

Viability of Permaculture Principles to Sustainable Agriculture Enterprises in Malta

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Abstract : Malta is a Mediterranean archipelago presenting a combination of environmental conditions which are less suitable for agriculture. This has resulted in a heavy dependence on agricultural chemicals, as well as over-extraction of groundwater, compounded by concomitant destruction of natural habitat surrounding the land areas used for agriculture. Such prolonged intensive land use has resulted in even greater degradation of Maltese soils. This study was thus designed with the goal of assessing the viability of implementing a sustainable agricultural system based on permaculture practices compared to the traditional local practices applied for intensive farming. The permaculture model was implemented over a period of two years for a number of locally-grown staple crops. The tangible targets included improved soil health, reduced water consumption, increased reliance on renewable energy, increased wild plant and insect diversity, and sustained crop yield. To achieve this in the permaculture test area, numerous practices were introduced. In line with permaculture principles land, tillage was reduced, only natural fertilisers were used, no herbicides or pesticides were used, irrigation was linked to a desalination system with sensors for monitoring soil parameters, mulching was practiced, and a photovoltaic system was installed. Furthermore, areas for wild plants were increased and controlled only by trimming, not mowing. A variety of environmental parameters were measured at regular intervals as well as crop yield (in kilos of produce) in order to quantify if any improvements in crop output and environmental conditions were obtained. The results obtained show a very slight improvement in overall soil health due to the brevity of the test period. Water consumption was reduced by over 50% with no apparent losses or ill effects on the crops. Renewable energy was sufficient to provide all electric power on-site, so apart from the initial investment costs, there were no limitations. Moreover, surrounding the commercial crops with borders of wild plants whilst only taking up less than 15% of the total land area assisted pollination, increased animal visitors, and did not give rise to any pest infestations. The conclusion from this study was that whilst results are promising, more detailed and long-term studies are required to understand the full extent of the implications brought about by such a transition, which hints towards the untapped potential of investing in the available resources on the island with the goal of improving the balance between economic prosperity and ecological sustainability.

Keywords : agronomic measures, ecological amplification, sustainability, permaculture

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