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Executive Summary

Healthier Hens conducted two 2-day farmer workshops in Kenya as a response to the knowledge gaps witnessed during in-country visits. The workshops aimed to address animal welfare, introduce feed fortification, as well as serve as a means to connect with many farmers to obtain farmer buy-in for future Healthier Hens initiatives. The workshops were led by Dr. Kikiope Oluwarore, Head of Field Operations, Faisal Qureshi, Country Manager, in partnership with members of the Africa Network for Animal Welfare and the International Livestock Research Institute.

These experts covered various topics related to animal welfare, hen welfare, feeding and poultry diseases. Each presentation included visual components to provide farmers with examples of proper and improper welfare. Presentations were always followed by discussions that were primarily led by Dr. Karani so farmers could ask questions and receive answers in Swahili if desired. ANAW also provided a detailed overview of Kenya's legal framework for animal welfare, and best practices for transporting live animals.

To measure the success of the workshops, surveys were conducted pre and post workshops. Pre-workshop surveys gauged current knowledge of welfare and revealed a major gap with many farmers equating welfare to production rather than the five freedoms. Post-workshop surveys gauged retention and the desire to work with Healthier Hens. Results showed improved knowledge and understanding of welfare concepts, although some ambiguity remained, but farmers indicated a willingness to work with Healthier Hens to continue learning and work on trials. The post-post survey, conducted three months later, faced challenges in obtaining responses but yielded additional insights.

Overall, both the workshops and surveys provided valuable insights into the awareness and knowledge levels of farmers regarding welfare. It also highlighted the need for further education and collaboration. The findings will guide Healthier Hens on future initiatives to improve the lives of egg-laying hens by supporting farmers in adopting better welfare practices.

Introduction

Our main mandate is to improve the welfare of egg-laying hens via dietary interventions. As we worked towards that goal on the ground in our country of pilot operations, Kenya, we noticed two main bottlenecks that might possibly prevent us from executing our mission. First, as we surveyed farmers during on-farm visits, we noticed that there might be a significant knowledge gap with regard to welfare. Most farmers equated welfare to either production or health. The common view was that if a hen was alive and producing regularly then proper welfare was being attained. There often was no acknowledgement of the five freedoms, and rarely awareness of keel bone fractures – a major source of pain for egglaying hens and part of our mandate. This led us to believe that there is a need to test and build a baseline understanding of welfare. Additionally, for our future tasks to be successful we needed farmer buy-in. Our initial approach of meeting with farmers relied heavily on industry partners, who were not as willing to provide contacts, and one off connections that provided less than ideal results (i.e. caged farmers or small-scale farms).

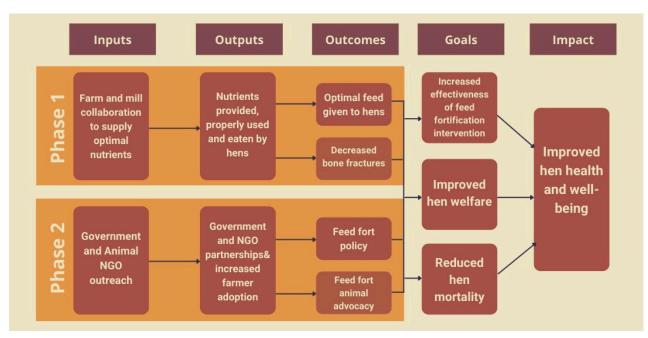


Figure 1. Outline of our Theory of Change. Our farmer workshops aid in the initial output of farmer collaboration.

One of our solutions was to conduct farmer workshops. This allows us to seek out farmers that fit our needs, build a bigger pool of eligible farmers for our various studies, trials, etc., and enable us to educate farmers on welfare. We also decided to switch our approach and consult Livestock Officers (LOs) who work for the government, often at the sub-county or ward level, and have a direct relationship with farmers. Their main duties include gathering data, providing technical advice and assisting in organising extension activities for farmers. We reached out to LOs from Nakuru and Murang'a counties, and they were eager to work with us. These counties were selected due to their high levels of egg production and farming. Another factor of consideration was the number of feed millers, both established locally and up-and-coming, that might be willing to collaborate with us down the line.

