



# LEGUME PRODUCTION IN ROMANIA – COMPARATIVE ANALYSIS OF PEA PRODUCTION BY DEVELOPMENT REGIONS

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**Abstract:** The production of legumes (e.g. peas, beans, chickpeas, lentils) is of high nutritional, agronomic and ecological importance. Romania occupies an important position in the EU in terms of the area cultivated with legumes. Under conditions of variable yields, the study evaluated the pea production recorded in the development regions in Romania, during the period 2015 - 2024. Total production during the study period ranged from 19792 t (Central area) to 524511 t (South-East region). High variability was recorded in all study areas, with CV values = 31.65 (N-W region), up to CV = 61.15 (Bucharest – Ilfov). An increasing trend was found in the data series for the North-West Region, Bucharest – Ilfov, and the West region ( $p < 0.05$ ). The two main principal components (PC1, PC2) explained 84.659% of the total variance. Cluster analysis (Two-way) grouped the regions and study years based on similarity, in relation to pea production. The South-East and South-Muntenia regions were highlighted, with the highest levels of pea production in 2017, followed by 2019. The comparative analysis between regions confirmed differences with variable levels of statistical certainty (Mann-Whitney test).

## • Introduction

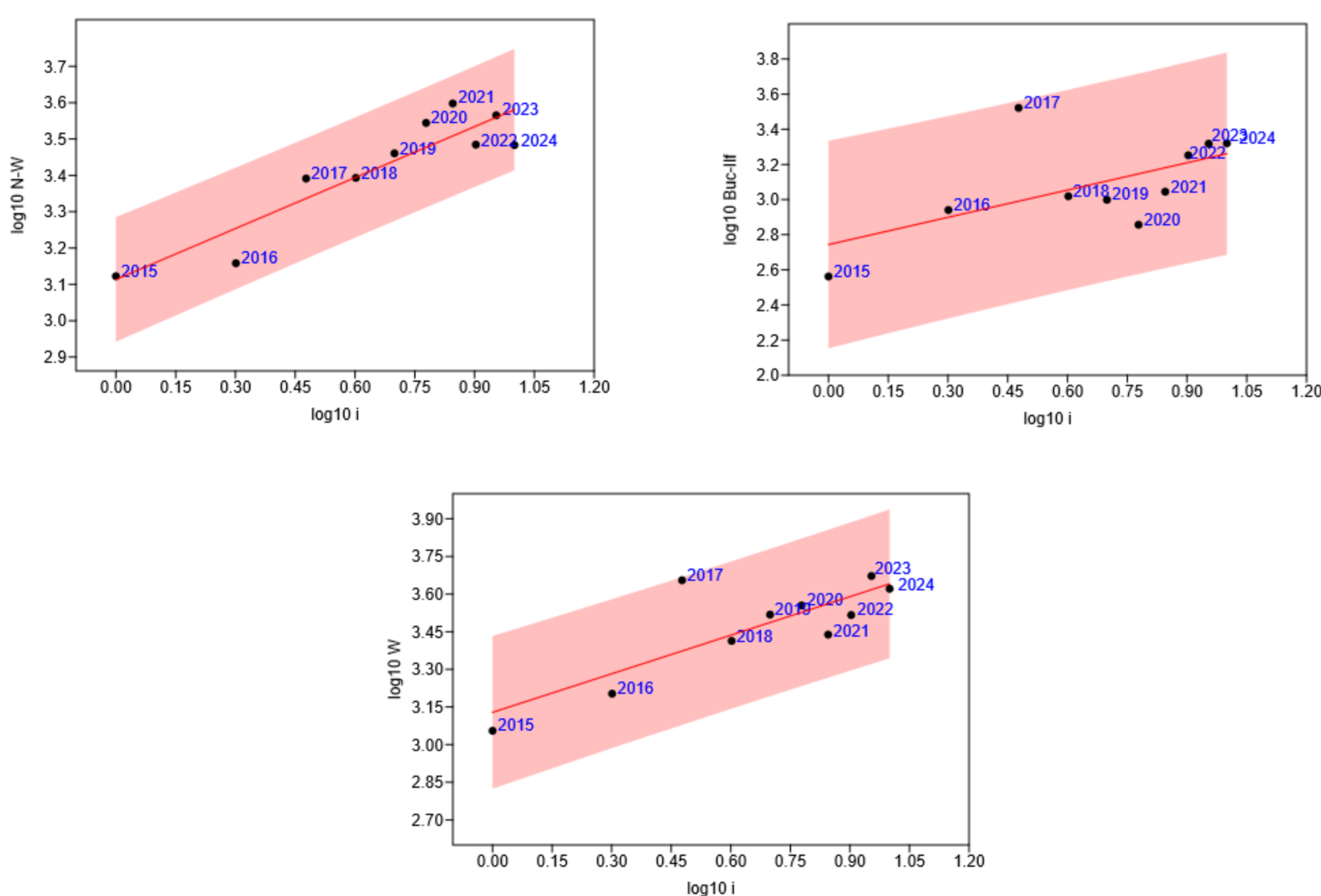
Legumes (family Fabaceae) include plants such as beans, peas, chickpeas, faba beans, lentils, peanuts, with high economic importance [11], [12]. Legumes represent a category of agricultural crops, with very high importance for global food safety and security, in the context of human population growth, climate and energy challenges [6]. An important role of legumes in carbon fixation and reducing carbon losses from soil has been communicated [10], [14], [18]. Despite all the ecological and economic benefits of legumes, some studies have reported the underutilization of these plants in many regions [1], [12]. This study evaluated pea production in Romania between 2015 and 2024, and described the dynamics and specifics of production by development regions.

