

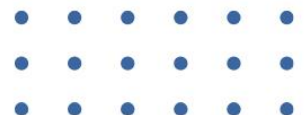
THESIS

AERES UNIVERSITY OF APPLIED SCIENCES



**ENVIRONMENTAL
SUSTAINABILITY IN
EQUESTRIAN
SPORTS**

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Environmental sustainability in equestrian sports

An elaboration of feasible ways to reduce the environmental footprint of equestrian sport:
perspectives from equestrian experts and international riders

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PREFACE

This thesis has been prepared for the International Equine Business Management program at Aeres University of Applied Sciences. With a deep understanding of the importance of promoting environmental sustainability, my motivation to contribute to this topic specifically within the context of equestrian sports has been ignited. As a result, this report is dedicated to identifying feasible approaches aimed at enhancing environmental sustainability within equestrian sports. I extend my heartfelt gratitude to my mentor, Janne van den Akker, for her guidance throughout the development of this proposal and the invaluable feedback. Additionally, I would like to express my sincere appreciation to Jessica Stommel from Schafhof Connects for her willingness in connecting with international riders and providing crucial information. Furthermore, I am grateful to Dr. Inga Wolframm for her valuable contributions in defining my topic by offering insightful perspectives on sustainability within the equestrian sector and conducting an interview. Furthermore, I would like to extend my heartfelt gratitude to Theo Ploegmakers, whose insightful interview have enriched this work immensely. I am deeply indebted to the riders who generously shared their valuable perspectives, including Jil Irving, Jessica von Bredow-Werndl, Frank Hosmar, Tanja Lammers, and Paraic Kenny. Special appreciation is also due to the three anonymous riders who, with their candid insights, have made a meaningful contribution to this project. Your collaboration and willingness to share your experiences have been invaluable in shaping the content of this preface and the broader research. All these people have made significant contributions that allowed me to independently design this thesis.

Jana Olberding,

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1. SUMMARY

This research aims to address the pressing concern of environmental sustainability in equestrian sports. The equestrian industry is increasingly recognizing this importance of adopting environmentally sustainable practices. While several initiatives and organizations have emerged to address the concern of environmental sustainability, there is currently a lack of comprehensive strategies and regulations in place. This qualitative investigation is therefore focused on answering the question: “What are feasible approaches to reduce the environmental footprint of the equestrian sport according to equestrian experts and international riders?”

In an in-depth interview, two equestrian experts offered valuable insights into how to reduce the environmental footprint of the sport. They emphasized transitioning to outdoor stabling, promoting biodiversity, and shifting towards roughage-based diets for horses when possible. Additionally, the expert’s recommendations focused on minimizing consumption behaviors and decreasing long-distance horse transport as well as communication about environmental sustainability.

The suggested initiatives by the experts were presented to eight international riders. While there was consensus among them that sustainability is a shared responsibility and that a holistic approach involving different stakeholders is necessary, they varied in their self-perceived roles. Almost half of the interviewed riders considered themselves role models and influencers, while others did not. This divergence underscores the complex nature of the equestrian community and the multiplicity of stakeholders involved.

The willingness of international riders to participate in sustainability initiatives was evident, but they outlined specific conditions. The riders emphasized the importance of cost considerations, complexity and time intensity, aesthetics, and the availability of clear guidance in the implementation of sustainable practices. The readiness of international riders to adopt changes is contingent on these factors, highlighting the need for practical, well-communicated initiatives that align with the sport's needs. While riders are willing to reduce the environmental impact of equestrian sports, they see long-distance horse transportation as an essential and challenging aspect to change.

This research report, caters to a broad audience within the equestrian community and beyond. Equestrian riders, businesses, associations, brands, and stable owners can draw inspiration from the findings and recommendations presented here. It serves as a valuable resource for stakeholders to initiate sustainability projects, better understand the market for sustainable products and services in equestrian sports, or implement new practices.

This study emphasizes the significance of collaborative efforts among stakeholders to implement sustainable practices. Further research involving a wider range of experts and riders is required to develop a comprehensive sustainability strategy.

2. INTRODUCTION

The impact of climate change, biodiversity loss and pollution on our planet are increasingly evident. Many sectors are already reacting to this and addressing the issue of environmental sustainability, but the equestrian sector is still lacking in this respect (J. Stommel, personal communication, March, 21, 2023). However, sport associations have immense potential to spread environmentally sustainable practices throughout society. A recent study has shown the significant influence of soccer associations on their supporters, which can also be applied to other sports such as equestrian sport. Acting as social opinion leaders and leveraging their fan identities, associations possess a strong capacity to influence the behaviors and actions of their supporters (Lozano & Barreiro-Gen, 2022). Therefore, it is of great importance also for equestrian sports to prioritize environmental sustainability.

