

**MARIA NEDEALCOV: "AGROCLIMATIC RESOURCES IN
THE CONTEXT OF CLIMATE CHANGE" –
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Two great challenges are facing now humanity: climate change and population explosion, which combined generate a third and more serious one - food shortages. No wonder that this is causing great concern in various quarters, at state and global level, mobilizing scientists to find appropriate solutions.

In this direction, this study is the product of hard work done by one of the foremost climatologists in Moldova.

The study has the particular merit that is tackling the most pressing and difficult issues we face nowadays, following also the modern trend in contemporary science. At the same time, it makes use of one of the most modern research tools - the Geomatics. It combines Geographic Information Systems effectively, spatial approach to examine systemic relations of geographical reality and beyond.

Vast and complex content of the paper is structured in five chapters:

In the first chapter (pp. 7-45) are presented the theoretical and methodological foundations of the study, from the definition of agroclimatic potential of the territory, continuing with the possibility to quantify this potential. The spatial and temporal variability can be expressed by using complex statistical indicators and their interpretation can be obtained by considering climatic factors, including atmospheric dynamics being the factor with the greatest variability.

The second chapter (pp. 46-121) is entitled *Fundamentals of theoretical and practical in resource estimation* and begins with the assessment of heat and solar radiation resources on the territory of Moldova, then continues to examine thermal resources (space-time variation of air temperature) in the actual stage, also trying to forecast changes over the twenty-first century based on climate change. The results are presented in a synthetic color map showing that only the southern third of the territory has optimal or favorable thermal resources, while northern third has limited thermal resources.

The third chapter (pp. 122-189) is devoted to estimation of moisture resources in Moldova. It begins with the rainfall regime peculiarities examination by analyzing complex time series from 1891, until 2010, analysis of the resulting large variability of this climate element, with frequent manifestation of droughts,

sometimes very severe during the growing season. It is therefore individualized a subchapter about moisture deficit by analyzing the relationship between rainfall and evaporation capacity but also by the saturation deficit, both indices being important in the development of irrigation norms. Variability of rainfall regime is expressed by production sometimes large amounts of daily precipitations, causing floods and other calamities. Therefore, it is assigned a chapter examining the issue. The chapter ends with a regionalization of resources moisture from Moldova, regionalization expressed through a color map which is clearly observed thermal contrast between resource allocation - best represented in southern territory and moisture distribution, which is very poor in that part of the country.

In the fourth chapter (pp. 190-242) is examined the climatic factors risk, starting with the terminology and risk assessment criteria. Taking into account the overall regional trend, the aridity of the climate in this part of the continent, it examines this problem and it concludes that the trend is not continuing as there are recorded very rainy years (2008) after very dry years (2007). The conclusion is that this variability would express precisely the climate change. If in the warm season the risk is given by the aridity, in the winter the risk is represented by the frost which becomes more dangerous in the transition seasons. Using data from 17 weather stations and GIS features, the risk of frost was quantified for each administrative district. It was taken into consideration the temperatures below -25° C in winter and the frost in the early autumn or late spring. Results of all these are expressed in tables and maps and were concluded in a territorial regionalization based on the climatic risk.

Chapter five is entitled *Evaluating the suitability of the current climate in the cultivation of certain crops groups (example of fruit crops)* (pp. 243-282). In the first part of the chapter it is noted that crop yield depends on three variables: the variety of plants, agrotechnics, weather and climatic conditions. If the first two variables can be controlled by humans, the third is independent of it. Climatic conditions are carefully studied, but mean values and sum of the parameters (temperatures and precipitations) over longer periods are not sufficient. It is necessary the characterization for short periods of time. Nevertheless the forecast should be done for periods of time as long as possible.

The role of the agro-climatic factors in influencing productivity of fruit trees is examined. First are assessed the wintering conditions as severe frosts of winter can attack and destroy the buds and the late frost in spring destroy flowers or fruits. Because as well the pronounced warming periods in the winter can be damaging too, therefore the frequency of thermal anomalies is analyzed also. Since different tree species behave differently in relation to thermal anomalies, a classification of species according to their response to these anomalies is done. Next the methodology of assessing the suitability of climatic conditions for various crops is

presented. This is done for the administrative districts and the physical-geographical units. A synthesis of all these is expressed through a map of the regionalization of the territory. This is based on the suitability for development of horticulture combined with the climate risk for various tree species. Spatial differentiation is obvious with good conditions for more thermophilic species in the southern third of the country, the conditions for the species more resistant to cold northern third and somewhat less resistant species in the middle third.

The final chapter of the study includes the conclusions and practical recommendations. A rich illustration, the result of laborious processing of large amounts of data with a modern methodology, the text explains and motivates interpretations and generalizations expressing spatio-temporal evolution of climate parameters and meteorological phenomena.

The bibliography, with 314 references, gives the dimension of the thorough documentation of the author.

This paper can also be a methodological guide for expanding research with applicability to other agricultural sectors, including particularly viticulture, cereals and technical plants.

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