COHESA

Capacitating One Health in Eastern and Southern Africa

One Health Teacher Training in Meru Province Sub-Counties of Buuri East, Buuri West and Tigania East, Kenya

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alinea

Farmers Helping Farmers

In partnership with Canada

Gender Responsive One Health

ILRI INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

CGIAR

ISAAA AfriCenter

cirad

OACPS R&I

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Finally, the workshop facilitators and authors of the materials for the session acknowledge the Global Alliance for Rabies Control, the Blue Cross for Pets, Manitoba Agriculture, the Education Committee of Farmers Helping Farmers (comprised in part by UPEI Education Faculty), and the primary school teachers in Mukurwe-ini who have all provided materials or contributed to this workshop design.

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1. Acronyms

ALINEA international	Canadian-based international development consultancy
COHESA	Capacitating One Health in Eastern and Southern Africa
CIRAD	Centre de cooperation international en recherche agronomique pour le development
ESA	Eastern and Southern Africa
FAO	Food and Agriculture Organisation of the United Nations
FHF	Farmers Helping Farmers
GARC	Global Alliance for Rabies Control
GROH	Gender Responsive One Health project
ILRI	International Livestock Research Institute
ISAAA	International Service for the Acquisition of Agri-Biotech Applications
KEMRI	Kenya Medical Research Institute
NGO	Non-Governmental Organization
OH	One Health
WHO	World Health Organization
WOAH	World Organisation for Animal Health
ZDU	Zoonotic Disease Unit

2. Background

This One Teacher Training initiative aimed to broaden the understanding of One Health and to promote safer interactions between humans, animals, and the environment through introduction of Safety Around Animals Lesson Plans. The initiative also aimed to introduce case-based learning to teachers and allow them to practice using a One Health topic relevant to their teaching curriculum.

The session was piloted in 2015 with primary students in Mukurwe-ini Sub-County in Nyeri County, Kenya. Following this, the program was expanded and refined and was taught annually with students for five years (2016-2021). Over 1700 students were taught in nine schools. With permission and support of the sub-country education director and curriculum officers, . workshops were held in 2022 and 2023, for science teachers from each of the 73 primary and 35 secondary schools in Mukurwe-ini Sub-Country so they could learn to teach and implement this session in their schools. Each school was represented by one teacher.

The 2024-2025, the One Health Teacher Training initiative was supported through the Capacitating One Health in Eastern and Southern Africa (COHESA) and the Gender Responsive One Health (GROH) projects through the ALINEA International and Farmers Helping Farmers.

COHESA aims to generate inclusive research and innovation ecosystems for rapid uptake, adaption, and adoption of solutions to issues that require a One Health approach, with the OH concept embedded across society in Eastern and Southern Africa (ESA), working for healthy humans, animals and environment. The project is co-funded by the OACPS Research and Innovation Programme, a programme implemented by the Organization of African, Caribbean and Pacific states (OACPS) with the financial support of the European Union. It is implemented by the International Livestock Research Institute (ILRI), the International Livestock Research Institute (ILRI), the French Agricultural Research Centre for International Development (CIRAD) and the International Service for the Acquisition of Agri-biotech Applications (ISAAA) AfriCentre In Kenya our partner is the University of Nairobi.

Farmers Helping Farmers (FHF) are globally minded people from Prince Edward Island Canada that has partnered with Kenyan farmers and families for more than 40 years. FHF has worked with Kenyan public schools in twinning project with Canadian schools since 2004 to develop sustainable food security and food safety for the students in these schools. In 2023, the organization was contracted as the delivery partner for the GROH project in Kenya by ALINEA international.

2.1. Objectives of the Workshop

1. Learn about One Health (OH) with examples of OH relevant to the sub-counties/student education level
2. Understand how safety around animals is related to OH with specific examples of:
   a. Prevention of illnesses (zoonoses) from animals (Rabies as a specific example)
   b. Prevention of injuries from animals
   c. Improving animal welfare and health of animals and people while considering environmental health
3. Create awareness and understanding of school food safety

a. Causes of foodborne illness: toxins, chemicals and 'germs'
b. Prevention of illnesses, with a focus on food safety at schools
c. Review Farmers Helping Farmers School food safety initiatives
4. Learn how to integrate OH using case-based learning
5. Provide an overview of Farmers Helping Farmers partner-school food programs – for safe and sustained school food programs for pupil health and success

Objectives 1,2,4 were led by COHESA, and 3,5 led by FHF

2.2. Summary of Workshop

The workshop was convened and organized by FHF. Teachers and head teachers from FHF partner schools in three sub-counties. Forty-five (20 men and 25 women) teachers and headteachers from 23 schools and 6000 students attended the workshop.

