Linkage of irrigation and nutrition in sub-Saharan Africa: a review of Kenya's irrigation arrangements

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Introduction

- In sub-Saharan Africa (**SSA**), the number of **undernourished people** is almost **double the global number** (Prevalence of undernourishment: World 10.8%, SSA 19.9%,
  - In spite of the **investments** done in the agricultural sector (**MDGs, CAADP** etc), evidence shows a **minimal impact on nutritional outcomes** (FAO, 2019).
- **Irrigated agriculture** back in Africa's policy agenda
  - How should it be **implemented** to achieve **food and nutrition security** - a **critical** aspect of **research** and **development arena** (Lankford, 2009).

Methods and Materials

- **Literature review** -recently published literature on irrigation in Kenya
- **2015/16 Kenya Integrated Household Budget Survey (KIHBS)** - look at the arrangement of irrigation and their linkage to nutritional outcomes.

Results and Discussion

- Arid and semi-arid lands (**ASAL**) covers about **89**% of Kenya's **land area** (Republic of Kenya, 2012; Njoka et. al., 2016)
  - But the data shows that only 5.35% of the respondents applied irrigation to their land
- **Figure 1: Rivers** act as the main source of water for irrigation followed by wells (deep and shallow), springs and ponds or water pans.
- **Figure 2:** The main method for water abstraction in Kenya is through **gravity**, followed by petroleum-powered fuel **pumps**, manual pumps, electric pumps and the least source of power for pumps is solar power.
- **Figure 3:** The respondents who irrigated their land had **better nutritional outcomes** in terms of worry about food, running out of food due to lack of money, eating few kinds of foods and in receiving relief food.
- However, when the results were subjected to a **chi-square** statistic, the none of the results were significant at 95% level of confidence while the **Cramer's V** statistic showed a very small positive association (<0.05) for worry about food, eating few kinds of foods and in receiving relief food and a very small negative association (<0.05) for running out of food due to lack of money.