These counties were also identified by other stakeholders, including local NGOs as good options for the work we wanted to conduct. In fact, one local NGO, Africa Network for Animal Welfare (ANAW), agreed to be a part of our workshop to discuss an overview of welfare and the need to transition away from cages, while we could focus on general hen welfare, nutrition and keel bone fractures. We also hired Dr. Maurice Karani, a respected veterinarian and epidemiologist from the International Livestock Research Institute (ILRI), to facilitate the workshop to keep the farmers engaged. This added value to our workshop as local experts could speak on welfare, giving credibility to the subject, our organisation, and our mission. It also created a space where farmers can feel comfortable speaking to issues with fellow Kenyans in English or Swahili. On our side, we had Dr. Kikiope Oluwarore's expertise as a seasoned veterinarian and administrator of similar workshops across Africa to lean on as we created the curriculum, pre-, post- and post-post workshop surveys.

As the day approached to conduct our first official farmer workshop, we put the finishing touches on our materials, finalised the budget and confirmed attendees. We decided on holding a two-day workshop because we ran a one-day trial workshop and saw the need to expand on information to ensure that baseline of understanding, as well as give farmers time to fully digest the information. ANAW was able to curate a discussion on welfare from the various workshops they have held, while Dr. Maurice Karani highlighted the status of hen welfare in Kenya, the pros and cons of cage-free farming and how to transition to cage-free through education and evidence based training, and facilitated group discussions. Our hope was that this would be the first of many workshops that would properly introduce welfare to farmers and connect Healthier Hens to farms willing to find solutions to the most pressing needs of the hens.

Workshops

In October 2022, Healthier Hens conducted two 2-day farmer workshops. One was conducted in Nakuru county from October 18-19, and the other was conducted in Murang'a county from October 25-26. Both workshops had similar agendas, surveys, and discussions. They were led by Dr. Kikiope Oluwarore and Faisal Qureshi of Healthier Hens, Dr. Karani of ILRI, and members of ANAW.

Agenda

Prior to administering the two-day workshop, we trialed a one-day workshop in Nakuru back in June 2023. The one-day workshop allowed us to try different curriculum, approaches and see what farmers were mostly interested in. Building off of that experience, we outlined an agenda to keep us on track and make use of our time with the farmers. We also embedded a question and answer section after each presentation to allow the farmers the chance to further their understanding. With any live event, we made slight adjustments per day/workshop depending on the number of farmers that attended and where their interests lay. The first day comprised information on animal welfare, hen welfare, welfare as it relates to Kenya, and an introduction to feeding and poultry.

With regard to animal welfare, Dr. Kikiope led a presentation that touched on the history of animal welfare and its evolving definition. She introduced the five freedoms and how they relate to the previous definitions mentioned, as well as relating it to sentience. She then expressed the benefits of animal welfare including: improved quality of life for the animal, improved human health and welfare, better food safety and quality, and the



potential for higher socioeconomic status for the farmers as they meet consumer needs and create a one welfare approach. Since animal welfare was a new or misunderstood subject to most farmers, she ended her presentation by going over violations of improper animal welfare, so farmers can see that these violations happen on a daily basis and are wideranging from inadequate provision of food to inhumane acts of punishment.

Faisal then focused the conversation on hen welfare. This allowed the farmers to relate what Dr. Kikiope spoke about to their own farming practice. He took the five freedoms and provided measures farmers can take to assess the welfare of their hens. He gave examples of good welfare practices such as providing nest boxes, and not having excessive stocking density. Additionally, he displayed visuals to show poor welfare, so farmers can identify issues hens might have on their farms. He also discussed keel bone fractures and their impact on hens, as well as a way to determine if hens have or are currently experiencing fractures. This presentation was followed by ANAW's discussion on Kenya's legal framework for animal welfare including hen housing, transportation, and current laws that punish violations with fines or other deterrents. Dr. Karani then spoke about feeding and common poultry diseases which flowed directly into a discussion about lessons learnt on the first day and any questions farmers might not have asked during the presentations.

Dr. Kikiope started the second day of the workshop by speaking about feed fortification and the importance of good feed for the health and welfare of the hens. We allowed a larger discussion to follow this section because our previous conversations with farmers unearthed many complaints about current feeds not being adequate for the hens. Dr. Karani then spoke about feeding related to poultry diseases. This was followed by ANAW expanding on housing related to: challenges with caged housing, alternative housing and how to transition one's farm to cage-free. Dr. Kikiope, Faisal and Dr. Karani then lead closing remarks, opened the floor to questions, and provided the farmers with the next steps.





