

3. METHODS

Three distinct, but interrelated, methods were used in synthesis to estimate soil loss: ground truth observations and surveys, analysis of two remotely sensed ASTER images and DEM, and prediction of soil quality indicators from DRS spectra. These appear in Venn diagram form as Figure 3.i.

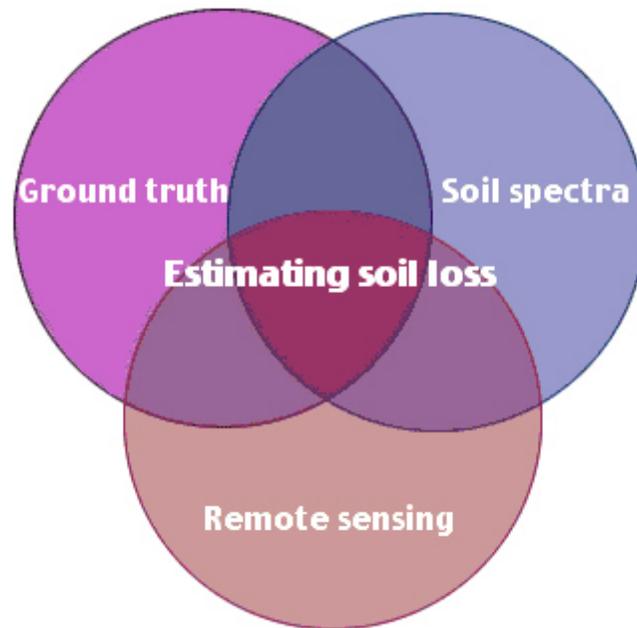


Figure 3.i Venn diagram of methodology

The ground truth component encompasses farmer surveys (section 3.1), general trends in soil type/land use, and site descriptions of soil sampling sites for June/July 2003. Remotely sensed data were corroborated with ground truth observations to produce maps of soil type/land use and a more sensitive vegetation index (SLA-NDVI), (section 3.2). After calibrating soil spectra to quality indicators, results were paired with site descriptions to assess trends in quality by soil type, field type, and agricultural management practices (section 3.3). Soil quality indicators derived from spectra were also paired with ASTER data, although no meaningful relationships

were found. These three components were then integrated into a variation of the Universal Soil Loss Equation to generate qualitative estimates of soil loss risk (section 3.4). A flow chart showing more precisely the interrelation of these components appears as Figure 3.ii. The methods described in this chapter are, for the most part, ordered sequentially so as to parallel the results described in Chapter 4 and the discussions in Chapters 5 and 6.

3.1 FARMER SURVEYS

A two-page survey (see appendix) was administered in July 2003 to 50 farmers who attended a two-day seminar held in the MESO office at the village center. The survey contained close-ended questions about demographics, crop productivity, and agricultural management practices. Farmers were also asked to mark the location of their field(s) on a topographic map that was included on the back side of the survey. From this marking, an estimate of each field's soil type was made using a soil type map included in the NSS report. The survey was translated into Kiswahili and orated in Iraqw by translators Mr. Octavian Hariohay and Mr. Albin Paulo.

Fields and crop productivity

The survey was designed so that if a farmer had multiple, geographically separate fields, then data would be collected for each individual field. For this study, a field is treated as a distinct plot of land that may contain within its perimeter multiple plots of land designated for the cultivation of different crops but may not continue past roads/other people's fields/settlements/etc. In other words, a single, 4 acre field may