

Preface

It was inevitable for this book to be written. The textbook “Agricultural Meteorology and Climatology” is an attempt to record on paper one hundred cumulative years of teaching experience of its authors and over 15 years of their joint work during which extensive discussions were carried on about meteorological education of future agronomists.

Following the example of our predecessors who bestowed on us textbooks of lasting value, we tried in this book to give a balanced presentation of basic meteorological elements and processes, meteorological measurements, and the application of meteorological knowledge in agriculture. Particular attention was given to the effect of plants on physical processes in the atmosphere, as well as to the impact of atmospheric processes on plants.

We sincerely hope that this book will help future generations of agronomists to recognize the weather as a partner, and not an opponent, in the venture they embarked upon - to maximize the production of healthy food.

Abstract

“Agricultural Meteorology and Climatology” is an introductory textbook for meteorology and climatology courses at faculties of agriculture and for agrometeorology and agroclimatology courses at faculties whose curricula include these subjects. Additionally, this book may be a useful source of information for practicing agronomists and all those interested in different aspects of weather and climate impacts on agriculture.

In times when scientific knowledge and practical experience increase exponentially, it is not a simple matter to prepare a textbook. Therefore we decided not to constrain “Agricultural Meteorology and Climatology” by its binding pages. Only a part of it is a conventional textbook. The other part includes numerical examples and recommended additional reading available on-line in digital form. This part comprises easy-to-edit worksheets and text files which can be continually improved.

To keep the reader’s attention, the book is divided into three sections: Basics, Applications and Agrometeorological Measurements with Numerical Examples.

The first section, **Basics**, discusses the structure of and important processes taking place in the atmosphere, their causes and consequences. The atmospheric composition, surface characteristics and incoming solar radiation determine the heating and cooling of the Earth’s surface, which, directly or indirectly, are the major forces behind almost all atmospheric processes that shape weather and climate. This is why special attention was given to soil, flora, and atmosphere interactions and the inevitable interchanges among them.

The section **Applications** deals with meteorological phenomena and processes that are of key importance for future agronomists. In this section we addressed the impacts of weather and climate on plant phenology and growth processes, including the impact of extreme weather events and the

resulting agricultural risk management. Since agricultural production is a weather-dependent activity, the impact of climate change on agriculture was elaborated to some extent, including modelling techniques and mitigation and adaptation measures from global to local scale.

The global climate is changing and this is the reality in this part of the world too. Consequences of climate change become perceptible only after the phenomenon has been in action for a few decades, but the knowledge of its potentially harmful effects, of measures that can alleviate these effects or which can help us to adapt to these effects are essential for all who are engaged in agriculture.

The section **Agrometeorological Measurements**, which contains numerical examples, should encourage readers to use the knowledge acquired during the course for solving practical problems related to micro-meteorological conditions in their own production fields. No matter what they prefer to use, their own measurements or remotely sensed data, information on the principles applied in the development of meteorological instrumentation as well as information on data acquisition and management will definitely meet the readers' needs. Finally, advanced users are given an overview of practical applications of the latest technological developments, such as the use of remotely sensed data (e.g., acquired from drones, satellites and other digital data-generating equipment) in precise farming operations.