IDENTIFYING APPROPRIATE FARMER ENGAGEMENT APPROACHES TO RAISE INTEREST OF DAIRY FARMERS TO TAKE UP IMPROVED FEED AND FEEDING PRACTICES FOR INCREASED MILK PRODUCTION

Developing value chain innovation platforms to improve food security in East and Southern Africa (VIP4FS) Project (FST/2014/093)
Identifying appropriate farmer engagement approaches to raise interest of dairy farmers to take up improved feed and feeding practices for increased milk production

Aside from its critical nutrition benefits, smallholder milk production has high income generation potential in Uganda's Eastern Region. However, both its productivity and quality remains low. A key underlying cause is inadequate feeding practices, with poor use of and access to quality feed being a key contributing factor. Smallholder dairy farmers typically rely on naturally growing grasses, especially in the rainy season, with a small number growing Napier grass. During the dry periods, grass is scarce and the animals tend feed on banana stems and other crop residue. Though rich in fiber roughage, these feed sources are not only of irregular availability but also are deficient in protein and other vital vitamins required for profitable milk production. While land is a limited resource and fodder growing faces competition with crop cultivation, there are untapped planting niches that dairy farmers could exploit to grow more and higher quality fodder, for example field boundaries.

Given VIP4FS’s goal of bolstering food security and income among key actors in targeted value chains, including smallholder dairy, identifying and scaling approaches among dairy farmers to bolster milk production through the increased and appropriate use of quality fodder (including nutritious fodder shrubs) is therefore critically important. This planned comparison seeks to identify cost-effective approaches to motivate dairy farmers to both grow and appropriately use appropriate high value fodder shrub species, in the wake of low availability of land. Government and non-government institutions have had initiatives to raise awareness and provide information on growing fodder, but the dairy cattle farmers’ response has remained low, thereby resulting in inadequate feeding practices and, in turn, low milk yields.

<table>
<thead>
<tr>
<th>Title</th>
<th>Identifying appropriate farmer engagement approaches to raise interest of dairy farmers to take up improved feed and feeding practices for increased milk production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Chains Targeted</td>
<td>Smallholder dairy</td>
</tr>
<tr>
<td>Country</td>
<td>Uganda</td>
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</tbody>
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**Rationale**

Key Challenge

Low milk production among dairy farmers in eastern Uganda stemming from poor feeding practices.

Key question(s) to be answered

To identify cost-effective and appropriate approaches to promote the uptake of improved (high value) fodder production and feeding practices among dairy farmers.

Options or interventions to be compared

1. Information treatment + nursery establishment. In this set of villages/village clusters, training will be delivered as a standard extension training session for one day. Topics to be covered will include: different fodder shrub specie and their benefits; where to access the planting material, as well as linking them with the providers/sources of the planting materials; how to grow shrub fodder reflecting on the available niches; how to manage; and appropriate feeding practices. Demonstrations of good feeding practices will be included in the training programme. To address the low access of shrub fodder, a fodder shrub nursery will be established in each village or village cluster, which will include a variety of appropriate species. These will ultimately run as village micro-enterprises.

2. Information treatment + Nursery establishment + Fodder material distribution. In this set of villages/village clusters, this group of dairy farmers will be exposed to the same information treatment and nursery establishment as above. However, several farmers in each village—selected through means of a lottery—will participate provided with appropriate species and quantities of shrub fodder as the community nurseries are taking root.

3. Information treatment + Nursery establishment + Participatory comparisons with reward system for participating ‘citizen scientists’. In this treatment arm, ‘citizen scientists’—selected again via lottery if there is an over-subscription of interest—will agree to participate in a pseudo-experiment, with results periodically being presented to the wider community of local.
dairy farmers. Several will be provided with shrub fodder as the community fodder nursery is being established, while others will continue to feed their dairy cows the way they have been doing. Both sets of participating dairy farmers will be required to keep reports of their feeding practices and milk yields, using simple record keeping tools provided by the product. This will be complemented by several community-level dissemination of the results of these pseudo-experiments—both with the before/after and with/without data. For participating in the ‘citizen trials’ both will be provided with batches of fodder shrubs and technical support to establish them on their farms. These farms will be set up as model fodder producing farms.

