land, farmers have contributed immensely to the shaping of the rural landscape and the environmental character of the islands characterized by small-sized and fragmented agricultural land and a rich diversity of semi-natural habitats that are often under severe threat from human activities and urbanisation. Today agriculture remains a major contributor in maintaining the quality of the landscape. It is also an integral component of the cultural heritage and a crucial backdrop to the tourism industry. Agricultural and rural areas constitute a green lung and a venue of recreation to many. In short, agriculture exhibits multiple functions and values beyond its economic contribution.

MAI Zaragoza

The 2nd International Conference on drought management: "Economics of Drought and Drought Preparedness in the Mediterranean" will be held from 4 to 6 March 2010 in Istanbul (Turkey).

This conference is being organised by the General Directorate of Agricultural Research of the Turkish Ministry of Agriculture and Rural Affairs, the NEMEDCA network, the FAO, ICARDA and CIHEAM (represented by MAIZ), in collaboration with CEIGRAM (Research Centre for the Management of Agricultural and Environmental Risks) at the Polytechnic University of Madrid.

The conference will be in three stages: it will begin with scientific analyses of the impact of drought and presentation of drought preparedness measures, followed by a round-table discussion, and lastly a technical field trip.

More information:
www.iamz.ciheam.org/nemedca/istanbul2010

Water availability

Malta being poorly endowed with fresh water resources, has a huge challenge in meeting the high and rapidly increasing water demand while protecting and conserving the resource base and the environment. There are no surface waters that can be exploited economically with the farming community focused on tapping into the underground water system to bypass the problem. Groundwater resources are subject to increasing competition. Agricultural water users continue to be more dependant on the vagaries of the climate and access to water resources for irrigation. Water shortages have resulted in farmers shifting towards cultivation practices and irrigation systems that make efficient use of water resources. The main source of water is groundwater pumped from private boreholes and conveyed to fields via pipe networks and water tankers. Although farmers are relatively more conscious of the importance of water conservation than urban water users, increased agricultural water use and the excessive groundwater abstraction in recent years has affected the sustainability and viability of the aquifer systems. Severe degradation has taken place in some areas, and the prognosis for other areas is not encouraging. Groundwater degradation linked to agriculture takes two distinct forms. First, there is increasing salinity of the Lower Coralline Limestone sea-level aquifer systems as a result of seawater intrusion. Second, there is nitrate contamination of practically all the aquifer systems as a result of intensive livestock production, high levels of fertilizer use, and leakages in the sewage collection systems. The forecasted sporadic reliability of precipitation due to climate change will unavoidably put increasing pressures on ground water resources.

Farm Genetic Resources

Throughout its history, Malta's location in the Mediterranean Sea has given it strategic importance, as a hub of refuge to the various cultures groups from the neighbouring lands. With the constant exposure to visitors and traders, it is not surprisingly to imagine that over time new crop and animal genotypes types may have been introduced. A classical example is proposed by Dent (1972) who puts forth an interesting theory on the origins of the Maltese Donkey, now extinct in Malta. He speculates that it is very plausible that while Malta served as a base for Phoenician merchants, who also had business interest in Spain, the same Merchants may have brought selected Syrian donkeys to Malta and later brought their progeny westward to the Iberian Peninsula.

Given the small territory and limited natural resources, the potential ensemble and subsequent hybridization of various genetic types, coupled with the harsh environment conditions with constant demands to maximise production, gave over time a unique agriculture genetic resource that evolved through high selection pressures. The resultant populations are richer in genetic resources than other mainland areas. These species of pulses, vegetables, cereals, forages, industrial plants, spices condiments and livestock are renowned for their hardiness not only by the Maltese farmers but also beyond the shores of Malta.

During the 1800-early 1900's, Malta had strong economic links with the North African coast spanning from Egypt to Morocco (Donato 2002, Attard 2003), and also with the other larger islands namely: Cyprus, Sardinia, Gibraltar and Sicily (Attard 2003). It was commonly known that the many Maltese stationed in these regions took along livestock seeds and trees (Donato 2002). Very often the "Maltese" type is recognised as well adapted possessing hardy characteristics coupled with high productivity. Attard (1979) gives an account on how in 1800's a Maltese trader and his wife obtained a long lease of the island of Lampedusa, then lying abandoned and uninhabited. Taking with them a number of workers, livestock and trees from Malta, they repaired the Castle, built warehouses and prepared the land for farming.