To initiate a dialogue with stakeholders regarding environmental sustainability in equestrian sports, interviews for this thesis have been conducted with equestrian experts and international riders. By gathering the opinions of these stakeholders on various approaches to enhance environmental sustainability in equestrian sports, it was possible to determine which approaches were suitable and feasible. This thesis aims to obtain solution approaches from diverse perspectives, providing insights into potential future developments in equestrian sports concerning environmental sustainability. These insights will inform decision-making processes, foster collaboration among stakeholders, and pave the way for a more sustainable equestrian sector.

2.1 AN ENVIRONMENTAL CRISIS

The world is facing an environmental crisis that threatens our future and the survival of many species. The consequences of climate change are already evident in an increasing number of natural disasters, food insecurity as well as water scarcity. Studies show that by 2050, 31 countries will be affected, where resilience to climate change-related ecological events is likely to be insufficient. Furthermore, greatly increased food insecurity and extreme water stress in many countries will occur (Institut for Economics & Peace, 2020). Heat flows will change, extreme winds will increase, large increases in precipitation in certain areas and general warming will occur (Vautard et al., 2014). Moreover, due to the insufficient protection of our planet, there are numerous impending events that we are currently aware of, which will have significant impacts on organisms, ecosystems, and human systems (Masson-Delmotte et al., 2019). This highlights the urgency of global action to reduce the environmental footprint of the various sectors.

In terms of environmental impact, consumer goods have the largest footprint, followed closely by transportation. In addition, plastic pollution, water use, CO₂ greenhouse gas emissions (both direct and hidden), other forms of pollution, and land use, including deforestation, are all interconnected factors that determine our environmental footprint (Porcelijn, 2016). By now, people are becoming increasingly aware of this environmental problem, and thousands of young people have taken to the streets to protest and demand action from governments and corporations worldwide (Sommer et al., 2019).

Various sectors have already come under criticism from society due to their high emissions, high levels of waste or chemical pollution of the environment, among other issues. Therefore, it is crucial for any industry to adapt to this change and meet the expectations of their customers and investors by becoming more environmentally responsible. Athletes have a high influence on their fans (Lozano & Barreiro-Gen, 2022), so it can be assumed that riders, particularly well-known riders who also compete internationally, act as role models for their fans. Therefore, they can promote the topic of environmental sustainability to their fans. The aim of this work is to collect approaches for improving the environmental sustainability of equestrian sports. It can be assumed that this sport has the potential to make a significant contribution to the promotion of sustainability by reducing its environmental footprint.

2.2 CURRENT ENVIRONMENTAL SUSTAINABILITY WITHIN EQUESTRIAN SPORTS

The equestrian industry, encompassing all economic activities associated with horses, has a significant economic impact. In Europe its economic value is \$133 billion and offers round about 400,000 jobs (Equine Business Association, n.d.). Equestrian sports, which were once a means of transportation and a necessity for survival, have now become a luxury and entertainment activity for the affluent. There are now a wide variety of activities in which horses are used. For the purposes of this thesis, equestrian sports are defined as the disciplines of the Fédération Equestre Internationale (FEI). These include show jumping, dressage, para-dressage, eventing, driving, endurance, and vaulting (Fédération Equestre Internationale, n.d.).

Nevertheless, this leisure pursuit of equestrian sports comes at an environmental cost. With a global horse population of 58.8 million, the methane emissions produced from horse manure are estimated at 1.1 million tons per year, contributing to annually 26.5 million metric tons of carbon dioxide equivalent (Elghandour et al., 2019). By way of comparison, a total of 746 million metric tons of carbon dioxide equivalent were produced in Germany in 2022 (Umwelt Bundesamt, 2023). This means that the global horse population emits exclusively through their manure about 3.5% of the carbon dioxide equivalent of the entire Federal Republic of Germany per year. In addition, however, there are also many much more influential factors on our environment besides the manure of the horses. International equestrian events, horse transportation, energy-intensive facilities, equipment usage are some examples that is expected to contribute significantly to the environmental footprint of the sport.

Considering the sustainability of equestrian sports, not only the environmental but also the social and economic dimension should be addressed. A sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). This concept of sustainability encompasses the three P's from the Triple Bottom Line Concept: people, profit, and planet (Alhaddi, 2015). Throughout this thesis, the term "sustainability" will be used to encompass the environmental, social, and economic aspects as defined by the Triple Bottom Line Concept (Alhaddi, 2015).

However, the focus of this thesis will primarily be on the environmental part of sustainability. To assess the environmental aspect, it is important to consider nine planetary boundaries, including climate change, biodiversity loss, nitrogen and phosphorus cycles, land system change, freshwater use, ocean acidification, ozone depletion, atmospheric aerosols, and chemical pollution (Rockström et al., 2009). In this thesis, the term "environmental sustainability" will be used to describe the holistic perspective of maintaining a stable and sustainable planet, as outlined by the Planetary Boundaries framework. To evaluate the overall impact on the environment, the term "environmental footprint" will be employed. It is important to note that there are several different types of environmental footprints, including water footprint, carbon footprint, land footprint, ecological footprint, and material footprint and there is no standardized definition for the term currently (Matušík & Kočí, 2021). To ensure consistency and comprehensiveness, this thesis will standardize the concept of "environmental footprint" by considering all nine planetary boundaries, which encompass the various factors that influence the maintenance of a stable and sustainable planet.

