
Preface

This book *System Dynamics: Modelling and Simulation* is a totally new book with numerous examples and case studies for better understanding the complex systems and their changes through modelling and simulation to aid in policy formulation and developing management strategies for sustainable development. This book provides a comprehensive introduction to systems thinking and modelling of complex systems with application to agricultural, aquacultural, environmental and socio-economic systems. Also this book essentially provides the principles of system dynamics with numerous examples and a good number of case studies in agricultural, aquacultural, environmental and socio-economic systems. It covers all aspects of system dynamics starting from systems thinking to participatory model building to provide a tool for policy planning, and the main focus is to aid in policy design.

This book has been written primarily for undergraduate and postgraduate courses on system dynamics, systems engineering, system simulation, agricultural systems and multidisciplinary courses on agricultural, aquacultural, environmental and socio-economic systems. This book can be adopted for courses in electrical engineering and computer science. It will also serve as an excellent reference for practicing system dynamists, system dynamics researchers and policy planners. It is the outcome of several years of teaching and research in system dynamics modelling and simulation with applications in agricultural, aquacultural, environmental and socio-economic systems and also is an updated and a new book on principles of system dynamics.

This book covers the wide spectrum of system dynamics methodology of modelling and simulation of complex systems: systems thinking, causal diagrams, system structure of stock–flow diagrams, parameter estimation and tests for confidence building in system dynamics models with a good number of worked-out examples in diverse fields using STELLA and VENSIM. In case studies, problem statement with dynamic hypothesis is followed by causal loop diagrams, stock–flow diagrams, parameter estimation, model validation and policy design. Exercises have also been included at the end of each chapter for further practices.

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