4. Waiting list group. Funding permitting, this group will serve as a benchmark each of the above treatment groups will be compared against to assess their relative cost-effectiveness

| Key overall hypothesis | The information + nursery establishment treatment (i.e. the ‘default’ treatment) will be the least costly but have the least effect in supporting adequate fodder take up, given that it fails to narrow in on the key behavioral barriers preventing dairy farmers from making the requisite investment and practice leap. The information + nursery + shrub fodder distribution treatment will be more (cost) effective because it is assumed that information on the improved milk yields of the ‘lottery winners’ will percolate throughout these communities through informal social networks. This is expected to increase wider investment in scaling up shrub fodder production and use. While the most costly, the information + nursery + participatory comparison group is expected to be the most (cost) effective. The results of the more formal comparisons are expected to be more convincing to the wider dairy farmer community and will reinforce key messages about the quantity required and feeding practices. The provision of fodder shrub seedlings as a reward will also enhance their prestige, and their deliberate incorporation into model shrub fodder farming systems will demonstrate feasibility and highlight the multiple additional benefits, e.g. soil fertility enhancement and erosion control. |
| Context and sub-group effect hypotheses | i) **Gender** (i.e. female versus male dairy farmers making effort to grow improved fodder) – the female farmers will be more interested than the male farmers in growing fodder given that feeding of domestic animals is often taken up by females. Females tend to care more about welfare of the domestic animals than men. So women are expected to respond more positively to all three treatments.  
   ii) **Farmland size** (i.e. smallholder versus large scale farm size). Dairy farmers with relatively larger farm size are more likely to allocate more land to fodder as compared with those with more limited land.  
   iii) **Number of dairy cows**. Farmers with more dairy cows (more than 2) are more market oriented and therefore more likely to grow fodder for the convenience of feeding their animals as compared to those with 1-2 dairy cows. Those with 1-2 cows perceive that it is easy to feed them with whatever is available and still get some milk and therefore no need to struggle.  
   iv) **Market of milk**. Dairy farmers with known market outlets of their milk versus those with no designated known market. The former will experience greater uptake, given the relatively ease of earning increased profits. |
| Unit of assignment | Village/village cluster. Care will be taken in constructing the sampling frame for the villages/village clusters to be included in the planned comparison, particularly to mitigate the sharing of information across the treatment groups (spill-over effects). Village/village clusters will be selected from Kapchesombe and Tegeres sub-counties in Kapchorwa District and Mukoto and Namabya sub-counties in Manafwa district). These are the districts that registered the highest number of dairy farmers from the household survey. |
| Unit of measurement | Dairy farming households |
| Outcomes and outcome indicators | i) Shrub Fodder Uptake and Practice Index (*Production*—species grown, quantity produced, mgt. practices; *Feeding Practices*—quantity, frequency, method; *Knowledge*—species, *feeding practices*, and production methods.  
   ii) Average milk yields per day per cow during milking period  
   iii) Minimum Dietary Diversity – Women, as a proxy food security measure |
Identifying appropriate farmer engagement approaches to raise interest of dairy farmers to take up improved feed and feeding practices for increased milk production

### Role of ICRAF

- Technical backstopping on:
  - Participation in designing the treatments (with input from Busara Centre for Behavioral Economics)
  - Identifying reliable sources of planting material (based on their other projects) and linking the farmers
  - Participate in follow up
  - Participate in the preparation of dairy farmer trainers and packaging of the information that will be provided to the farmers
  - Take lead in the sampling process of the participating villages and designing the data collection tool
  - Providing technical backstopping and follow up especially to the partners

### Role of VIP4FS partner staff

#### i) NaFORRI

- Coordinate activities of various partners in the implementation of the experiment/PC
- Take lead in identifying the households that will take part in the different treatments
- Take lead in putting together available information on the different fodder types, how to grow them, the recommended rations and frequency of feeding the dairy cow
- Provide some planting materials, as well as information, about where to access the planting materials for particular fodder type
- Conduct baselines
- Identify and engage the extension workers and the lead farmers that participate in the information provision, practical sessions
- Packaging and provision of information to the different group treatments
- Facilitate dialogue between PC stakeholders
- Following up the farmers and M&E

#### ii) Makerere University

- Participate in packaging and sequencing the information to be delivered to the farmers
- Prepare the farmers on what is going to happen and the roles of every partner in the PC
- Build capacity of partners (NaFORRI and KADLAC) in information packaging and how to use/integrate the identified farmer engagement approaches
- Train the extension workers identified
- Train or prepare the lead farmers
- Participate in conducting the baseline
- Facilitate dialogue between PC stakeholders
- Follow up and M&E

