

# Using Small Area Models to Estimate the Total Area Occupied by Olive Trees

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This work aims at estimating the total area occupied by olive trees in a region called Comarca IV, located in a central region of Navarra, Spain, using as auxiliary information, classified data provided by satellite images. Traditionally, small area linear mixed models have been used for similar purposes using regular quadrats (also called segments) as sampling units, and assuming that these are fully included in the study domain. When it does not happen, the sampling units are of different size, and there exists an extra variability that can be very different within areas. In this case it is advisable to include weights into the model. In this work, we propose a weighted unit level linear mixed model where both, the variance components and the coefficients of the model are estimated using these weights. We also compare the performance of the weighted mixed model to other models already proposed in the literature using the aforementioned real data.