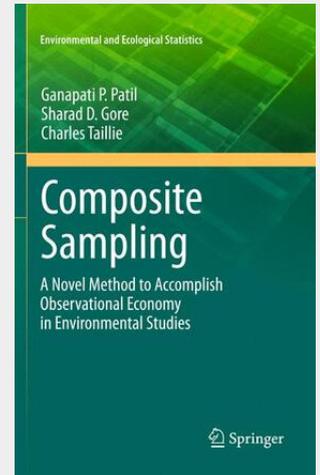


Composite Sampling

A Novel Method to Accomplish Observational Economy in Environmental Studies

Sampling consists of selection, acquisition, and quantification of a part of the population. While selection and acquisition apply to physical sampling units of the population, quantification pertains only to the variable of interest, which is a particular characteristic of the sampling units. A sampling procedure is expected to provide a sample that is representative with respect to some specified criteria. Composite sampling, under idealized conditions, incurs no loss of information for estimating the population means. But an important limitation to the method has been the loss of information on individual sample values, such as, the extremely large value. In many of the situations where individual sample values are of interest or concern, composite sampling methods can be suitably modified to retrieve the information on individual sample values that may be lost due to compositing. This book presents statistical solutions to issues that arise in the context of applications of composite sampling.

This monograph provides, for the first time, a most comprehensive statistical account of composite sampling as an ingenious environmental sampling method to help accomplish observational economy in a variety of environmental and ecological studies. Sampling consists of selection, acquisition, and quantification of a part of the population. But often what is desirable is not affordable, and what is affordable is not adequate. How do we deal with this dilemma? Operationally, composite sampling recognizes the distinction between selection, acquisition, and quantification. In certain applications, it is a common experience that the costs of selection and acquisition are not very high, but the cost of quantification, or measurement, is substantially high. In such situations, one may select a sample sufficiently large to satisfy the requirement of representativeness and precision and then, by combining several sampling units into composites, reduce the cost of measurement to an affordable level. Thus composite sampling offers an approach to deal with the classical dilemma of desirable versus affordable sample sizes, when conventional statistical methods fail to resolve the problem. Composite sampling, at least under idealized conditions, incurs no loss of information for estimating the population means. But an important limitation to the method has been the loss of information on individual sample values, such as the extremely large value. In many of the situations where individual sample values are of interest or concern, composite sampling methods can be suitably modified to retrieve the information on individual sample values that may be lost due to compositing. In this monograph, we present statistical solutions to these and other issues that arise in the context of applications of composite sampling.



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