The workshop comprised of sessions on One Health, safety around animals, food safety and storage, and case-based learning (.

Resources were shared with the participants to supplement their learning (Lesson Plan & presentation) including links to the World Health Organization (WHO), World Organisation for Animal Health (WOAH), Food and Agriculture Organisation of the United Nations (FAO), Global Alliance for Rabies Control (GARC), Zoonotic Disease Unit (ZDU) in Kenya, and the Kenya Medical Research Institute (KEMRI) OH. During the sessions videos on OH, rabies, and zoonoses from ILRI, FAO, and WOAH were played to further sensitize.

In addition to the technical delivery related to objectives 1-3, facilitators shared information on the contributing partners, the growing importance of OH worldwide, and the potential career opportunities for students in the field of OH in Kenya. Participants were advised of integration of the OH approach and concepts through a variety of examples that they could use or expand upon in their normal curricula materials. These included linking some subjects to others and to real life examples, designing OH cases for case-based learning, using clubs, assemblies, and parent-days to reframe their current curriculum with OH concepts. The lesson plan shared with the teachers gives an overview of a one-hour session which can be taught to students.

During the session on case-based learning, teachers worked on OH cases safety around animals, that had previously been used to test student knowledge. Teachers were asked to develop their own cases to apply their skills to OH scenarios and present their answers to the rest of the group and provide feedback on the case indicating their relevance to their existing curricula. The cases were developed in small groups after which participants exchanged

between groups for feedback on the style and presentation and how to improve them. Topics of these cases included environmental health, zoonoses, food safety, and water pollution. The use of case-based learning has been shown to help ensure students understand material and can apply their knowledge in real life and complex settings[1].

Facilitators encouraged teachers to develop creative ways to integrate OH concepts into their current curriculum and to help students be prepared as the next generation of the OH workforce.

[1] https://www.queensu.ca/ctl/resources/instructors/instructional-strategies/case-based-learning

3. Monitoring and Evaluation

A questionnaire on KOBO Collect (see link below) was administered before the session began as well as upon its completion to access baseline and post workshop knowledge on one health, zoonotic disease, rabies prevention, and food safety. Mentimeter was also used to collect participant responses on food safety during the presentation. Despite technical challenges in using mentimeter to create a word cloud and graphs of responses, it was clear that teachers had a good understanding of the importance of handwashing as a key measure to prevent illness and germ transmission. Concerns over how to control aflatoxin during challenging drying seasons was raised.

The questionnaire was answered by 30 participants (2/3 of attendees) before the workshop began. Most participants were female 63% (37% male). After the workshop, the follow up questionnaire was completed by 33 participants (¾ of attendees; 55% male, 45% female).

Most participants (48%) were 46-55 years old. The majority (42%) had completed undergraduate studies while the rest had completed diploma (39%) or certificate (18%) level education. The majority (76%) taught at the primary level with the rest taught at secondary (21%) and pre-primary levels (6%) (respondents could indicate they taught at more than one level).

Most of the participants taught math (45%), Swahili (42%), and agriculture (39%). Other subjects taught included religion (33%), English (33%), home science (21%), art & design (21%), general science (18%), geography (9%), history & government (9%), biology (6%), chemistry (6%), science, Christian Religious Education (CRE) (3%), environmental activities and creative activities (3%), and music (3%). (respondents could indicate they taught more than one subject)

Prior to the session most participants indicated they had a moderate amount of knowledge on OH (57%) with 20% indicating they had very limited knowledge on OH, whereas after the session was completed, the majority (55%) had a moderate amount of knowledge on OH, with 36% indicating they were experts; however 9% (n=3) indicated still had limited knowledge. This was reflected in the question 'What is One Health', where only 67% of respondents were correct prior to the session and 91% answered correctly following the session. Zoonotic diseases were correctly defined by 73% of participants prior to the workshop and improved at the end of the workshop to 88%.

