MAXIMIZING THE PRODUCTION, MARKETING AND RETURNS FROM LOCAL CHICKEN

Developing value chain innovation platforms to improve food security in East and Southern Africa (VIP4FS) Project (FST/2014/093)
Maximizing the production, marketing, and returns from local chicken

The livestock sector—which includes cattle, goats, sheep, pigs, and poultry—contributes to approximately 42% of Zambia’s national agricultural output. The sector has potential to grow, especially among smallholder farmers. In 2001 the livestock population was estimated at 1.5 million cattle, 1.2 million goats, 500,000 pigs and 51,000 sheep. In 2008 the numbers had substantially increased to 2.8 million for cattle, 2.4 million goats, 1 million and 157,000 for pigs and sheep, respectively (Lubungu et al 2012). Statistics show that broiler chicken production has also substantially increased from 11 to 36 million birds from 2001 to 2011, respectively, while layer chickens and indigenous chicken numbers have remained significantly unchanged over the same period at three and 11 million birds, respectively (Bwalya and Kalinda, 2014).

Over 90% of smallholder households in Zambia keep indigenous (‘village’) chickens, which contribute greatly to household nutrition (as a key protein source), income, and essential goods and services through barter trade (Haazele et al., 2002, Bwalya and Kalinda, 2014). The meat is preferred by many to that of broiler chickens, mainly due to its taste and lower fat content. Despite the enormous potential that indigenous chickens (Gallusgallusdomesticus) have for sustaining livelihoods, their production and marketing has been neglected, resulting in the sub-sector being highly underdeveloped with poor linkages between producers and consumers (Bwalya and Kalinda, 2014). Bwalya and Kalinda (2014) show that there is a positive gross margin for all players along the indigenous chicken value chain. However, there is need to address various constraints affecting it development.

Given demand, there is considerable scope for indigenous chicken production and marketing. Smallholders, in particular, can potentially experience considerable benefits, given that indigenous chickens fetch a higher unit price on the Zambian market; their cost per kg. is about the same as beef, and, on average the selling price for broiler chickens is USD $5.20 per bird, while it is USD $6.84 for indigenous chickens.

Moreover, the demand for village chicken is on the rise in Solwezi District with its increasing population. On the local market, village chicken fetches a much higher price as compared to broilers. Sometimes the price can be twice as much. Though the value chain requires minimal production costs, the supply is too low to meet the demand. The VIP4FS project seeks to improve food security by strengthening the market linkages through Innovation Platforms. This proposed planned comparison is in line with the VIP4FS’s objective, which is to increase farmers’ food security and incomes. Further, the knowledge obtained would contribute to the body of knowledge.

<table>
<thead>
<tr>
<th>Planned Comparison Title</th>
<th>Maximizing the production, marketing, and returns form local chicken</th>
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<tbody>
<tr>
<td>Value Chain(s) Targeted</td>
<td>Local chicken</td>
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### Rationale

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### Summary table:

<table>
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<tr>
<th>Key challenge or objective</th>
<th>Low production levels of local chicken to meet high demand, due to low levels of household investment and high disease burden</th>
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<tbody>
<tr>
<td>Key question(s) to be answered</td>
<td>What approaches can be used to (cost) effectively motivate farmers to increase investment in local chicken production, reduce the disease burden, and link them to viable markets?</td>
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| Options or interventions to be compared | 1. **Buyer collection points**  
This treatment will be basic, but potentially very cost-effective. Collection points will be set up for camp zones assigned to this treatment arm at agreed locations and pick-up times, e.g., once per month. Households will be informed and reminded of the opportunity and prices to be offered at the time of collection. One or more buyers willing to make the collection rounds and payments will be identified and facilitated, particularly in the beginning when the low economies of scale will make the venture economically unviable unless subsidized. |
2. Buyer collection points + training
In addition to the above collection point treatment, producers in this set of camp zones will also experience basic training on location chicken management and marketing. Here, they will be provided information on (a) demand and price (market potential); (b) key buyers (local and within the district) and recommended marketing practices; and (c) recommended production practices in village chicken husbandry practices, including feeding, disease control, housing, etc. Visual aids and demonstrations will be key pedagogical techniques to be used.

