Clusters of galaxies constitute one of the low-redshift cosmological probes complementing early Universe measurements from the cosmic microwave background (CMB). Since cluster number counts are both sensitive to the geometry of the Universe and the growth of structure, related statistics provide, in theory, key cosmological information. More specifically, we compute the number counts of clusters of galaxies, Log $N$ -- Log $S$, relation, in X-ray and submm bands on the basis of the Press--Schechter theory. We pay particular attention to a set of theoretical models which well reproduce the ROSAT 0.5-2 keV band Log $N$ -- Log $S$, and explore possibilities to break the degeneracy among the viable cosmological models.