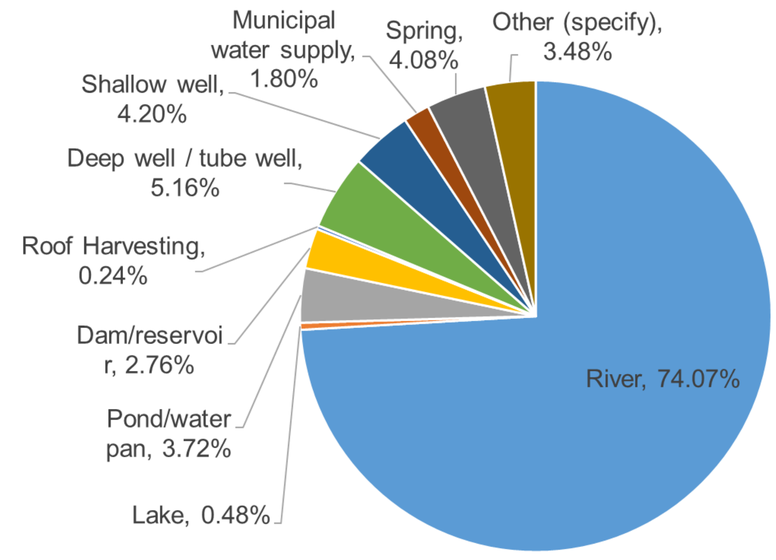

Figure 1: Main source of water for irrigation

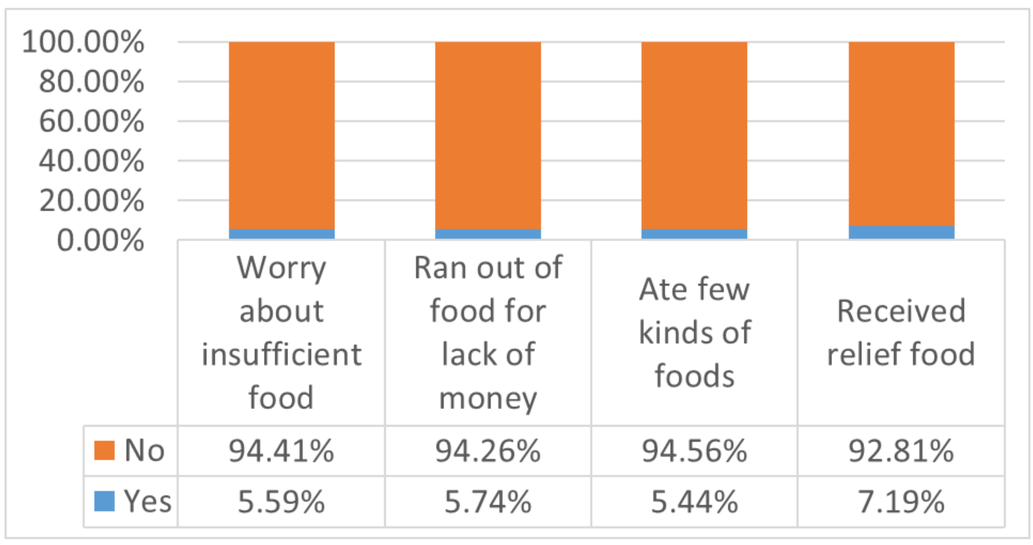

Figure 3: Responses on nutritional related outcomes for irrigators and non-irrigators

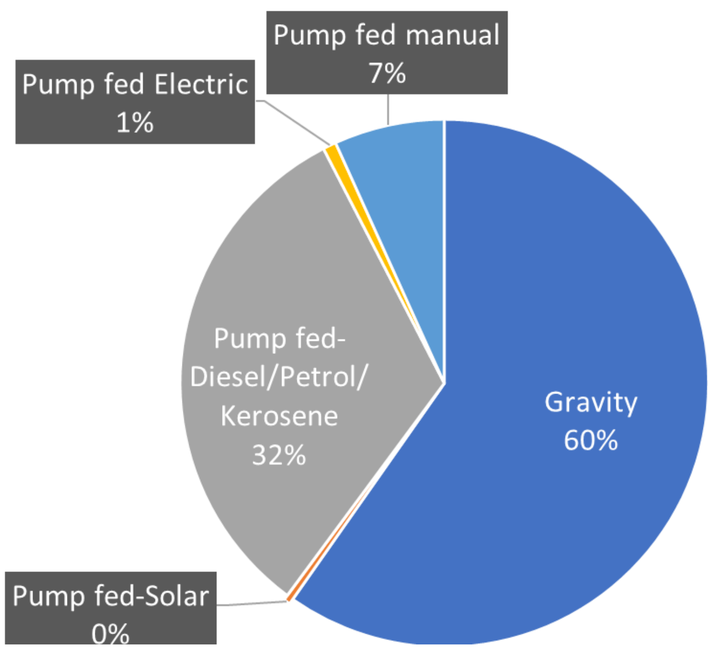

Figure 2: Main method of water abstraction for irrigation

Conclusions and Way Forward

Weak link between nutritional outcomes and irrigation?

a) An aspect also found in **literature**

- **Few studies** linking agriculture and nutrition
  - Need for **unpacking "agriculture" and "nutritional status**" (Muthayya et al., 2013; Webb and Kennedy, 2014)
  - Paradigm shift in research - Understand the link between **agriculture and nutrition** (Ruel et al., 2018)
  - **Irrigation** impacts on **nutritional outcomes** are **understudied** (Domènech, 2015)

b) Research design and data limitation

- **Data** "not specified" to capture nutritional outcomes
  - Known measures e.g. dietary diversity and food diary
  - Dummy variables – trap?
- **Literature** - **Lack** of **strong and robust study designs** and **survey methods**
  - **Weak results** and limited **generalizability** with most of the nutritional effects remaining hidden (Jaenicke and Virchow, 2013; Webb and Kennedy, 2014)
  - **Methodological flaw**s (Domènech, 2015)
    - Sampling -Bias on selecting the sample, Self-selection, Inadequate control sample for comparison

Part of a **preliminary study**

- Use of primary data – better research design and data collection

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