Surveys

Part of the workshops include surveying the farmers to measure their current understanding of welfare (pre-survey), knowledge acquisition, measured right after the workshop (post survey) and their retention level three months after the survey (post-post survey). For both the pre and post surveys, we printed out paper copies so the farmers could fill them out in person before and after the workshop. The pre-survey was administered before any presentations were given and had to be administered on both days of the workshop as some farmers could not attend the first day but were able to attend the second day. The post survey was given to farmers after closing remarks, so all questions and discussion points could be addressed before evaluating the farmers' retention. Because the surveys were conducted via paper and pen, there were some issues with the readability of answers provided as penmanship was sometimes illegible. The method also did not allow us to mark required fields and it left us open to losing hardcopies without automatic digital backups. We also did not provide a Swahili version of the surveys which may have deterred farmers from answering questions they did not understand, but Dr. Kikiope, Dr. Karani and Faisal were available to answer any clarifying questions in person.

The post-post survey was an important measurement to determine if our workshop truly provided digestible and implantable information. After the workshops were finished, we invited the farmers to a Whatsapp group, so we could keep in touch with the farmers and build the community. Prior to sending the post-post survey to the farmers, we provided them with resources that had previously been developed or were developed in response to the information the farmers wanted further knowledge on. At the three-month mark, we sent the farmers a link to the survey via the Whatsapp group. After multiple follow-ups, we only received one entry. We then decided to try to incentivize the farmers to fill out the survey by providing additional resources and offering a free-of-charge on-farm welfare assessment, but that did not lead to more entries. Ultimately, we decided to call farmers individually and were able to get additional entries to the post-post survey. Unfortunately, due to the nature of interviewing farmers and filling out the survey responses ourselves, it limited our ability to fully gauge the level of retention. For instance, we were not able to ask questions that had a visual component, such as a picture accompanying a prompt, and we may have added an unnecessary bias as we could answer clarifying questions which would not be available via the original online survey. Also, since we were cold-calling the farmers, we were not guaranteed that they had enough time to finish the survey or that they had a good connection to understand the questions asked.

Additional Thoughts

A majority of the conversations and questions revolved around cages and feed quality. For many of the farmers, a caged housing system was something to strive for rather than something to leave or change. The misconception lied in the belief that it allowed for better health and productivity. We were glad ANAW could bring their expertise and discuss the need and importance of cage-free systems. Because this collaboration was so successful and spoke to a big knowledge gap, we would welcome them, along with other local NGOS to partner with us on future workshops so all knowledge gaps can be filled. Additionally, many

of the seasoned farmers expressed how feed quality has deteriorated throughout the years, and they were glad to hear that Healthier Hens is in the region to aid in quality. Even though two-day workshops seem to be best, we feel that we should not exclude farmers from returning and attending similar workshops. Also, multiple workshops may be needed to deepen understanding, fully change a farmer's approach, and sustain the engagement with the farmers.

Pre-workshop survey results

Majority of our pre-workshop survey results are from Nakuru county as a portion of the filled paper forms were misplaced after the workshop in Murang'a. In total, 28 responses were collected. Only 61% of the respondents provided an email address, while virtually all submitted their contact phone numbers - confirming that access to cellular services is adequate (for mobile financing) and that WhatsApp is the preferred channel of communication.

The respondents were equally split between female and male, constituting 52% and 48%, respectively. There was more distribution in terms of the age groups of the respondents: six people each from the 35-44, 45-54 and 55-64 groups, followed by five who were above 65, three from 25-34, and just one below 24. Most, 41%, had obtained secondary education, while 26% of the respondents reported having attained a post-graduate degree. On the other hand, 11% reported primary education. 70% were both farm owners and caretakers, while the rest only cared for the hens. In terms of farming experience, just two respondents were in the business for over 20 years, while the majority - 14 have been keeping hens for 6-10 years. Eight farmers reported 1-5 years of experience, while none were completely new to the industry. Interestingly, most farmers reported having additional sources of income. However, when asked why they had ventured into this type of farming, most mentioned income, followed by sustenance, the positive social impact for their community, and passion. Among key struggles, the most prominent were farming economics (high feed costs, low egg prices), hen diseases, and feed quality issues.

"The simplest agri business, less capital."

"To provide quality table eggs and commercial purpose."