Participants' showed improved knowledge of risk prevention methods for zoonoses (generally) and for rabies (risk of being infected and signs of rabies in animals); however, a minority were still not able to indicate every possible risk control/acquiring a zoonoses/rabies and signs of rabies in animals. This could be in part related to the style of question which allowed multiple responses as opposed to just one correct response.

Participants were questioned on risk prevention methods for rabies. Prior to the workshop respondents were mainly aware of vaccination, but following the session participants became aware of additional methods to control rabies (avoid roaming/unowned dogs, bite prevention, keep away from wildlife). Respondents also improved in responses regarding post-bite care. Prior to the workshop most respondents indicated to seek medical care, but very few indicated the need to return to all medical treatments (which is required to prevent the development of rabies) and to wash the wound well with soap and water immediately after the bite occurs. Following the workshop over 60% of participants indicated these additional measures should be done following bites.

Regarding animal behaviour, participants had limited awareness of why animals might injure people (respondents mainly indicated animals would do this to protect themselves), following the workshop participants recognized all possible reasons why animals might injure people.

In the area of food safety, 80% of participants were aware that maize was a source of aflatoxin and following the workshop this awareness increased to 89%. Few were aware that wheat flour is a potential source of aflatoxin; however, this awareness increased from 20% (before) to 30% after the workshop. All participants were aware that allowing maize to dry well before storing is a key aflatoxin prevention method; however, the storage of maize off the ground as an aflatoxin prevention measure was known by only 5/30 prior to the workshop. This awareness increased to 13/33 (39%) after the workshop.

Awareness was high regarding the importance of adhering to a "pre-harvest interval" to help ensure the pesticide residue is low when the food is harvested and increased modestly after the workshop (70% before and 73% after). Knowledge of ways to prevent pesticide-related illnesses increased following the workshop in all aspects of pesticide handling excepting preventing pesticide spills.

	(n = 30)
Prevent pesticide spills from getting into water	7%
Have trained personnel apply the pesticides	13%
Follow the specified pre-harvest interval	23%
Store pesticides in a locked cabinet away from food	37%
All the above	40%

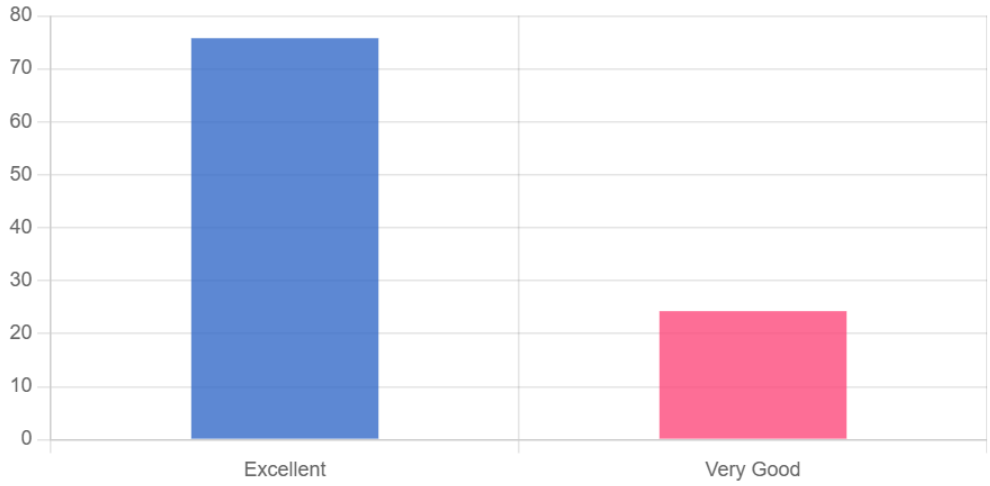
Participants demonstrated good knowledge of germ-related illnesses. Majority indicated that all germs could cause illness. All participants (before and after the workshop) indicated diarrhoea is often caused by germs in food and water, and that rats, birds, and flies can transmit harmful germs. They also knew that most foodborne illnesses are preventable. All participants felt that handwashing in the spread of disease-causing germs is "very important". Some believed that dishes stored wet could cause illness before the workshop (67%). However, after the workshop fewer believed storage of wet dishes was a concern. This may be due to a mis-understanding the question. This practice should be followed up with the teachers as air-drying of dishes is a promoted by FHF as a food safety practice.