Another reason why it is important to reduce the environmental footprint of the equestrian sport is that the societal awareness on environmental sustainability continues to grow, (Barr, 2003) The social license of equestrian sport is already precarious due to the growing concerns in society regarding the welfare of sport horses. Consequently, the equestrian sector is currently facing the challenge of preserving and restoring its public image, with a focus on gaining societal acceptance (Douglas et al., 2022). Further damage to the image of the sport must therefore be avoided and the need to reduce the environmental footprint of equestrian sports is significant.

The equestrian industry currently acknowledges the need for environmental sustainability but lacks comprehensive strategies and regulations despite emerging initiatives and organizations. Nevertheless, significant efforts have been made by different entities. These examples demonstrate the potential for reducing the environmental footprint of equestrian sports. Moreover, smaller brands in the riding equipment sector have also started producing environmentally sustainable clothing and initiatives like "Riders for Future" aim to generate ideas and promote sustainable practices within the equestrian community. These examples of approaches already introduced to make equestrian sport more environmentally sustainable are explained in the following:

- Climate commitments:
The FEI has already recognized the urgent need to become more environmentally friendly. As a signatory to the UN Sports for Climate Action, the FEI has committed to taking steps to reduce its carbon footprint and promote sustainability in equestrian sports (Fédération Equestre Internationale, 2019). In line with this commitment, the European Equestrian Federation (EEF) is also a signatory of the commitment and has established a working group to develop more sustainable practices in equestrian sports (European Equestrian Federation, 2022).
- Electricity from horses' manure:
The use of horses' manure for generating electricity shows how resources can be saved while solving the problem with the waste management of the manure.

Recent studies have revealed that entrepreneurs and future entrepreneurs are interested not only in maximizing profits but also in addressing societal needs and protecting the environment. These findings highlight the growing interest in developing innovative technologies for recycling horse manure and harnessing it for renewable energy in the equestrian sector (Lupoae & Radu, 2022). Horse manure can be of great economic and environmental benefit as a fuel source for biogas fermentation. The savings in waste disposal of the manure as well as the energy produced add up to an economic viability (Young et al., 2014). This innovation is already successfully implemented at the Helsinki International Horse Show. The whole electricity is generated entirely from horse manure since the last five years (Hurme, 2019).

- Carbon neutral horse show:
Since 2022, the London International Horse Show has been certified as carbon neutral. In addition, they have implemented various measures to reduce their environmental footprint, including the utilization of predominantly seasonal food, stopped the use of single-use plastics, incorporating recycled materials whenever feasible, and sending the equestrian muck to power stations. Furthermore, they encourage public to promote environmental sustainability (The London International Horse Show, n.d.).
- Sustainable equestrian brands:
There are until now several small brands which are producing sustainable riding equipment and clothes – meaning also the part to keep the environmental footprint of the products as low as possible. An example of a company that embodies these practices is Hoofment from Germany. They prioritize environmental sustainability by utilizing sustainable materials, eliminating the use of harmful chemicals, and manufacturing their products in Europe. They also avoid overproduction, ensuring a more efficient use of resources. Hoofment is committed to producing high-quality and durable products while employing sustainable packaging methods and opting for climate-neutral shipping (*Nachhaltige Und Faire Reitbekleidung*, n.d.). Other examples of sustainable equestrian brands are the Royal Horsemen, Equimus, Shine Bright or Nafilia.
- Riders for future:
An initiative of a 17-year-old girl from Germany is "Riders for Future". Equestrian athletes, riding clubs and equestrian associations and other stakeholders support the initiative. They want to set an example in terms of sustainability and give tips from simple DIYs to climate protection suggestions for horse show organizers or riding facilities owner. They have also founded a reforestation project for equestrian sports, with which they have planted over 3,600 trees to date, as of May 2023 (*Nachhaltigkeit Im Pferdesport*, n.d.).

However, these steps taken to reduce the environmental footprint in equestrian sports are currently limited in scope and may not have a significant impact on a larger scale. There is a need for comprehensive strategies in the future to drive substantial improvements in environmental sustainability of the sport. In seeking approaches to further improve the environmental sustainability of equestrian sports, the sport could draw inspiration from other sports that have already made significant strides.

2.3 APPROACHES TO IMPROVE ENVIRONMENTAL SUSTAINABILITY WITHIN EQUESTRIAN SPORTS

Several sport associations actively address sustainability and environmental concerns by formulating strategies, promoting initiatives, and transforming old habits. Equestrian sports can draw inspiration from these strategies and the corresponding implementation examples to adopt environmentally sustainable practices in the future. Table 1 highlights exemplary sports associations that are at the forefront of promoting these changes through established strategies.