3. Buyer collection points + training + community incubation and vaccination services
In these camp zones, in addition to the buyer collection points and training, lead chicken producers will be identified, trained, and provided with low-cost and locally appropriate incubators, as well as vaccination kits. Other chicken producers from within their camp zones will be encouraged to bring their local poultry eggs to have them incubated. They will receive vaccinated chicks in exchange, proportional to the numbers of their eggs that actually hatch. The recommended vaccinations for Newcastle disease is on 4th and 8th day after hatching, and efforts will be made to ensure that the chicks are vaccinated within this window.

Later, if the incubator system proves to work well, the local chicken producers will be given part of their payment in vouchers, which can be directly exchanged for vaccinated chicks from the camp zonal incubation facilities (which will be expected to have evolved into self-sustaining businesses, given that producers see that the benefits greatly outweigh the costs associated with utilizing the services). This is intended to put the maturation rates of the birds on a more consistent schedule, something that is in the buyer’s direct interest for achieving greater of economies of scale.

4. Waiting list group
Only baseline and endline data will be collected from the randomly selected producers in this set of camp zones. However, if it is feasible to scale out the most cost-effective of the above treatments to this group by the end of the project, this will be undertaken.

Key overall hypothesis(es)
- The collection point only treatment will be as effective or close to being as effective as the collection point + training treatment. In other words, it is hypothesized that a key behavioral barrier against scaling up local chicken production is confidence in their being reliable buyers and readily access to them. The training is not expected to have much of an independent effect, as it does not address this key structural barrier that has strong behavioral implications.
- Despite it being significantly more costly, the most effective treatment combination is the one that combines the two above with this community level incubation and vaccination services. The experience of witnessing other fellow household members utilize the community services and experience higher hatch and chick survival rates is expected to inspire confidence that there will be significant returns from scaling up local chicken production, particularly when considering there is a ready and accessible market. Given that this treatment will be the most effective facilitating higher vaccination rates, it is also expected be the most cost-effective of the treatments overall.

Contexts to compare
1. Male and female chicken producers
2. Accessibility to road network (distant to tarmac road)
3. Age
4. Education
5. Economic status
**Context and sub-group effect hypotheses**

1. The collection only and collection + training intervention will be more effective for women than men, and the more educated, given that (a) women traditionally rear local chicken so it is just a matter of scaling up what they are already familiar with; and (b) the more educated are better able to absorb, make sense of, and act on the information they are being provided with.

2. Distance household to the collection points will inversely affect the effectiveness of all treatments. In other words, households closer to main road networks will find realize that it will be relatively easier to get their chickens to places where they can easily be sold, so will invest more upon realizing the untapped opportunity.

3. All options will be more effective for the relatively richer farmers

**Unit of assignment**

Camp zones (48). The above treatments will be randomly assigned to the different camp zones, thereby resulting in 12 camp zones being assigned to each treatment arm.

**Outcomes and outcome indicators**

- Village Chicken Investment Index (comprised of four dimensions: marketing practices, scale of production, extent of investment, e.g. in housing, and management practices). This index will be decomposed in different ways during data analysis
- Local chicken mortality rates
- Minimum Dietary Diversity-Women (MDD-W) as a proxy for HH food security

**Roles of ICRAF**

- Financial support
- Monitor and evaluate the project
- Technical support (Designing tools, setting up of trials etc)
- Data analyses
- Capacity building (tool designing, data analyses)
- Provide analyses tools (SPSS etc)

**Roles of VIP4FS partner staff**

- Capacity building
- Designing and setting up of trials
- Data collection and analysis
- Day to day implementation of the project
- Mobilizing groups and other stakeholders
- Stakeholder engagement
- Report writing

**Roles of IP platform actors**

- Agriculture/extension officers: technical advice/support/information, monitoring producer group activities
- Agro dealers: Input supply
- Primary producers: engaged in production, information dissemination, capacity building
- End user: provide the market
- Transporters: provide transport facilities
- Financial institutes: financial support, capacity building

**Type of study**

Cluster randomised control trial (12 camps X 4 camp zones)

**Suggested timing (start and end dates)**

June 2017 to March 2018
1. Prepare treatment protocols, materials, recruit and train lead producers for treatment area 3.

This will take time and a high level of effort, so this step will start immediately. The three treatments need to be standardized and relatively easy to deliver, so that they are rolled out in the same way in all their respective camp zones. Diverting away from the agreed treatment protocols will make the findings difficult to interpret. Work with extension partners and relevant experts (including those who know the local and district village chicken market) to develop the training treatment. Work with extension partners to identify ways of how the collection point and incubation/vaccination treatments can be made to work.

