Framework for crop-livestock production systems research

Amare Haileslassie\textsuperscript{1,2}, Peter Craufurd\textsuperscript{1}, Michael Blümmel\textsuperscript{2}, Ramana Reddy\textsuperscript{2}

\textsuperscript{1} International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), \textsuperscript{2}International Livestock Research Institute (ILRI)

Two Major Steps in Crop-Livestock System Research

I. Understanding present performance and state of the system [Figure 1 (green and blue colours)]

II. Exploring future trajectories of the system [Figure 1 (grey colour)]

Key Issues to Understand the Present Performances of Crop-Livestock systems

I. Structural components of the system and their interactions (e.g. edaphic, biotic, abiotic) across scales and livelihood dimensions;

II. Functional components of the system (e.g. input levels and types and output level achieved over time);

III. State of the system (e.g. stability, risk and uncertainty factors).

Figure 1: A simplified framework for agricultural production system research: illustrating agricultural system components, their interactions, driving factors, livelihood outcomes, strategies and feedbacks

Key Issues to Explore Trajectories of the Future Crop-Livestock Systems

I. Understand the livelihood objectives of farmers and how this match with the present livelihood outcomes.

II. Study positive or negative feedbacks of the present system-functions and trajectories to the major system drivers.

III. Identify options/scenarios to modify or change the system to achieve higher level of performances.

IV. Examine effects of external factors (e.g. climate change, migration, market) on system performances and options to move the system in the desired direction.

V. Explore whether the proposed scenarios are technically, socially and economically feasible.