Table 1

Sustainability strategies from different sports

Sport association	Main objectives	Implementation examples
International Olympic Committee	<ul style="list-style-type: none"> • Reducing emissions • Reducing travel impacts • Waste reduction • Energy efficiency in buildings • Construct future venues in accordance with recognized sustainability standards • Leverage their influence on stakeholders and fans (<i>The IOC's Climate Commitment</i>, n.d.) 	<ul style="list-style-type: none"> • Biodiversity Action Plan: <ul style="list-style-type: none"> - 45 hectares of biodiversity habitat around Queen Elizabeth Olympic Park ("Biodiversity in Action," 2021)
FIA Formula E	<ul style="list-style-type: none"> • Net-zero carbon emissions • Waste reduction • Renewable energy utilization (<i>"Sustainability,"</i> 2023) 	<ul style="list-style-type: none"> • First all-electric race • Promote electric motors • Piedra Larga II wind farm project (<i>"Racing for Better Futures,"</i> 2023)
Fédération Française de Tennis	<ul style="list-style-type: none"> • Use renewable energy • Improve waste management • Prevent air pollution • Prevent biodiversity loss (<i>The Roland-Garros Commitment</i>, n.d.) 	<ul style="list-style-type: none"> • Roland-Garros tournament: <ul style="list-style-type: none"> - 100% renewable energy - hosting bees on the roof - encourage ecofriendly transportation - using reusable cup

World Sailing association	<ul style="list-style-type: none"> • Reduce emissions • Optimize resource management • Preserve biodiversity and ecosystems • Establish environmentally sustainable technics • Adopt eco-friendly energy technologies ("Sustainability Agenda 2030," 2016) 	<ul style="list-style-type: none"> • Sustainability Agenda 2030: <ul style="list-style-type: none"> - Promotes more sustainable equipment - Research about end of life composites - Reuse program for equipment - New equipment sustainability standards ("Sustainability Agenda 2030," 2016)
Forest Green Rovers football club	<ul style="list-style-type: none"> • Reduction of emissions • Offering environmentally sustainable food • Improving waste management • Being in harmony with nature • Spreading environmental sustainability around the world • Continuously measure and reduce carbon footprint (Forest Green Rovers, n.d.) 	<ul style="list-style-type: none"> • Offering exclusively all plant-based food • Use solar panels • 100% renewable electricity • Electric driven team bus • Prioritize environmentally sustainable transportation for spectators • Waste reduction systems • Collect rainwater and filtered spectators' urine for the pitch irrigation • Planted bee habitat (Forest Green Rovers, n.d.)

More research is needed to develop strategies or initiatives for equestrian sports that are comparable to the environmental sustainability strategies presented in table 1. Jessica Stommel of Schafhof Connects advocates for greater environmental sustainability, noting the lack of comprehensive environmental research and sustainability initiatives in equestrian sports. Schafhof Connects is a partner of Sports for future and is working on initiatives to promote environmental sustainability in equestrian sports (Stommel, 2022). According to Jessica Stommel, all new findings in the area of environmental sustainability within equestrian sports are of great value and can make an important contribution to promoting environmental sustainability in the sector (J. Stommel, personal communication, March, 21, 2023).

Dr. Inga Wolfram, lecture on sustainable horse husbandry and equestrian sports, highlights the challenge in effectively translating scientific findings about environmental sustainability into practical implementation within equestrian sports. She emphasizes the importance of collaborating with diverse stakeholders and engaging in extensive dialogue with various parties in order to be able to make the sport more sustainable (*Inga Wolfram Benoemd Tot Lector Duurzame Paardenhouderij En Paardensport*, 2022).

At Van Hall Larenstein University of Applied Sciences, one of Dr. Inga Wolframm's main focuses is to identify the biggest sustainability challenges in equestrian sports and how to address them (*Duurzame Paardenhouderij En Paardensport*, n.d.). This underscores the general limited knowledge of stakeholders' opinions regarding environmental sustainability in equestrian sports.

In order to investigate initiatives or strategies to reduce the environmental footprint of equestrian sports, viable approaches need to be identified. It is of great importance to gather ideas from equestrian experts and to get the opinion of other stakeholders on this. In this regard, the opinion of international riders is essential because they act as role models on their followers like sport federations do (Lozano & Barreiro-Gen, 2022) and thus play an important role in the implementation of any approaches. By gaining insight into their opinion, long-term implementation will be more likely to be feasible.

2.4 RESEARCH QUESTIONS AND OBJECTIVES

The statements of Jessica Stommel and Dr. Inga Wolframm highlight that the development of comprehensive strategies for environmental sustainability in equestrian sports would be significantly influenced and enabled by information regarding the opinions and ideas of equestrian experts and international riders. Consequently, there is an urgent need to investigate their opinions and ideas, which gives rise to the following research questions:

Main question

What are feasible approaches to reduce the environmental footprint of the equestrian sport according to equestrian experts and international riders?