"Passion for poultry and feeding the community."



Figure 2. Direct farmer quotes indicate some of the motivations behind them getting into keeping hens commercially.

In terms of flock sizes, most of the farmers kept between 501-2000 hens. Only 1 farmer cared for more than 5000 birds, while 5 were smallholders with 500 or fewer hens in their barns. Throughout this initial survey, on average, 32% of the participants did not provide an answer to a given question (4-71%, depending on the question). 11%, on average, answered the questions with a clear "I don't know".

Farmer awareness and knowledge

While only 37-41% of the respondents knew terms such as 'hen welfare' and 'animal welfare', all farmers expressed a belief that hens can feel pain and experience suffering. Those who had known about welfare, listed animal well-being, freedom from injuries, diseases and good nutrition as key aspects to strive for. However, there was a significant fraction of the respondents who expressed high productivity among the goals. Previous work by ANAW uncovered that caged housing systems are getting more popular, while the awareness of welfare problems associated with cages is low and welfare was still a largely foreign concept among farmers (ANAW, 2020).

Farmers mostly listed peers, veterinary professionals and online media as the channels of their previous exposure to information on animal welfare. An alarmingly large fraction of the respondents, 73%, expressed that they were unaware of any national animal welfare legislation.

The farmers were then asked to identify whether several listed practices and issues are good or bad for hen welfare. The reader is advised to note that quite a lot of people chose not to respond, suggesting ambiguity or uncertainty (36-71%). The surveyed topics were: overcrowding, overfeeding, underfeeding, poor hygiene, indiscriminate use of antibiotics, use of production hormones/stimulants, debeaking, declawing, battery cages, free-range housing, cage-free housing, and enriched nesting areas. Most respondents were in agreement and correctly identified the high-level welfare outcomes for each. However, there were several notable exceptions:

- Only 58% thought that the use of production hormones/stimulants is bad for welfare;
- 81% thought that debeaking is good for hen welfare;
- 58% thought that declawing is good for hen welfare;
- Only 50% thought that battery cages were bad for hen welfare, with a third indicating that they didn't know;
- 77% thought free-range housing is good for hen welfare.

When asked to list which housing system offers the best hen welfare, 52% chose deep litter (cage-free) barns, 30% picked free-range and 19% expressed a belief that battery cages offer the best welfare for egg-laying hens. Interestingly, two farmers mentioned switching from cage-free to cages in the past, giving better disease management and space efficiency as the reasons.

All farmers could correctly identify at least one nutrient key for hen bone development and health – this typically was calcium. 48% of respondents correctly identified all three: calcium, phosphorous and vitamin D3. All respondents expressed knowledge of bone fractures

causing pain and suffering to hens. When asked if they were familiar with keel bone fractures, the majority, 71%, of respondents indicated not being familiar with the issue. The farmers then reflected on their farming experience and three quarters provided that hens under their care had experienced bone fractures at some point.

Impressions of the wider community

The farmers were also asked about their wider community. 40% thought that their fellow farmers cared about hen welfare, 40% were not sure about it, and 12% offered that their peers did not take welfare into consideration. Similarly, when asked about their customer preferences, the results were widespread with a third saying each that their buyers care, do not care about hen welfare, and that they don't know.

This somewhat contradicts the findings of a previous study, where the majority of interviewed county officers believed that the consumers did not care about animal welfare (ANAW, 2020).

Several specific challenges were self-identified that would prevent welfare improvements on the farms. According to the participants, the following impedes implementation:

- High costs of farming inputs
- Difficulties selling the eggs
- · Not enough barn space
- Not enough training
- Low feed quality

Reported willingness to take action

The final couple of questions were intended to gauge the initial expressions of willingness to take next steps towards improved hen welfare. The vast majority of respondents confirmed that they would be willing to adopt improved welfare practices on their farms if they were provided with appropriate training and guidelines. Similarly, all respondents expressed willingness to share the obtained knowledge with and encourage their peer farmers to implement on-farm improvements.