Most participants (61%) reported that they had not used case-based learning before the workshop. Those who had previously used case-based learning mentioned several positive impacts on student learning, including improved comprehension, faster and easier understanding, increased content retention, linked to real life application, increased student engagement, and overall better learning outcomes.

Overall knowledge on the technical aspects of the workshop improved to a level where participants could teach the material competently to students, especially considering the participants were provided with reference material on one health, rabies, zoonoses, and animal behaviour (hard and soft copy).

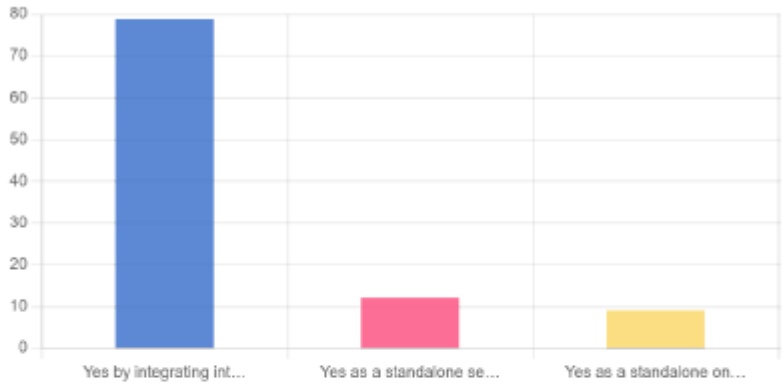
Feedback on the workshop was positive, with 76% of participants indicating the session was 'excellent' as indicated in Figure 1, which was supported by 93% of participants stating the objectives were clearly presented, 97% indicating the workshop was very useful, and 100% of participants indicating they would recommend this workshop to their colleagues. Participants could provide open ended responses on the most important aspects taught in the workshop, and these included comments such as: one health, creating case studies, food safety, zoonoses, food hygiene, good hygiene, and rabies. Most participants (n=32) felt all content was relevant, but one indicated aflatoxin was not a relevant topic to learn about.

Figure 1: Proportion of respondents indicating how they rate the workshop



Most participants (79%) indicated that they could integrate case-based learning into other course materials, while the remaining participants indicated they could implement it as standalone session and within course materials (12%), and as a standalone one-hour session (9%) as presented in Figure 2. The majority (91%) of participants indicated that they would use case studies to teach OH examples, with 30% also planning to apply them to other topics.

Figure 2 : Proportion of respondents on how they will utilize the workshop training materials, note none responded that they will not use the materials (but this was an option)



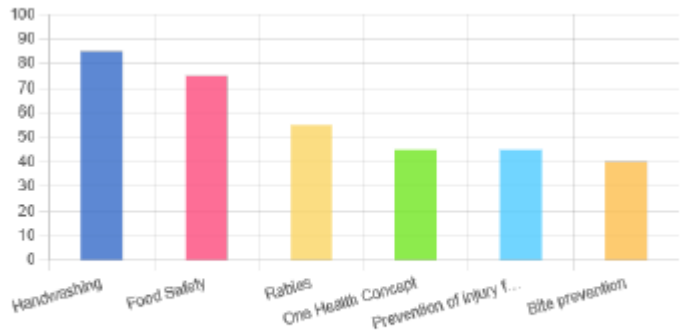
Value	Frequency	Percentage
Yes by integrating into other course materials	26	78.79
Yes as a standalone session and integrate into course material	4	12.12
Yes as a standalone one hour session	3	9.09

Approximately 7 weeks after the workshop, a follow up questionnaire was administered virtually through KOBOCollect. Twenty responses were received from 11 women and 9 men. All of the respondents indicated they had taught One Health concepts since attending the session, with a variety of topics covered as illustrated in Figure 3. Almost half of respondents taught One Health concepts alongside technical topics. Teachers mainly utilized the approach of integrating messaging into their existing curriculum (80%), followed by using the provided case studies (20%), creating their own case studies (15%), and giving a standalone session comprised of the materials learned in the workshop (5%). On average 95 students were taught per teacher, with a total of 3865 students reached by One Health messaging and education.

