Statistical analysis of the sampling design: FishPi case study on the biological sampling of the European hake fishery

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FishPi is a pilot project financed through an European grant (MARE/2014/19) aiming to strengthen regional coordination in the area of fisheries data collection. This project includes four case studies, one of which aims at analyzing alternative sampling plans for fisheries operating on Northern & Southern hake stocks. The case study analyzes a variety of sampling design scenarios, from Simple Random Sampling to combinations of stratified sampling designs (by country, by port, by quarter…), using anonymised landings data from logbooks and sales notes (2013-2014). The results were compared regarding bias and precision to evaluate the best approach. The most precise estimates of total catch were obtained in scenarios stratified by port and, secondly, by port and country and by port and quarter. The general conclusion was that regional sampling designs stratified by port provided improved precision in this fishery. Apart from statistical considerations, this conclusion was also discussed under other points of view to give a feasibility perspective showing that coverage by country, and also by domain (stock), would be compromised if regional design is simply based on statistical analyses. Efficiency and precision of sampling were found to be highly sensitive to the sampling assumptions and in general countries with smaller contributions to overall landings of hake would see their sampling plans reduced, compromising other requirements for advice such as those related to other stocks or local management measures established by National governments. Hence further analyses are being considered that integrate biometrics, cost-benefit aspects, and concurrent or single-stock sampling strategies.

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