weather conditions. The emphasis on livestock in East Africa provided an added dimension of complexity that was not studied in West Africa.

Livestock data is much weaker in terms of spatial specificity due to mobility of animals over time, the use of common grazing lands, and the multi-year production cycles of saleable products. Derivation of suitable biophysical data to support the economic models challenged our group to devise improved methods to characterize land area and forage/livestock yields. The geographical extrapolation of effective environments was much more complex in East Africa due to the topographic effects of highland/lowland interactions. The technology suite selected with smallholder dairy was found in the cool highland areas and hot, humid peri-urban coastal zones, requiring representation of a large variety of environmental conditions in the model along with a large number of crops.

6.8 Criticality of Non-Modeled Variables in Defining Adoption and Economic-Environmental Outcomes - Sociologic Variables Affecting Adoption and Use of Technology

Assessing the economic impact of a specific technology package requires realistic estimation of the traditional, current, and maximum future adoption rates that can be expected for the technology. This is also important when trying to quantify the environmental impact of a technology. The selection of realistic adoption levels requires careful and methodical consideration of a variety of factors. Socio-economic variables, in particular, often add complex and site-specific considerations to decisions regarding the adoption of a technology. One method to ensure reasonable adoption rates is to seek opinions from a panel of experts that will contribute to the development of heuristic models and rules for behavior of people as part of the adoption process.

The individual providing this kind of expert opinion must have an extensive knowledge of producers’ ability to integrate the technology over a range of social and geographic settings. It is important that the experts have a “mental geography” that allows them to define and stratify geographically where the technology can be applied appropriately. When considering the environmental impacts of a technology, the “where” question of adoption is particularly critical.

There are a number of steps required to effectively solicit the information from an expert panel. The solicitation process needs to be carefully guided to ensure the participants are focused on the correct target group and technology suite or package. The process then requires that experts incorporate into their assessment non-modeled socio-economic and environmental variables that affect producers’ adoption of the technology. A short, but by no means complete, list of these factors includes: type of production orientation of the producer (subsistence versus commercial production), access of the producer to credit and markets, land tenure rights of the producer, accessibility to animal draft power, natural resource endowment and climatic variability in the region. These and other factors influence the adoption of a new technology.

Greater efforts will be needed in the future to better use indigenous and local expert knowledge to help translate the impact of the adoption of a suite of technologies on ecosystem health. Regardless of the type of analysis, the challenge is to ensure realistic assumptions are made regarding the technology adoption rates that take into account the socio-economic and environmental factors facing the target decision-makers.