## • Material and method

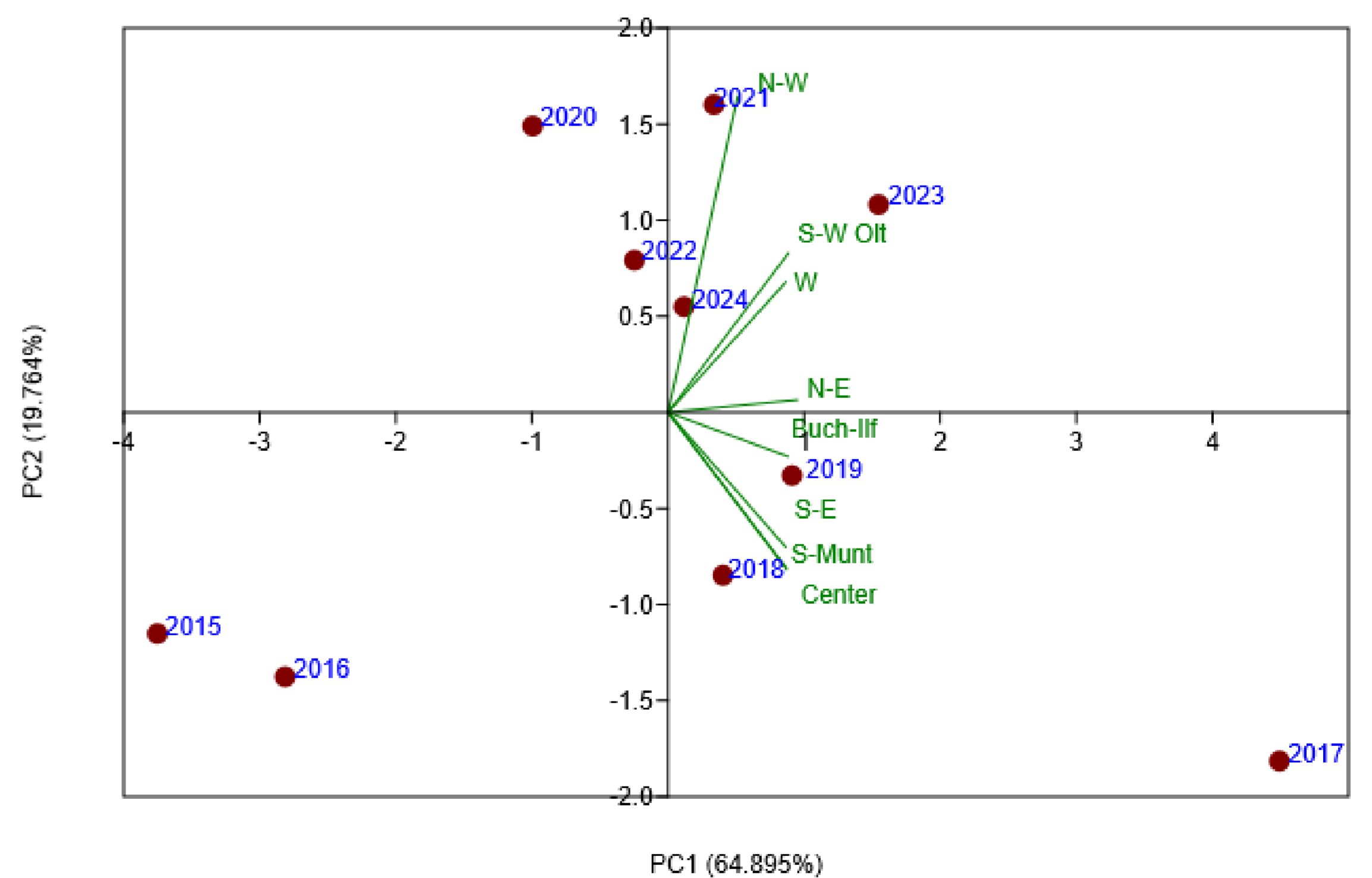
In the context of interest in protein crops, from a food, industrial, and animal feed perspective, this study analyzed pea crop production in Romania between 2015 and 2024. The analysis was based on data from the INS records, by development regions: North-West development region, Center development region, North-East development region, South-East development region, Bucharest-Ilfov development region, South-Muntenia development region, South-West Oltenia development region, and West development region [19]. For this study, data recorded by the INS [20], for the period 2015 - 2024, were accessed. Pea production values (tons per study year) were considered.

