Since the performance of the chemical extraction methods are largely dependent on the soil characteristics many methods have been developed towards determining the availability index of plant nutrients in soils. Thus, this research was conducted to select the most suitable chemical extraction method and/or methods for available Fe, Cu, Zn, and Mn concentrations in acid soils of Rize and Artvin regions. In the research, total of 220 both soil and plant samples were collected by considering the tea production potentials of orchards at second harvesting period. 197 samples for Fe, 207 samples for Cu, 214 samples for Zn, and 196 samples for Mn were used to test methods' efficiency in estimating nutritional status of both soils and plants. Plant available soil Fe, Cu, Zn, and Mn concentrations were determined by using 14 different chemical and 2 biological methods. The linear correlation coefficients between available Fe, Cu, Zn, and Mn concentrations determined through the chemical methods and the biological indexes indicated that the best extraction methods for cationic microelements in acid soils are: "0.05 N HCl + 0.025 N H2 SO4" for Fe, "0.005 M DTPA+0.01M CaCl₂ +0.1 M TEA (pH=7.3)" for Cu and Zn, and "0.01 M CaCl₂" for Mn.