Preface

The agricultural world has changed significantly. In recent years there has been an increasing interest in securing the sustainability of soil by preventing it from permanent irreversible damage. The excessive use of heavy machinery, waste disposal, the use of agrochemicals and the unconventional use of soil cultivation methods has led to a series of problems forcing engineers to find solutions in these difficult areas, such as soil compaction, waste management, controlled traffic farming, optimisation of tillage tools, mechanical weed control and the use of robotics in agriculture, in order to reduce soil degradation.

This volume in the *Soil Biology* series on *Soil Engineering* is an attempt to highlight some of the aforementioned issues that have to be solved by agricultural engineers in order to ensure the sustainability of soil.

Soil movement results from man’s attempts to change prevailing soil conditions into those that are more suitable, or to use soil for support and locomotion of vehicles. As the use of agricultural and forestry machinery has increased in recent years in order to increase productivity, due to the current economic situation, soil–machine interactions have changed significantly in both tillage and traction. Machinery is getting larger and heavier and threatens soils with compaction, affecting air water and nutrient movement and resulting in reduced crop production. A selection of papers in this book gives the state of the art in soil compaction.

Today the agricultural sector requires non-chemical weed control that ensures food safety without degradation of soil and water. Consumers demand high quality food products and pay special attention to food safety. Through the technical development of mechanisms for physical weed control, it might be possible to control weeds in a way that meets consumer and environmental demands.

Waste management is a vital issue in modern agriculture as volumes of waste continue to rise, leading to increased environmental risks. Application of waste to agricultural land constitutes a low-cost disposal option and can be of benefit to the soil.

Autonomous vehicles have been widely used in industrial production and warehouses, where a controlled environment can be guaranteed. In agriculture, research into driverless vehicles has always been a dream, but serious research started in the
early 1960s. Possible applications for the use of robotics in agriculture are presented here, targeting soil sustainability and cost reduction.

*Soil Engineering* will be of great value to engineers and researchers working in the agricultural engineering section, and to postgraduate students.

The editors would like to thank the authors for their cooperation, Dr. Jutta Lindenborn from Springer for her great support during the preparation of the book, and Professor Ajit Varma, Editor of the *Soil Biology* series.

Volos, July 2009

Thanos Dedousis and Thomas Bartzanas
Soil Engineering
Dedousis, A.P.; Bartzanas, Th. (Eds.)
2010, XII, 230 p. 93 illus., Hardcover
ISBN: 978-3-642-03680-4