#### iii) KADLACC

- Coordinate activities of local PC stakeholders
- Guide identification and enrollment of the lead farmers and extension worker
- Mobilization of identified households
- Guide identification of farmers/households to work with from each of the selected villages
- Training of the farmers, facilitation of the experiential games
- Contribute to conducting of baselines
- Coordinate operations of the farmers under each treatment type
- Facilitate dialogue between PC stakeholders
- Follow up and M&E
Role of Innovation Platform (IP) actors

i) Eastern Dairies
- Coordinate activities of member dairy farmers
- Provide market for farmers’ milk produce
- Take part in identifying the farmers or households to participate

ii) Dairy farmers
- Avail selves for the engagement
- Attend and actively participate in generating knowledge and skills in feed and feeding practices that will be provided
- Make use of the knowledge provided (in theory and practical sessions)
- Provide feedback on effectiveness of extension approaches and improved fodder options
- Guide in sampling of appropriate households

iii) Local governments
- Enable access to dairy farming communities
- Provide extension agents’ staff time
- M&E

Role of others

i) Agricultural input suppliers
- Provide inputs necessary for farmers to take up good practices exhibited on model farms

Type of Study
Randomized field experiment

Suggested timing (start and end dates)
June 2017 – June 2019

5. Specifics of Planned Comparison Protocol:

a) Steps on how the planned comparison will be executed

1. Preparation of treatment protocols and materials.
The three treatments are standardized and rolled out in the same way across all respective villages. The team worked with extension partners and relevant smallholder dairy experts to develop the first information only treatment. All project partners will work together to develop the specific details of the various treatments, as well as their implementation modalities.

2. Demarcation of the study area and compilation of household lists.
Villages included in the planned comparison will be clearly mapped out and will ultimately make up the sets of villages that will be assigned to each of the three treatments and to the waiting list group. Once villages are selected, local informants are be asked to compile household lists of dairy farmers in each village. The households are defined as the common place where people live and sleep together and each from the same cooking pot.

<table>
<thead>
<tr>
<th>SN</th>
<th>Household Head</th>
<th>Household Adult Members &gt; 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Juliette Banda</td>
<td>1a Juliet Banda</td>
</tr>
<tr>
<td>1</td>
<td>Juliette Banda</td>
<td>1b Lucy Banda</td>
</tr>
<tr>
<td>1</td>
<td>Juliette Banda</td>
<td>1c Markus Banda</td>
</tr>
<tr>
<td>2</td>
<td>Fredrick Mpesa</td>
<td>2a Fredrick Mpesa</td>
</tr>
<tr>
<td>2</td>
<td>Fredrick Mpesa</td>
<td>2b Mable Mpesa</td>
</tr>
<tr>
<td>3</td>
<td>Cynthia Nkoswe</td>
<td>3a Cynthia Nkoswe</td>
</tr>
<tr>
<td>3</td>
<td>Cynthia Nkoswe</td>
<td>3b Peter Nkoswe</td>
</tr>
<tr>
<td>3</td>
<td>Cynthia Nkoswe</td>
<td>3c Carol Nkoswe</td>
</tr>
</tbody>
</table>
3. Developing and piloting of the baseline data capture tool.

In this step, Open Data Kit (ODK) tool will be used to collect data. The survey will be as short as possible and will only capture data pertaining to the indicators earlier developed, as well as basic household characteristics and asset ownership. Before the survey is administered, it will be piloted as part of the enumerator training programme. The exercise takes place in a context similar to one or more of the selected villages but outside of them to avoid ‘contamination’. Several people are included in the pilot at the same time, so that experiences can be compared to inform value added adaptations to the tool.

4. Identification and training of a team of enumerators.

Given the shortness and nature of the survey instrument, only a small number of enumerators are required. After recruitment, the enumerator training will be undertaken, which will include going over the ODK survey tool, which can be loaded onto their smartphones, followed by a test run of administering the tool in a village outside of the study area.

5. Undertaking random sampling of profiled adult dairy producers.

Before or as the enumerators are being trained, a list of all households in the villages o be visited have been properly compiled, ideally in the format displayed under Step 2. The team should also have a specific tab with a list for each village that is to be included in the study.