Sub questions

- 1) What economically and socially feasible approaches do equestrian experts propose to reduce the environmental footprint of the equestrian sport?
- 2) How do international riders perceive their responsibility in terms of reducing the environmental footprint of the equestrian sport?
- 3) How do international riders perceive the proposed options of the experts with regard to reducing the environmental footprint of the equestrian sport?
- 4) Under what conditions are international riders willing to participate in initiatives to reduce the environmental footprint of the equestrian sport?

Valuable insights from experts and international riders on possible approaches to effectively address and mitigate the environmental footprint of equestrian sports will be gained through answering these research questions. By initiating a dialogue with stakeholders in equestrian sports, it will be possible to develop feasible approaches that are specifically tailored to the needs of the sport, thereby increasing the likelihood of successful implementation. All possible approaches could be the result of this thesis, i.e. initiatives, regulations, products or others.

The digital availability of this thesis will make it accessible to anyone interested which provides that all interested stakeholders involved in equestrian sports can gain insights into the opinions and ideas of equestrian experts and international riders regarding environmental sustainability in the sport. This can assist them in driving their own initiatives, better understanding the market for sustainable products or services in equestrian sports, or implementing new practices themselves. It can aid organizations like Schafhof Connects in implementing potential initiatives based on the findings obtained here. This thesis serves as a source of inspiration for equestrian riders as well as for equestrian businesses, associations, brands or stable owners.

3. METHODOLOGY

This qualitative investigation employed an exploratory research design, utilizing semi-structured interviews to gather opinions from key stakeholders in the equestrian sport. Therefore, the thesis was based on primary resources.

The participants of the interviews consisted of two key groups:

a. Equestrian Experts:

Dr. Inga Wolfram: An esteemed professor at the Van Hall Larenstein University of Applied Sciences with extensive knowledge and research experience in Sustainable Equestrianism. Her expertise contributed valuable insights into the environmental aspects of equestrian sport.

Theo Ploegmakers: President of the European Equestrian Federation (EEF) and a board member of the Fédération Equestre Internationale (FEI). Mr. Ploegmakers possessed comprehensive insights into the organizational and regulatory aspects of equestrian sport.

b. International Riders:

A group of eight experienced riders from Germany, the Netherlands, Canada, Ireland and Belgium who are renowned for their expertise and experience in equestrian sport. A prerequisite for participation in the interviews was participation in at least 5 of the FEI-recognized international competitions. There were no restrictions regarding the rider's country of origin or discipline in order to ensure a view of equestrian sport as a whole. The riders interviewed are active in the disciplines of dressage, show jumping and western riding. No other selection criteria were applied.

Interviews with the equestrian experts and the international riders were scheduled individually for each participant. The interview structure was sent to the participants by email a few days before the scheduled interviews. This allowed participants to give thoughtful answers and ensure that no important aspects that would influence their answers were overlooked. The duration of each interview was between half an hour and an hour, depending on the willingness of the participants to engage in discussions. The interviews were conducted via video call whenever possible so that visual cues and non-verbal communication could be captured. In exceptional cases, interviews were conducted without pictures and with sound only. Audio recordings of every interview were made to ensure accurate transcription and create reliable protocols for later analysis. All participants were initially asked the same set of questions to ensure consistency across the interviews. However, additional questions may have been included during the conversation as deemed appropriate.

All interviews were conducted in the form of semi-structured interviews, and the structures for both the equestrian experts and international riders' interviews can be found in the appendix. At the beginning of the interviews, the participants were informed about the data processing and the interview procedure.

Each participant could decide individually whether they wished to appear anonymously in the thesis or whether their name may be mentioned. At the end of each interview, the interviewer gave a rough summary of the most important findings of the interview. This gave the interviewer the opportunity to correct any misunderstandings.

First, the interviews with experts were conducted in order to incorporate their answers into the interviews with the international riders. The aim was not to focus on predefined environmental topics, but to give the experts the opportunity to comment on what they considered to be the most important issues. This ensured that their views were captured without preconceived notions based on the topics previously given by the interviewer. In case the equestrian experts did not identify any approaches, the sustainability strategies from other sports in table 1 would have been consulted to serve as a source of inspiration but this was not the case.

Their approaches to making equestrian sports more environmentally sustainable were presented subsequently to international riders to solicit their opinions in this regard. In addition, the biggest environmental issues according to the equestrian experts were presented to the international riders to ask them for possible further approaches they had in mind to solve these issues. The equestrian experts' interviews served to provide answers to the first sub-question, whereas the interviews with the international riders served to provide answers to the second, third, and fourth sub-questions.

To ensure the reliability of the study, ten interviews were conducted. Two interviews with equestrian experts took place to gather general approaches to reduce the environmental footprint of the sport and to present them to the international riders. The exact number of international rider participants depended on the information received and the point of saturation reached. Saturation occurred when the different participants gave repeated answers. By reaching this point of saturation, the thesis achieved a high level of reliability, making the results independent of chance (Baarda et al., 2021). With a total of eight conducted interviews with the international riders the saturation seemed to be reached.

