Flood-Based Farming Systems in Eastern Africa

Liman H. Issoufou

Eike Luedeling

Jan De Leeuw

Maselu Maimbo

- **FBFS, ubiquitous**
  - world ≈ 125 million ha (wetlands, FAO based on soil map);
  - Africa: ≈ 25 millions ha (SIN(1), nd);

- **FBFS, under-recognized**
  - Missing in policy and research (Dixon et al. 2001, Garrity et al. 2012);
  - Assessment not exhaustive (SIN(1), nd);

- **FBFS, potential for outcomes to food security and livelihoods**
  - Suitable area larger than reported.
  - Potential for intensification (Roger, Martin, & Sloans, 2013)

Garrity, D., Dixon, J., & Boffa, J. M. (2012). *Understanding African Farming Systems: Science and Policy.* Sedney: Food Security in Africa.
SIN(1). (nd). *Flood based farming systems in Africa. Overview paper 5.* Spate Irrigation Network Foundation. Retrieved from http://spate-irrigation.org/resource-documents/overview-papers/
Roger, B., Martin, B., & Sloans, C. (2013). *African agriculture, transformation and outlook.* Johannesburg, South Africa: NEPAD.

- **However,**

  - lack of data and appropriate tools for FBFS
  - significant variation among them etc.
  - potential can not be estimated;
  - The extent of the variability unknown etc.

- **Knowledge gap**
  - Knowledge gaps around FBFS's
  - These knowledge gaps impede intensification

- **Proposed research**
  - To fill this gap, we consider the following chapters:

Chapter 1: Establishing a sampling frame for Flood Based Farming Systems: An ICRAF Project

- **Locating FBFS that can be localized by remote sensing using the opportunity provided by open sources geospatial data (Google Earth, Landsat, Field data).**

- **Estimate the development and potential options.**

- **Selection of focal watersheds according to different agro-ecological zones, similarity/dissimilarity, and criteria developed in chapter 2.**

- **Selection of focal households and their farming plots.**

- **Classification EA FBFS based on geomorphological and hydrological criteria:**

    - Extensive literature review,

    - Key informant interviews,

    - Hydrographic and climatic data analysis,

    - Field observations.

Chapter 3: Enabling Farmers' investment in FBFS

- **Profitability of different types of FBFS:**

  - From available classification schemes to decision making. e.g. Geomorphological classification ignores risks;

  - The NDVI maps developed in chapter 1, will be used to determinant the length of the growing season and its predictability for both uni and bimodal systems.

  - A workshop will be held with knowledgeable people in order to access the risk in each type of FBFS. Finally, informed recommendation on the variability and profitability of each types of FBFS will be performed.

Chapter 4. A review of current agriculture in flood based systems in East Africa.

- **Describe the farming systems in the various flood based system in each of the three countries:**

    - questionnaire to experts coming for annual courses on FBFS (this room);

    - Based on that, questionnaire to staff working with the ministry of agriculture, the ministry of water, and other relevant institutions;

    - Questions addressed : hydrology and the farming systems in FBFS.

Chapter 5. Production risk in flood based farming systems.

- **Incorporate risk and uncertainty into crop growth models using ensemble modelling approach:**

  - Scenario based on climate and hydrology and information generated in chapter 1, 2, and 3 will be used to calibrate the models;

  - Comparison among FBFS types;

  - Targeting risk in both crop yield and monetary value.

Chapter 6. A broad perspective on risk in flood based farming systems.

- **This chapter is focusing on a broad risk assessment (as described by Hardaker) considering the type of FBFS described in chapter 2:**

    - Establish the context;

    - Identify the risks;

    - Analyze the risks;

    - Assess the risks.

Chapter 7. Options for intensification.

- **Describe the options for intensification:**

  - Develop scenarios for managing hydrological risks;

  - how this would affect the options for agriculture?

  - use the model developed in chapter 5 to assess the production outcomes of the system when hydrological risks are managed.

Chapter 8. Synthesis, summary, conclusion and recommendations

- **Take home message regarding the whole PhD thesis will be given**

Works Cited

Cassman, K. G., & Wood, S. (2005). Cultivated Systems. In R. Hassan, R. Scholes, & N. Ash, *Ecosystems and Human Well-being: Current State and Trends* (pp. 745- 794). Washington, D. C.: Island Press.

Dixon, J., Gulliver, A., & Gibbon, D. (2001). *Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World.* (H. Malcolm, Ed.) Rome: FAO.

Erkossa, T., Hagos, F., & Lefore, N. (2013). Introduction. In T. Erkossa, F. Hagos, & N. Lefore (Ed.), *Flood-based Farming for Food Security and Adaption to Climate Change in Ethiopia: Potential and Challenges* (p. 180). Adama, Ethiopia: International Water Management Institute.

Ngigi, S. (2003). *Rainwater Harvesting for Improved Food Security Food Security: Promising Technologies in the Greater Horn Of Africa.* (D. Thomas, K. Mutunga, & D. **Mburu, Eds.)** Nairobi, Kenya: Kenya Rainwater Association (KRA).

SIN(1). (nd). *Flood based farming systems in Africa. Overview paper 5.* Spate Irrigation Network Foundation. Retrieved from http://spate-irrigation.org/resource-documents/overview-papers/

Van Steenbergen, F., Haile, M. A., Alemehayu, T., Almirew, T., & Geleta, Y. (2011). Status and Potential of Spate Irrigation in Ethiopia. *Water Resour Manage*.

Thank you