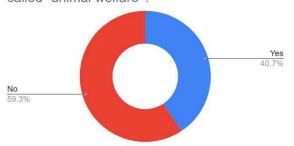
Post-workshop survey results

The survey results gathered right after the workshops will be mostly presented in relation to how they differ from the responses collected initially, prior to the workshops. In total, 36 filled questionnaires were collected and digitized. In general, the workshops have, at the very least, provided clarity to the participants as the percentages of "I don't know" and skipped questions decreased from 11% to 4% and from 32% to 24%, respectively. Mostly, ambiguity remained in identifying practices and their overall effect on hen welfare (most particularly in the cases of debeaking and declawing) and the wider community - whether fellow farmers and consumers cared about hen welfare.

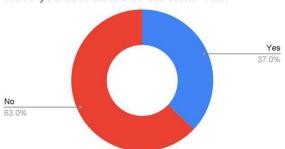
Pre and post: what changed?



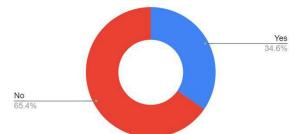
Have you ever heard of the field of work called "animal welfare"?



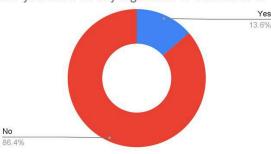
Have you ever heard of the term "Hen



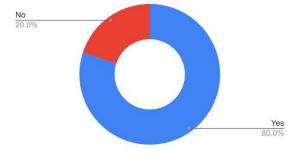
Do you believe your consumers and buyers care about Hen Welfare?



Do you know of any legislation or standards to

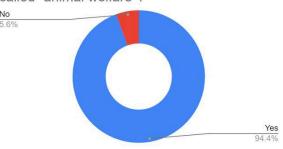


Have you heard of keel bone fractures?



Post

Have you ever heard of the field of work called "animal welfare"?



Have you ever heard of the term "hen welfare"?



Do you believe your consumers and buyers care about Hen Welfare?



Do you know of any legislation/standards/compliance to Animal...



Have you heard of keel bone fractures?



Figure 3. Changes in farmer knowledge, awareness and perceptions pre and post workshops.

As shown in the table above, many points of knowledge and awareness had shifted throughout the workshops. However, it remains unclear why some people still expressed not knowing, e.g., about animal welfare after the workshops. Our best guess is that it has to do with language barriers - it would be a good idea to spend some time on putting terms in English and Swahili side by side throughout the workshop to ensure that everyone is on the same page. A notable negative change included fewer respondents claiming to have observed bone fractures on their farms. This might be due to the fact that they became more familiar with fractures in general and how to identify them. Another explanation might be that the farmers associated bone fractures with injuries of the keel, specifically, as our content included a lot of information and discussion about this specific type of fracture. Nonetheless, the figure remains relatively high. Our in-person conversations with cage-free farmers in Germany and the US indicated that most farmers had not observed fractures on their farms.

The change in perception of whether consumers care about hen welfare might be explained by interactions among the farmers during the discussion and as the instructors mentioned global tendencies spreading to the Global South. Significantly more farmers were aware of national legislation protecting the welfare of animals, which was a major gap in awareness also shown by the work of others (<u>Luvanda, 2021</u>).

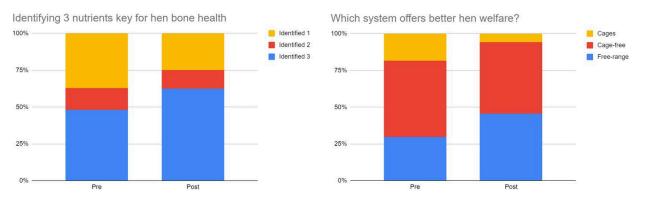


Figure 4. Changes in farmer knowledge on pro-welfare housing systems and nutrients key for hen bone health.

The charts above illustrate the change in knowledge of hen welfare in different housing systems and the three nutrients key to hen bone health. There was immediate improvement, with fewer people associating better welfare with caged housing and more people correctly identifying all three nutrients.

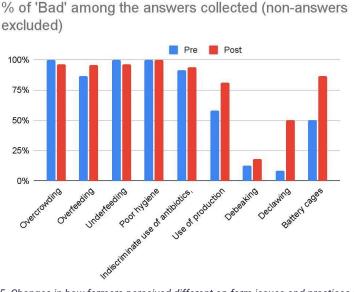


Figure 5. Changes in how farmers perceived different on-farm issues and practices in terms of their net negative effects on hen welfare. Pre and post workshop responses are shown.