## • Results and discussions

The data on pea production by development region in Romania, showed high variability for all development regions, in relation to cultivated areas and vegetation conditions during the study period. Coefficient of variation values between CV = 31.65% (North-West development region) and CV = 61.15% (Bucharest-Ilfov development region) were recorded. According to the values in Table 3, statistical certainty was observed for the increasing trend of the values in the case of the North-West development region, the Bucharest-Ilfov development region, and the West development region. In the case of the other development regions, the data variation did not present statistical certainty. The regression analysis generated the graphical distribution of pea production during the study period in the case of the three development regions, Figure 1. Based on the results of the ANOVA and Kruskal-Wallis tests, which confirmed significant differences between the mean and median values, the Mann-Whitney pairwise test was applied, and the results indicated significant differences between regions, based on the recorded pea production, during the study period. The fields colored in gray, indicate the lack of statistical certainty ( $p > 0.05$ ). The multivariate analysis generated the factor loading values (development regions) in the principal components, Table 6, and generated the PCA diagram, Figure 7, with the distribution of years associated with the development regions. The multivariate analysis generated the factor loading values (development regions) in the principal components, Table 6, and generated the PCA diagram, Figure 2, with the distribution of years associated with the development regions.



Distribution trend of values: (a) North-West development region; (b) Bucharest-Ilfov development region; (c) West development region



PCA diagram with the distribution of years in relation to development regions based on pea production

## • Conclusions

Pea production presented differentiated values in relation to the years and regions of development in Romania, during the study period, 2015 - 2024. The data series were in normal distribution, with an outlier value ( $p < 0.05$ ) in the case of the Center Region, year 2017. There was an increasing trend in pea production during the study period for the North-West Development Region ( $p = 0.0023$ ), for the Bucharest-Ilfov Development Region ( $p = 0.230$ ) and for the West Development Region ( $p = 0.0230$ ).

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