How to randomly select households:

Create a new column in each tab called Random # (or something similar). In the next cell below it, type = RAND(), and then move away your cursor. A random number between 0 n 1 will be automatically generated. Copy this formula and paste it in the remaining cells of this column, so that each cell in the column has its own unique number against each household adult members. This next step is critical; do not forget it. Copy all the newly generated random numbers. Select the dropdown under the paste icon and select paste values 123.

You should now have a list of ‘fixed’ random numbers against each name. You can then sort the list either from the smallest or the largest of these numbers. To do this, select any cell in table with either the random numbers or the adult names, etc. Then hold down the ctrl key and select the ‘a’ key. This will select all of your table. Under the sort and filter icon, select ‘custom sort’.

The window below will appear. In the ‘sort by’ drop down, select the heading from your random number column, and ensure that the ‘my data has headers’ field has been selected. Select ‘ok’.

The names of all adult members will now have been sorted by the smallest to the largest random numbers. Take the first 20 as potential dairy producers to be interviewed. Since only one adult should be interviewed from each household, check each name in the order in which they appear on the list. In the case where a household representative has already been selected, replace with the next name, a row below, starting with the 21st sorted name.

Once the priority list of 20 names from different households have been selected, work your way further down the list to select about eight additional names to be on the reserve list for each village. For each village therefore, there will be a list of 20 priority adult dairy producers from different households and a reserve list of about eight others from different households.
6. Administering the baseline survey.

First, develop a plan to carry out the baseline survey. Assuming that the survey will take about 30 minutes to administer the survey, the randomly selected dairy producers will be mobilized to a central place in the village, then about 5 villages can be covered in one day by the 10 person enumerator team inclusive of travel and waiting time. Depending on the number of households required, the exercise should take about 10-12 days to complete. A plan will therefore have to be developed and communicated to ensure that the selected dairy producers are mobilized to specific locations at specific times. The enumerators can then go with a supervisor to the village and be paired with the waiting respondents and interview them in a private place. Those that have been interviewed should be discouraged from talking with those that are waiting to be interviewed. After the enumerators have completed each interview, they should check the completed ODK form and then upload it onto the ODK server that will be set up for the planned comparison.

7. Randomly assigning the villages/ village clusters to the three treatments and the waiting list group.

Given the relatively small number of villages that are to be randomly assigned, it is preferred if this exercise take place after the baseline survey to ensure that there is good balance across the treatment groups in relation to the outcome measures. The random assignment exercise can be done similar to Step 5. The names of all the villages can be listed in an Excel sheet and a random number generated and then ‘fixed’ beside each, followed by the use of the Custom Sort tool against these random numbers. The first number of villages can then be assigned to the information only treatment, the next 12 to information + experiential games treatment, and the next to the information + experiential games + home follow-up treatment. The final number will then serve as the control group (or the ‘waiting list’ group).

8. Implementing the treatments following the agreed treatment protocols.

The three different treatments will then need to be implemented as per their respective protocols in their assigned villages. Given limited resources, the treatments should only target those individuals who were interviewed in the baseline survey. That is, invite these same individuals to attend the primary information session, etc. Don’t prevent others from attending, but make specific efforts to ensure that those who were interviewed during the baseline survey participate.

It is critical that the implementation be done according to the protocols and therefore it is essential for the protocols are carefully monitored and supervised. There should be no implementation in the waiting list villages until after the endline survey, and there should be no mixing of the protocols.

9. Undertaking an endline data collection and analyse results.

The same individuals who were interviewed for the baseline survey and were targeted for the treatments will then be requested to come to a central place again and be interviewed approximately 6 months before the closure of the VIP4FS project, following many of the same questions in the baseline survey. If, despite all efforts, some individuals interviewed during the baseline survey happen to not have been exposed to the treatment they were targeted for, this should be noted, so that it can be taken into account in the analysis. As much as possible, efforts should be made to interview all the same individuals who were interviewed during the baseline survey.

10. Share key findings with the Innovation Platform and more broadly.

b) Ethics

Informed consent will be obtained prior to interviewing the project participants.

For more information contact: K.Hughes@cgiar.org or J.Oduol@cgiar.org
For more information visit the VIP4FS Project webpage:

VIP4FS data repository Dataverse:
https://dataverse.harvard.edu/dataverse.xhtml?alias=VIP4FS