regional resource constraints. The interpretation of these results is limited because estimates of cross-price elasticities of demand and/or supply are not currently available for use in the ASM analyses. However, even with these limitations, the interaction between commodities provides a very useful insight into the overall economic-biophysical-environmental performance of agricultural systems in developing countries.

6.6 Linking Multiple Models to Address Multi-Dimensional Assessments

We are encouraged that the linkage and interaction between biophysical, environmental, and economic models has been achieved under research conditions. The resulting linkages produced results that would not have been achieved with the use of individual models. The remaining concern about this methodology is its relative complexity and difficulty for full use in many developing countries. We are engaged in an active collaboration with FAO to further develop packaging techniques that allow the interface between these kind of models to be as seamless as possible and to work with our developing country partners to ensure their utility. It is important to think of the IMPACT product as a tool-kit of methods, from which individual studies may be crafted using the most relevant models for the needs of the analysis.

The integrated suite of analyses conducted within this document represent a first generation attempt to identify the proper sequencing of information flow between models that insures that output of one model meets input needs of another. This is needed in the quest for an integrated analysis capable of capturing the spatial extent of resources, production systems and markets, and then project yield variations of crops and livestock reflected in economic models with resulting environmental responses.

The resulting analytical flow has allowed a clearer definition of how best to optimize the flow of information between models. This analysis has resulted in development of a first generation “middleware” program called the Common Modeling Environment (CME) that allows placement of models in a computing environment where developers do not have to modify their models but can place their tools online and allow users to interact with their models via the Internet or local host. A suite of models can be either be run as individual modules with a common interface or be directed to share common data where output from one module can be input into another model.

The challenging aspect of impact assessment of complex systems at multiple scales is to design analytical systems that capture the complexity in a manner that users can comprehend the necessary data requirements, follow the information flow protocol, learn to use the tools in a timely manner, and interpret output. Design of a common interface with smart linkages between models to meet the multiple dimensions of impact assessment couple with a sound foundation of supporting data is the key to a long-term investment in impact assessment methodologies.

6.7 Contrasting the Complexity of the East and West Africa Studies

The impact assessments conducted in East and West Africa involved two quite different environments for testing our methods. West Africa provided a mechanism to work with crop and farming technologies in a region with well-defined climatic conditions that repeat themselves across several countries. East Africa was a more complex landscape in terms of crops, vegetation, and geographical distribution of the technology and