Abstract: We consider adaptive tests and estimates which are asymptotically efficient in the presence of unknown, nonparametric, distributional form in various pure spatial models. An adaptive Lagrange Multiplier testing procedure for lack of spatial dependence is proposed and is extended to cover regression with spatially correlated errors. Feasibility of adaptive estimation is verified and its efficiency improvement over Gaussian pseudo maximum likelihood is shown to be either less than, or more than, for models with explanatory variables, depending on the (a)symmetry of the spatial weight matrix and whether this matrix has negative, as well as positive, elements. The paper covers a general class of semiparametric spatial models allowing nonlinearity in the parameters and/or the weight matrix, in addition to unknown distribution.