Their success encouraged the British Royal Commission to suggest in 1812 the purchase of Lampedusa, Linosa and Lampione, and possibly also Pantelleria. Donato(2003) remarks that the Maltese were fast to recognise the potential of the Algerian soil, and large plots of land spanning the departments of Annaba and Sikkda were planted with fruit orchards all belonging to the Maltese. Donato makes a further interesting statement "All the Maltese are fruit growers and all the fruit growers are Maltese." The introduced cultivation of Maltese fruits included: the Maltese orange, mandarin, peaches, plumbs and a special variety of cactus fruit "baitar tad-dem". The Maltese oranges famous throughout Europe (Blondy 2003) can still be found in selected markets, but it today originates from Tunisian orchards. MacGill (1839) refers to the local silla *(Hedysarum coronarium),* as one of the most beautiful plants, and richest produce that is cut down in February and March for dry forage to be fed to ruminants.

ARIMNET

Launched one year ago, the ARIMNET network, which is intended to coordinate agricultural research in the Mediterranean Region and is funded by the European Union as part of the Era-Net programme, continues to develop and to set up new initiatives.

The ARIMNET Steering Committee, of which CIHEAM is a member, met in Rome on 29 October 2009 to approve the project's annual report and review progress in its operation. Particular attention was paid to the structure of the information available on the project's website, progress in the production of country reports and the finalisation of a mapping of research programmes.

The Committee also addressed obstacles to cooperation and possible ways of identifying best practice in this area. It also decided to hold a conference in Valencia in October 2010, which would bring together partner countries.

For more information:

www.arimnet.com

Seeds have been sent to the East and West Indies, to different parts of America, to the British Isles, to France, Italy, Sicily and Greece. Maltese cabbage, cauliflower and broccoli also enjoyed prestige and fate, with seeds being requested from all over the Mediterranean basin (Blondy 2003).

The same can also be said on animal genetics. Most probably the best known example is the Maltese Goat widely praised for its unique docile characteristics and heavy milking abilities. This breed has been widely diffused and kept as a pure breed as in Italy, or to improve other rustic breeds as is the case in Sardinia or to develop an new breed such as the Golden Guernsey breed in the Channel Island. Mason (1996) states that the Comisana Sheep breed found in south-eastern Sicily, originated in part from the Maltese sheep in the late 19th and early 20th century. MacGill (1839) reports that the "Maltese Donkeys continued to be exported to different parts of Europe and America". Tegetmeier (1895) comments that the original Maltese jack from Gozo, had a great reputation in America as a mule getter to the extent that at one time the island of Gozo had been entirely depleted of the old breed by the Americans to form the breeding pool of the Kentucky mules and was extensively used as the foundation stock for the development of the American Giant Mammoth donkey. The report by the inspector of agriculture in 1911, notes the near extinction of the Maltese ass. Cesareo (1950) elaborates on how the Maltese Black chicken was developed in the mid 1930's from the local breed of chicken into a strong heavy egg layer. He further states that fertile hatching eggs were exported to Libya and Cyprus.

Conclusions

In view of these constraints, Maltese agriculture cannot attain the high productivity standards achieved elsewhere. Given the severe shortage of the basic agricultural resources; farming has had to adapt to intensive husbandry with continuous use of all available resources. It is thus very difficult to challenge the husbandry practices that have evolved over time with the main criterion adopted by default being that of maximising use of the limited available resources by intensive and continuous use of difficult landscapes and the minimising waste.

Considering Malta's small size, it may be surprising to note the high degree of agro-biodiversity. Changes in the Maltese production systems and consumer lifestyle have resulted in the setting aside of these local breeds to make way for the introduction of modern and imported hybrids and/or synthetic line type of animals. Some of these Maltese breeds can today only be found outside of Malta. The recuperation and reintroduction of these local genetic types into Malta may hold the key in the adaptation of agriculture to the challenges presented by climate change.

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