2. Clearly demarcate the study area and compile household lists.

Will it be all villages falling under each camp zone that will be targeted or a sub-group of villages? For cost considerations, it is perhaps best to only include clusters of villages where all producers residing in the camp zone can easily meet up at one central point. Once the specific villages have been decided on, work with local informants to compile household lists with the names of all adult members who reside more or less full time in the households. For simplicity, a household is defined as a common place where people live and sleep together and each from the same cooking pot. The lists for each camp zone should be compiled in the format below (but with other columns added as felt appropriate), so that there is a specific line for each household member but then a means of tracing the member back to the household head. Develop a separate worksheet in the Excel workbook in this format for each camp zone. This will be important for the sample that will be done later.

3. Develop and pilot the baseline data capture tool.

This will be supported by Judith and Karl from Nairobi. However, it would be good if we can organize an online training to develop team capacity in applying and using the Open Data Kit (ODK) tool that will be used. The baseline survey tool needs to be relatively quick to administer (under 30 min.), so it will just capture data pertaining to the above indicators, as well as basic household characteristics and asset ownership. After a draft of the survey tool is developed, work with the ICRAF Nairobi and Lusaka teams to organize a piloting exercise. This should take place in a context similar to one or more of the camp zones but outside of them to avoid ‘contamination’. Have several people pilot the survey tool at the same time, so that experiences can be compared to inform value added adaptations to the tool.

4. Identify and train a small team of enumerators.

Given budget considerations, it is unlikely that it will be possible for the interviews to take place at the household level; undertaking them at central locations in the camp zones is likely more realistic, despite being arguably less ideal. And given this and the relatively short nature of the survey instrument, a small team of enumerators, e.g. about 10 (5 younger college/university educated men and 5 younger college/university women) will be needed. They should each have their own reliable android smartphones. Advertise the opportunity and competitively recruit the 10 enumerators. We have found that conducting rapid interviews where the enumerator candidates are asked on the spot to administer a small set of mock survey questions to be a highly effective way of screening out potentially weak enumerators.

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**5. Specifics of Planned Comparison Protocol:**

a) Steps on how the planned comparison will be executed: Describe the specific things that will be done to carry out the planned comparison as a sequence of steps.
We have also found that younger adults in later years of college/university or those freshly graduated to be both highly motivated and competent. Spend a day or so going over the ODK survey tool, which can be loaded onto their smartphones, followed by a test run at administering the tool in a village outside of the study area and then a thorough review of the test run. It is possible that some coding mistakes will have been identified through this final piloting exercise that need to be corrected.

5. Undertake random sampling of profiled adult household members.

Before or as the enumerators are being trained, ensure that all the lists of households have been properly compiled, ideally in the format displayed under Step 2. There should be a specific tab with such a list for each camp zone 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. Administer baseline survey.

Develop a plan to carry out the baseline survey. Assuming that the survey will take about 30 minutes to administer and the randomly selected respondents will be mobilized to a central place in the camp zone, then about 5 camp zones can be covered in one day by the 10 person enumerator team inclusive of travel and waiting time. The exercise therefore should take about 10-12 days to complete. A plan will therefore have to be developed and communicated to ensure that the selected respondents are mobilized to specific locations at specific times. The enumerators can then go with a supervisor to the camp zone 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 this planned comparison.

7. Randomly assign the camp zones to the three different treatments and one control arm.

Given the relatively small number of camp zones (48) that are to be randomly assigned, it is best that this step 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 camps 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 12 camp zones 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 extension treatment. The final 12 will then serve as the control group (or the ‘waiting list’ group). Request support from Karl and Judith at ICRAF HQ for this step, so that they can check to see that the outcome measures are well balanced across the block zones assigned to the different treatment groups.

8. Implement 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 block camps. Given limited resources, simply targeted the treatments at 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, so make sure that this is carefully monitored and supervised. There should be no implementation in the control camp block until after the endline survey, and there should be no mixing of the protocols.

9. Undertake endline data collection and analyse results.

The same individuals who were interviewed for the baseline survey and were targeted for the treatments should 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. Judith and Karl will, again, support the development of the endline data collection tool. 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.

c) Sampling and sample size

20 randomly selected participants per block zone X 48 block zones = 960
For more information visit the VIP4FS Project webpage:

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