To ensure the validity of the thesis, several steps were undertaken during the descriptive data analysis phase. First, the audio recordings of the interviews were transcribed, written down word for word. Salient non-verbal expressions were considered and mentioned in the transcripts. A comprehensive understanding of the participants' opinions was developed by reading and rereading the transcripts. This familiarization process allowed for an immersion in the data, facilitating the identification of initial impressions and potential themes. First, the entire text was divided into content segments. To enable efficient and systematic analysis, the segments were coded. These codes captured the essence of the participants' opinions about the currently discussed topic. A coding scheme was created for each interview participant, summarizing the content in keywords for each topic discussed and providing additional notes. Related codes were grouped together to form initial themes. These themes were then further examined to identify patterns, connections, and differences within and between the interviews.

This process of theme development enabled a comprehensive exploration of the data and uncovered key insights. To answer the first sub-question, the data from all interviews with the equestrian experts were summarized and analyzed per topic. The same process to answer the second, third, and fourth sub-question took place for the interviews of the international riders.

4. RESULTS

In this section, the perspectives of two equestrian experts as well as eight international riders who excelled in equestrian disciplines such as dressage, jumping, and western riding will be explored. The experts are both from the Netherlands and riders come from a diverse array of countries, including Germany, the Netherlands, Canada, Belgium, and Ireland. All of the riders compete at international competitions and ride at a high level up to Olympic in their respective disciplines, providing diverse perspectives on various aspects of equestrian sustainability and environmental responsibility. The general coding scheme used for organizing the interviews and collecting results is provided in Appendix B, table 12.

4.1 SUB-QUESTION 1

What economically and socially feasible approaches do equestrian experts propose to reduce the environmental footprint of the equestrian sport?

In the next section, the perspectives of the two equestrian experts are examined to provide insights into the sport's environmental sustainability priorities and approaches for reducing its environmental impact. It's important to note that in this analysis, there is no distinction between which expert said what, as both experts' viewpoints collectively contribute to the findings. These findings are summarized in table 2, and where necessary, additional explanations are provided in the text below. The experts' comments on the implementation of the approaches are summarized in a separate paragraph because they offered more general remarks that were not directly tied to the specific key issues they discussed. Figure 1 below displays a word cloud, offering an initial overview of the topics discussed by the experts.



FIGURE 1: WORD CLOUD EXPERT TOPICS

Furthermore, to offer a preliminary and visually overview, this word cloud is provided, visually highlighting the most prominent keywords that surfaced during the interviews with the experts, providing a snapshot of the key themes.

Table 2

Expert approaches to reduce the environmental footprint of equestrian sports

Themes	# experts mentioned theme	# experts mentioned approaches	Approaches mentioned
Horse management	2	1	<ul style="list-style-type: none"> - Stable horses outdoor - Reintroduce natural elements - Redesign land and use pasture land for hay production for horse grassland - Equestrian federations should support change to more outdoor stabling - Governmental support to implement biodiversity - Possible to implement new regulations
Feeding	1	1	<ul style="list-style-type: none"> - Reduce feeding of supplements and concentrates and feed roughage (local hay/ grass), mainly applicable for leisure horses
Consumption behavior	1	1	<ul style="list-style-type: none"> - Federations should stop accepting certain products - Recyclable products

Transportation	2	1	<ul style="list-style-type: none"> - Less airborne horse transportation - Choosing host countries where most participants have the shortest travel distance - Less transportation in general
Communication	2	1	<ul style="list-style-type: none"> - Convince people why sustainability is important
Water management	2	0	General remark to improve on this theme
Energy management	2	0	General remark to improve on this theme
Events	2	0	General remark to improve on this theme
Waste management	2	0	General remark to improve on this theme
Surfacing	2	0	General remark to improve on this theme
Deforestation	1	0	General remark to improve on this theme

4.1.1 HORSE MANAGEMENT

Prominent perspectives, as expressed by the two experts, pertained to the proposition of favoring outdoor accommodation for horses rather than confining them to indoor environments, which currently predominated in horse management practices. This concept entailed according to an expert the reintroduction of natural elements, such as trees and bushes, thereby enhancing biodiversity and fostering the introduction of varied ecosystems and species. According to one expert, many countries could redesign land use to be more effective and allow horses to be kept primarily outdoors, through the use of pasture land previously allocated for hay production. The expert emphasized that transitioning to stable horses outdoors represented the most impactful and feasible approach and is therefore in the experts opinion the most important one. With governments already focusing on biodiversity in the agricultural sector, the expert suggested a similar commitment be extended to the equestrian domain. It was paramount to recognize that many stable owners were unprepared for significant changes, underscoring the importance of a gradual transition. Moreover, the expert advocated rigorous research before introducing possible new regulations, as rushed implementation might result in resistance and unintended consequences.