The chart above illustrates how the farmers' perception of bad welfare practices changed throughout the workshop. Most notably, more respondents believed that overfeeding, the use of production hormones or stimulants, debeaking, declawing and battery cages are bad for hen welfare after the workshop. This shows an improved awareness in the short term as an outcome of the in-person workshops.

Pre Post 100% 50% 25%

% of 'Good' among answers collected (non-answers excluded)

Figure 6. Changes in how farmers perceived different housing system arrangements in terms of their net positive effects on hen welfare. Pre and post workshop responses are shown.

Deep litter (cage-free)

Similarly, farmer awareness was also increased when looking at higher welfare practices such as free-range, cage-free housing or the enrichment of nesting areas. When discussing what they have learnt during the workshops, farmers mostly identified with welfare-positive learnings, many referring to the positive effects of health monitoring, high-quality feeds, maintaining cleanliness, keeping farm records, and overall benefits of attaining high hen welfare.

"Hens are supposed to have enough freedom so that they can behave in their primordial ways."

Free-range housing



Enriched nesting areas

Figure 7. Direct farmer quote indicating how the freedom to express natural behaviours can be understood by farmers keeping hens commercially.

In terms of specific challenges that the farmers faced, the themes remained the same, with many issues revolving around high farming input costs, space limitations, feed quality, and diseases. There were significantly fewer expressions of a need for further training, suggesting that the participants found the workshops informative and useful.

Post-post workshop survey results

As outlined above, collecting post-post-workshop questionnaire responses was particularly difficult and in the end, through an alternative approach, our team managed to gather the responses of only 12 participants, six from each Murang'a and Nakuru counties. Many remembered at least one of the following topics: caged vs. cage-free housing, farm management practices, hen welfare, good feed quality, monitoring hen behaviour, the five freedoms' welfare model, and keel bone fractures. Only one respondent claimed not to have applied any of the obtained knowledge. For those who have, biosecurity, providing more space, better ventilation, checking in with their vet, no longer considering cages, and improving feeding were the highlights. Also, only one indicated not having discussed the workshop or learnings therefrom with fellow farmers. It is worth noting that this was the same individual, who had also responded "No" or "I don't know" to most of the questions. For those who have shared their learnings with their peers, major topics included proper water and feed provision, the superiority of cage-free housing, and the importance of hen welfare.

Three-quarters of the respondents chose deep litter (cage-free) over caged housing to provide the best welfare for egg-laying hens. This could be an indication that knowledge awareness was not retained as the distribution was similar to that recorded prior to the workshops. However, none of the interviewed farmers considered switching to a caged housing system.

All farmers reported that the newly obtained knowledge about existing national animal welfare laws has changed how they treated or handled animals. Most notably, many expressed having attempted to persuade their peers to switch away from caged housing systems, focusing on improving the provision of water and feed, and improving housing conditions. Similarly, all but one expressed that they remembered aspects of the discussion and instruction relating feed quality to bone fractures in hens, mentioning how to inspect for keel bone fractures and that nutritional deficiencies can result in such injuries. However, it remains unsure whether this was but a case of social desirability bias as visual aids, intended to test the knowledge, could not have been used during the phone call follow-ups.

Two farmers claimed to have observed hens with bone fractures on their farms since the workshops, while ten indicated having taken action to improve the quality of the feed they provided to the hens under their care. Examples of actions taken included improving the feeding regime, the feeders themselves, and sourcing better feeds. Similarly, two-thirds told us of having taken on-farm action to prevent bone fractures, ranging from providing more space to the hens and adapting management practices, all the way to sourcing higher quality feeds.

Which of the following hen welfare topics do you still need more information or explanation on?

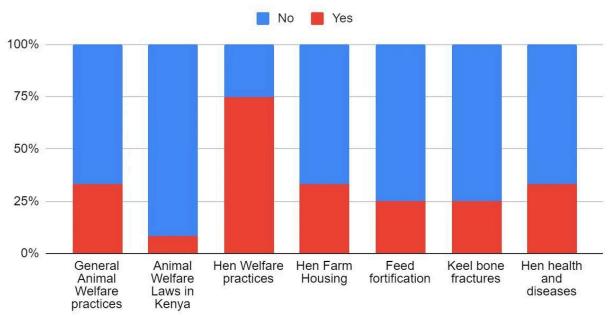


Figure 8. The respondents' ratings of which topics they needed more information on.

