The world population is expanding rapidly and the necessity of enhancing crop yields globally makes food security a major challenge in the 21st century. Food production on presently used lands must be doubled in the next two decades to meet food demand of the growing world population. To achieve the required massive increase in food production, large enhancements in application of plant breeding and seed production are indispensable approaches. Plant breeding research provides invaluable information highly useful in sustaining food security and well-being of humans without harming the environment.

A great part of agricultural production is presented by vegetables including tomatoes. Tomato is one of the most widely cultivated crops in the world due to its high adaptation to a wide range of climatic conditions from temperate to hot and humid tropical. It is an important source of vitamins and an important crop for processing industry.

In the current book, the basic aspects of tomato breeding and tomato seed production are presented. The history of plant breeding including that of tomato breeding is described in detail. Morphological and biological characteristics of cultivated tomato and its wild relatives are presented. The well-known conventional methods for plant breeding as well as contemporary approaches such as plant biotechnology and genetic engineering for development of new cultivars and hybrids are described. The great importance of collecting, investigation, multiplication and conservation of genetic resources and mutants for tomato breeding is underlined.

Analysis of main environmental abiotic and biotic factors and their influence on the plant phenotype was performed and the possibility for enhancement of the accessible genetic variability to improve the adaptability and stability of plant production was studied. An attempt for differentiation of the tomato cultivars variety based on main plant and fruit characteristics was conducted. A list of dominant and recessive traits was presented.

Different tests for evaluation and identification of new tomato cultivars to breed the best perform in local conditions are described. Requirements for distinguishing, homogeneity and stability as well as protection of cultivars are presented.

The post harvest handling – maintaining the cultivars and seed production, are described. The methods for storage of the direct cultivars and parental lines
of the hybrid cultivars are presented as the main reasons for cultivars degeneration and the variability of the seeds quality is pointed out. The technology of hybrid seed production both on fertile and sterile base is described and illustrated in detail. Different types of seeds, requirements for their certification and market conditions are defined.

Based on information and the contemporary breeding trends, an analysis to project the development of tomato breeding was made. While the breeding process is still time-consuming, it may be presumed that in the future the enhancement of fruit production would not be in time. Therefore, it is highly believable that the new methods of plant biotechnology and molecular markers such as Marker-Assisted Selection (MAS) may contribute to tomato breeding.

In the last section of the book, the main directions of tomato farming in Bulgaria and an analysis of requirements of certain directions depending on the environment, cultivar and the purpose of the fruit are given. The characteristics of introduced new cultivars and hybrids resulting from Bulgarian selection and illustrated by figures as well as technologies for seedling production and tomato cultivation are presented.

The current book should be helpful for experts working with tomato breeding and seed production and also for agricultural specialists using self-pollinated crops. The materials might be used for education of students in High Schools of Agronomy and Colleges of Agriculture. The information is also of interest for tomato farming and small-scaled business such as farmers, retailers, etc.