Bang on the money: evaluating information flows through dairy-farming social networks for the effective implementation of farmer-to-farmer extension.

# Hypothesis

Modelling the flow of information

# The suitability of communities and “lead farmers”[[1]](#footnote-1) for participation in farmer-to-farmer[[2]](#footnote-2) extension is. The appropriate complementary mix of information sources may also be predicted from certain individual and community traits. Rationale

A reduction in the supply of key agricultural inputs and basic foodstuffs (particularly grains) due to Russian aggression in Ukraine has exacerbated food insecurity across Africa (see Hatab, 2022) (Fig1). This has been exacerbated by droughts in the East of the continent (Toreni *et al.*, 2022) - symptomatic of the long-term threats posed by climate change (‘IPCC Sixth Assessment Report - Regional fact sheet - Africa’, 2022) – which have impacted communities dependent on livestock in particular (Button, 2022). Persistent low productivity gains Takahashi

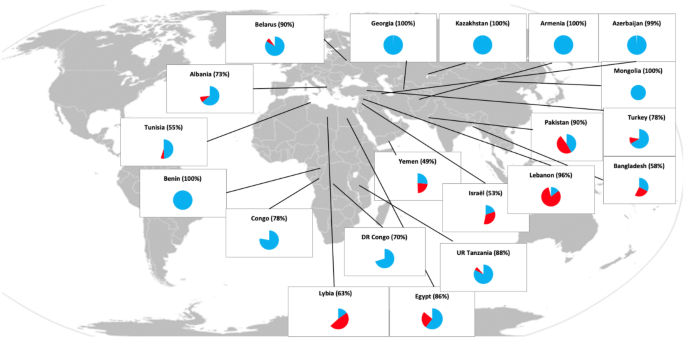


Figure : The share of countries' wheat imports from Ukraine (red) and Russia (blue) in 2020 (Hellengers, 2022)

In these circumstances, the need for quick and efficient agricultural extension systems is more pertinent than ever, particularly amongst livestock farmers (Antwi-Agyei and Stringer, 2021, p. 3; Button, 2022). Simultaneously however, inflation and rising interest rates are likely to push private and public entities cut budgets for development aid and agricultural extension.

By aiding to identify farmers and communities suitable for F2F extension and the optimal mix of information sources, this research seeks to offers practical insights into how private and public entities may deliver this much-needed agricultural extension at a lower cost, without comprising its effectiveness.

The primary dataset available combines characteristics of dairy farmers in rural Western Kenya with information on their social connections, community characteristics, and preferred sources of agricultural information, and thus its analysis offer key insights into ongoing practical and academic debates on the selection of lead farmers (Taylor and Bhasme, 2018; Ochieng, Silvert and Diaz, 2022, p. 26) and the respective roles of public and private agricultural extension (Muyanga and Jayne, 2008; Feder, Birner and Anderson, 2011; Norton and Alwang, 2020).

# Research Questions

1. What characteristics[[3]](#footnote-5) are associated with dairy farmers being more likely to seek information from other farmers[[4]](#footnote-6)? For ease, these are referred to as *seekers*.
   1. Are network or individual characteristics, if any, more significant in establishing of whether farmers will be seekers?
2. What are the traits of farmers sought out as a source of information by other farmers? For ease of reference, these are called *soughters*.
   1. To what degree are these consistent across networks and different types of *seekers*?
   2. How different – if at all – are soughters from seekers? Are *soughters* likely to be non-*seekers*?
3. Excluding other farmers, where do *seekers*, *non-seekers*, and *soughters* prefer to acquire information on dairy farming from – with particular focus on private, public and open-access sources - and to what degree are they respectively dependent on these sources?
   1. Are the clear differences between and/or within groups?
   2. What does this say about the effectiveness and equity implications of replacing of direct extension with F2F?
   3. How does this inform the optimal and most equitable distribution of private and public extension resources?

# Objectives

To identify network and individual characteristics linked to farmers’ propensity to seek information from other farmers.

To determine characteristics of farmers more likely to be sought out for information by other farmers.

To evaluate how different types of farmers (types being *soughters, seekers,* and *non-seekers*) vary in where they seek information from, and to what degree they are reliant on these.

# Methods

Map

Description automatically generatedThe dataset available consists of qualitative and quantitative variables on the individual, household, socio-economic and community characteristics of dairy farmers in four rural communities in Western Kenya (Fig2). Importantly, question on who farmers speak to and where they get information from captures important community and information flow-dynamics, which are not available from standard household surveys. The author was author was thoroughly involved in the data collection design and subsequent data cleaning.

Figure : Locations communities where data collection was conducted (Morrison, 2022)

From this dataset, variables to measure traits of interest whch are not directly measurable – including social capital and network characteristics – will be constructed.   
These, as well as variables on farmer and household traits, will then be integrated as explanatory variables into a logistical regression equation with the farmer’s binary choice as to whether they would seek information from other farmers as the dependent variable. Appropriate statistical tests to determine the significance and robustness of these explanatory variables will then be conducted.

Following this, a Tobit regression[[5]](#footnote-7) model will be constructed to determine the traits associated with farmers being sought out for information on dairy farming by others. The number of farmers referring to a given farmer as a source of information will be regressed against individual, household, and network traits. As above, appropriate tests will be used to determine the robustness and explanatory power of each variable.

Using the predicted values from the two linear regressions above, the traits of different groups (soughters, seekers, and non-seekers) will be compared using appropriate statistical test including T-tests, with analysis by community where appropriate. Venn diagrams, histograms, and other visualisations will be generated to determine the overlaps and links between groupings.

Subsequently, a comparison of the preferred information sources on dairy farming reported between and amongst groupings will also be undertaken, comparing these results to variation between communities. Flowcharts and histograms will be used to analyse and discuss the importance of different information sources.

# References

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1. Farmers who are trained and then task to disseminate their knowledge and experiences with others farmers [↑](#footnote-ref-1)
2. Referred to as F2F, a model of extension whereby farmers themselves are the agents of dissemination, informing and training other farmers themselves [↑](#footnote-ref-2)
3. including household traits, farmer characteristics, market-orientation, social capital [↑](#footnote-ref-5)
4. For ease, referred to as *seekers* [↑](#footnote-ref-6)
5. The distribution of the dependent variable renders itself best to a Tobit regression appraoch [↑](#footnote-ref-7)