Eight teachers reported challenges when implementing One Health education which included issues like: insufficient time in implementing new training, low level of understanding from early primary level students, trying to recall the training when developing their messaging, having large numbers of students to teach, and limited resources. Teachers also shared they would like more education materials, to learn more about communicable diseases in different formats; a song to teach the content; practical materials to improve things like handwashing at their schools, and more audio-visual materials and relevant equipment to teach students with.

Teachers also felt the lesson was not only useful for children but also for the adults and for application in and out of schools, and that One Health should be practiced daily. They also indicated the pupils liked the concepts and received the information well.

Figure 3: One Health topics taught to students following the teacher workshop



Value	Frequency	Percentage
Handwashing	17	85
Food Safety	15	75
Rabies	11	55
One Health Concept	9	45
Prevention of injury from animals	9	45
Bite prevention	8	40

4. M&E Questionnaires pre and post workshop forms

Pre workshop M&E Questionnaire tool https://ee.kobotoolbox.org/x/7SnRSVdf
Post workshop M&E Questionnaire tool https://ee.kobotoolbox.org/x/U9novBbQ
Follow up Questionnaire tool https://ee.kobotoolbox.org/x/b48GIRHY

M&E Results Pre-Workshop_Pre Workshop Responses

M&E Results Post-Workshop Post Workshop Responses

M&E Results Follow up Questionnaire Follow up Responses

5. Recommendations

This workshop was successful in providing teachers with the technical knowledge and skills to integrate One Health into their teaching without the need to change their curriculum. Teachers agreed they could integrate One Health messaging and approaches into the material they already taught (79%), and that they could also use the materials shared today to do a one-hour session (21%). This was further supported by the follow-up questionnaire in which at least 44% of those trained already had implemented One Health education in their schools, reaching over 3800 students.

In future additional sensitization to the KOBO form and 'select multiple response' questions can assist in better understanding participant learning. To better support teachers moving forward, innovative materials that can be used without projectors should be developed, as well as consideration to develop a teaching song. Moving forward, it would be valuable to understand the student learning impacts via a baseline questionnaire for students' pre-teacher training and then post teacher training and implementation.

For long term integration of One Health, it would be advisable to ensure curriculum regulators in Kenya have access to these training resources and consider them in the next curriculum review.

6. Annexes

Annex 1: Meeting agenda

8:00 AM Arrival of Workshop Participants + Pre-Workshop Questionnaire
8:30 AM Opening of Workshop – ALINEA/FHF Salome Ntinyari & Teresa Mellish
9:00 AM Introduction to One Health – Shauna Richards and Buke Yussuf
- What is One Health and examples
9:30 AM One Health & Zoonotic Diseases – Shauna Richards and Buke Yussuf
- What are zoonotic diseases, signs of illness in animals, prevention
10:00 AM Tea Break
10:30 AM Rabies – what is it and how is it prevented – Shauna Richards and Buke Yussuf
11:00 AM Bite Prevention and Injury Prevention – Shauna Richards
- Bite prevention and dog language
- Injury prevention and cow language
11:30 AM Example One Health Case Studies to evaluate student understanding – Buke Yussuf, Joyce Lillian, Shauna Richards
1:00 PM Lunch break
2:00 PM Food Safety & Storage and School Gardens – James Mureithi & Colleen Walton
- Types of food contamination - Aflatoxins, pesticides, "germs"
- Sources and control of food contamination; with One Health lens

3:15 PM Small group work - develop new One Health Case Studies based on their current curriculum – facilitated by COHESA
4:15 PM Farmers Helping Farmers School Food Programs– Jennifer Murogocho / Teresa Mellish
4:45 PM Post Workshop Questionnaire - COHESA
5:00 PM Close out Workshop – FHF

Annex 2: Presentations and Supporting Documents

1. Lesson plan for One Health Teaching **OH Lesson Plan 2025 Kenya.pdf**
2. PowerPoint of One Health & Safety Around Animals Teaching Session **Powerpoint for teachers workshop 2025.pdf**
3. PowerPoint for Case Based Teaching Session **Case Based Learning.pdf**
4. Examples of Cases to use in case-based learning **Case Based Learning.pdf**
5. School Food Safety **School Food Safety.pdf**