4.1.2 FEEDING

According to one expert, many horses, mainly those not involved in high-performance sports, are fed additional supplements and concentrates that are not necessary. It is according to the expert well-established that most horses do not require these additives and could thrive on a diet of basic roughage, which is not only sufficient but also healthier in many cases. To promote sustainability and overall equine well-being, the expert stated that there should be a shift towards reducing the use of supplements and concentrates and instead focusing on feeding locally sourced roughage/ gras.

By repurposing the land previously allocated for the production of feed additives towards accommodating horses, the expert stated that vast areas suited for outdoor equine habitation could potentially be unlocked, while ensuring a steady supply of roughage. This reallocation of resources, as advocated by the expert, emerged as a pivotal element in the overarching effort to diminish the environmental footprint of equestrian sports. The implementation of such a transformation necessitated a change in behavior, an endeavor fraught with challenges, yet undeniably attainable, as underscored by one of the experts.

4.1.3 CONSUMPTION BEHAVIOR

One aspect raised by one expert pertained to the consumption behavior observed within the equestrian community. This behavior was characterized by the excessive acquisition of products, driven by a focus on sales generation by brands. The expert contended that this had resulted in the production of what the experts considered to be superfluous and non-essential items, mainly focusing on care products and equipment products. This cycle of overconsumption was further exacerbated by the presence of exhibitions that actively encouraged such practices. An associated concern related to the environmental impact, as most of these products were not recyclable. Addressing this issue presented a unique challenge, as merely expecting consumers to voluntarily reduce their consumption had proven ineffective. In response to this, the expert suggested a potentially vital role for equestrian federations. The expert proposed that federations had the capacity to intervene by refusing to endorse or accept certain products or practices. By establishing such regulatory boundaries, they could effectively discourage the purchase of such items. Nonetheless, it was imperative to exercise prudence when enacting regulations, as the process of implementation was inherently intricate and multifaceted.

4.1.4 TRANSPORTATION

One expert underscored the compelling need to address and mitigate the extensive travel of horses, with a particular focus on specific scenarios where this concern became acutely relevant. A central area of contention in the expert's discourse revolved around the selection of host locations for prestigious equestrian events. For instance, the decision to host the FEI World Cup in Saudi Arabia in 2024 and organize qualifiers for the Olympics in Russia, alongside the practice of flying horses worldwide for exhibitions, had sparked considerable debate. This was primarily due to the logistical complexities and the environmental implications associated with the airborne transportation of horses to distant locations. The expert strongly advocated the exploration of more sustainable alternatives when choosing host countries. Such alternatives might include selecting host nations where the majority of participants could attend with reduced travel, thereby mitigating the overall environmental impact of these equestrian competitions. In addition, the expert stresses that a change in the sport is necessary and a reduction of the general horse transport is inevitable.

4.1.5 COMMUNICATION

Both experts emphasized the critical role of effective communication and education in promoting sustainability in equestrian sports. One expert's perspective revolved around the idea that it was necessary to convince people of the need for sustainability. This involved articulating the "why" - why there is a need to promote sustainability, and if this "why" is convincing, the "how" - how to achieve sustainability - would follow automatically. In the words of the expert, "Because when you are convinced, you do it automatically."

4.1.6 ADDITIONAL ENVIRONMENTAL CONCERNS

In addition to the primary issues discussed, the experts highlighted several other noteworthy environmental concerns within equestrian sports. These included water management (including water pollution), waste management, energy management, the organization of equestrian events, riding ground surfacing, as well as deforestation. These topics were not discussed in detail in the context of this thesis, and no considerable approaches to address these concerns were mentioned by the experts in this regard.

4.1.7 IMPLEMENTATION

Both experts stressed the necessity of a multifaceted approach involving diverse stakeholders. Regulatory measures might be warranted for specific issues, but a tailored, case-by-case approach, considering the roles and responsibilities of each stakeholder, was considered essential. Experts also emphasized the central role of individual riders in adopting sustainable practices, as well as the role of educational and research institutions in promoting environmental awareness. Equestrian organizations such as the FEI and national federations played another role in promoting sustainability according to the experts. One expert attributed a high level of responsibility to the national sports federations in particular, as they have power over the national regulations for the sport. In addition, the expert said that national governments should look into their own country's situation to make country-specific provisions and, if necessary, regulations. Experts agreed that shifting the focus from equine welfare to sustainability within equestrian organizations would go a long way in preserving the social license. By prioritizing sustainability, equine welfare would be improved automatically through practices such as outdoor stabling. In the words of one expert, "If you are sustainable, horse welfare is guaranteed. But if you take care of your horses well, it didn't mean you are sustainable." The expert underscored the need for equestrian organizations to shift their focus from horse welfare to sustainability, as it held the potential to address both concerns effectively. Failing this proactive shift, government intervention might have become inevitable, compelling the equestrian sector to undergo substantial changes, according to the expert.

How do international riders perceive their responsibility in terms of reducing the environmental footprint of the equestrian sport?

