EVALUATING THE COST-EFFICIENCY OF REMOTE SENSING IN DEVELOPING COUNTRIES

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COST EFFICIENCY OF REGRESSION ESTIMATOR

• Relative efficiency of estimator using remote sensing data as auxiliary variable
• Variance of estimates with ground survey only/
• Variance of estimator using remote sensing data
• With the same budget
• Cost efficient if relative efficiency higher than 1
COST EFFICIENCY OF STRATIFICATION (1)

• Relative efficiency of stratification is the ratio between the variance that would have been obtained without stratification and the estimated stratified variance.

• Efficiency strongly depends on landscape complexity.

• Where crops are very mixed up efficiency low.

• In pilot areas of the MARS Project ranged in most cases from 1.1 to 1.6.
COST EFFICIENCY OF STRATIFICATION (2)

• High efficiency where a certain crop is dominant (in Catalonia a value of 10 for rice in 1992)
• Cheap stratification using existing land cover maps
• Test in Spain with an agricultural intensity index computed on CLC
• efficiency between 1.7 and 2.2 for main crops (Gallego et al., 1999a)
EARLY EXPERIENCES OF ASSESSMENT OF COST EFFICIENCY

• USDA-NASS runs most important operational application based on area frame survey and remote sensing for agricultural statistics
• Cost-efficiency analysis has given positive conclusions for this program
• MARS project of the JRC in the 90’s demonstrated insufficient cost-efficiency in the EU
COST EFFICIENCY FOR ITALIAN PROGRAMME

• Italian AGRIT programme realized low cost efficiency of use of satellite data at estimator level, when sampling frame moved from segments with physical boundaries to points on regular grid
• Dropped remote sensing correction through regression estimator
• Kept photo-interpretation of orto-photos for stratifying points
A key financial benchmark for cost efficiency is cost of current surveys.


Including estimation of crop area and yield, production means and socio-economic information.
Remote sensing applications to agricultural statistics can be sustainable if their total cost fits in the budget without endangering the feasibility of surveys that cannot be substituted by satellite technology.

- Narrow margin for cost-efficiency
- free data policy helps
Efficiency of remote sensing at:
- design level in various kinds of landscape in developing countries (stratification of segments, photointerpretation of points, kind of satellite data)
- estimator level in various kinds of landscape (small fields, mixed cropping)

Other kinds of use or remote sensing (remote sensing for reducing sampling area or observation, agro-meteorological yield forecasting model, other models)

- Labour cost
- New satellites free of charge
- Capacity development at country or regional level
THANK YOU

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