Judging from the results presented in the chart above, many participants felt they now had sufficient knowledge of national animal welfare laws. At least three farmers wanted to learn more about each general animal welfare practices, hen housing, feed fortification, keel bone fractures, and hen health and diseases. Most respondents, however, felt like they still wanted to learn more about specific hen welfare practices, suggesting that any future curricula could put even more emphasis on this aspect of the workshop.

When asked about remaining on-farm challenges, there were repeat mentions of too high feed prices and inadequate availability of space, followed by individual issues such as maintaining biosecurity measures, diseases and ventilation. Among self-identified potential solutions to said issues, the farmers voiced requests for financial support and further training.

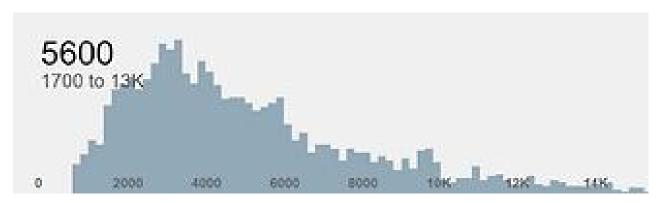
In general, it would seem that most participants found the workshop to be both informative and well-organised. Only one respondent did not want to attend another workshop in the future, while all highlighted that they would invite fellow farmers to any such upcoming workshops. Finally, all but one respondent expressed a wish for on-farm visits to get hen welfare recommendations applicable to their farm and management system.

Impact assessment

Despite the fact that the in-person workshops seemed to have immediate improvements in farmer knowledge and awareness of hen welfare topics, it remains unclear whether this change resulted in actual change on the farms and, in turn, higher welfare outcomes for the hens. The improvement in immediate knowledge was apparent through the decrease in the number of farmers who said they didn't know about animal welfare, as well as the increase in

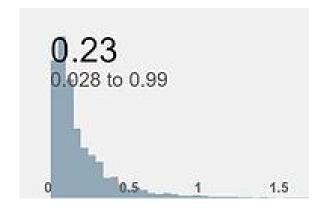
the number of people who correctly identified the three nutrients key to hen bone health. The workshops also changed the participants' perception of bad welfare practices. More respondents believed that overfeeding, the use of production hormones or stimulants, debeaking, declawing and battery cages are bad for hen welfare after the workshop. Finally, the workshops increased the participants' awareness of higher welfare practices such as free-range, cage-free housing or the enrichment of nesting areas. Based on the self-reported actions taken on farms and extrapolating the responses of the post-post workshop surveys, we estimate the following direct impact for the hens:

How many hens experience improvements?



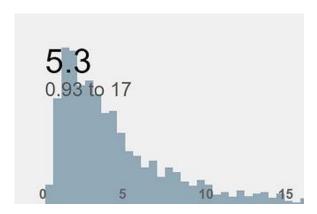
^{*} Social desirability discount factor: 75% are deemed genuine, improvement attrition discount factor: 90% are deemed to last throughout the remainder of the hens' lifetimes.

How much do such workshops cost per welfare point?



^{*} Workshop cost per WP (\$/WP)

How significant is the mean improvement?



^{*} Total Welfare points per hen. Welfare Points as defined by Charity Entrepreneurship.

How much do such workshops cost per positively affected hen?



^{*} Workshop cost per hen (\$/hen affected). The full Guesstimate model can be seen here.

Main uncertainties include discount factors used for social desirability among the answers and how durable the on-farm practice improvements are. We recommend carrying out pre- and post-workshop on-farm welfare assessments to reduce the uncertainty around these factors.

In terms of sustained impact, the workshops seemed to have helped the participants to learn how to address several key challenges. This included improving biosecurity, providing more space, better ventilation, checking in with their vet, no longer considering cages, and improving feeding. The respondents also claimed to have shared their learnings with their peers. This led to a wider discussion of hen welfare and the sharing of best practices. The fact that knowledge was retained even after three months is a positive sign of the impact of such workshops. However, a serious limitation was our inability to measure whether on-farm practices were improved, putting in question whether such workshops can have a positive impact on hen welfare.

Based on feedback collected from the participants, several improvements can be made in future workshops:

- Putting even more emphasis on specific hen welfare practices
- Providing more visual aids to test the participants' knowledge during post-post workshop surveying.
- Carrying out pre and post farm visits to both be able to measure hen welfare outcomes and provide applicable recommendations.

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