In this section, the outcomes of interviews involving eight international riders will be mentioned, delving into their perspectives on their own responsibilities they think they have in the endeavor to reduce the environmental footprint of equestrian sports, as shown in table 3. Besides that the riders did also mentioned other stakeholders they think are responsible for reducing the environmental footprint of the equestrian sport which will be mentioned in a separated abstract and been shown in table 4. Each table is also showing citations from the interviewees and following to each table a further explanation is given.

Table 3

Riders' perception on their responsibility to reduce the environmental footprint of the equestrian sport

Opinions	# riders	Citations
Not more responsible than everyone else	4	<p>"Riders are normal people, everybody is for his own actions responsible."</p> <p>"I don't think we have a role model function to other riders, no."</p> <p>"Sustainability is everyone's business. Everyone is responsible for themselves and it starts with the small everyday issues."</p>
High responsibility as acting as role models/ influencer	3	<p>"I see international riders as a kind of influencers on other riders."</p> <p>"Yes – we are definitely acting as role models here! You really got me!"</p>
Not sure about responsibility	1	<p>"I don't really know. That's difficult to be honest."</p>

Three riders expressed a sense of duty as international riders, seeing their role as crucial in creating awareness about environmental sustainability within the sport. One rider emphasized the influential role of international riders as influencers and underlined their potential to promote sustainability, for example by endorsing sustainable equipment brands or discouraging unnecessary purchases. Conversely, two other riders suggested that the responsibility for promoting sustainability should be shared by all riders, questioning the capacity of international riders to influence their peers. Additionally, there was unanimous agreement among all riders that sustainability should receive more attention within the realm of equestrian sports. Some believed that the sector was already making significant efforts in this regard but could further improve, while others asserted that there was a notable lack of activity on this front. No examples were mentioned in this regard.

Table 4

Responsible stakeholders to reduce the environmental footprint of the equestrian sport according to riders (apart from themselves)

Stakeholders considered to be responsible	# riders	Citations
Equestrian sport federations	7	<p>"The FEI as the main equestrian sport organizations is responsible for promoting the sustainability within the sport in my opinion."</p> <p>"I think they have a role but in relation to breeding and shows. They should make sure that people breed horses consciously and not unknowingly breed sick horses without any background knowledge."</p> <p>"The FEI is responsible when it comes to flying horses."</p> <p>"The FN should approach individual horse owners and create awareness."</p>
Stable owners	2	"Stable owners have a big potential when it comes to sustainability. You can also pay attention to various things like electricity, food etc."
Breeders	1	"Breeders are responsible for breeding healthy horses and dealing with diseases and breeding in general."
Magazines	2	"[It should be promoted] in magazines, that the people read about it. [...] People don't think about it and take everything for granted. Magazines should simply report more on this."
Competition organizers	3	"I think there is a responsibility for the show organizers."
Companies in equestrian sector (feed producers)	1	"The companies selling horse beddings and feed, for example, they are responsible for the packaging."

In addition to the role of international riders, all interviewees stressed the importance of collective responsibility within the equestrian sport for addressing environmental sustainability. In this context, most of the riders also saw a significant role for the FEI and national equestrian sport federations, like the FN, as they could promote sustainability, provide guidance, generate ideas for riders and horse owners, and establish strategic initiatives. Stable owners were deemed responsible. Breeders were recognized as responsible stakeholders because of their impact on the health and longevity of the sport horses. Magazines were also seen as influential as well as competition organizers for their role in decision-making regarding waste management, energy consumption, recycling practices, and more that could contribute to the overall environmental sustainability of the sport.

Furthermore, one rider believes that horse feed manufacturers and other companies in the equine industry can promote sustainability by using shorter transportation routes, reducing plastic use and emphasizing organic labels.

4.3 SUB-QUESTION 3

How do international riders perceive the proposed options of the experts with regard to reducing the environmental footprint of the equestrian sport?

The main key issues suggested by the two experts revolved around the management of horses, their feeding practices, consumption behavior, transportation, and communication within the realm of equestrian sports. In this part of the research the various themes and approaches mentioned by the two experts were presented to the riders and the perspectives of the riders regarding these approaches will be mentioned. Citations are included in the tables.

4.3.1 HORSE MANAGEMENT

Expert approach: housing horses in outdoor facilities with natural elements and keeping horses more outside to improve biodiversity.

Riders' viewpoints on this approach: Some riders saw potential risks associated with full-time outdoor housing, such as injuries and horses running wild in the pasture, while others preferred to have their horses outside during the day but indoors at night. There was a consensus among riders that outdoor stabling was beneficial to the horses' well-being, and they expressed a desire for it for the horses. However, some felt that some horses preferred to be stabled in boxes, possibly because they had not learned otherwise. Another rider had the opinion that top sport horses needed rest and regeneration in the box to be able to perform at their best. Two riders stated that they were willing to house their horses outdoors but believed there was not enough available land, and the associated costs were prohibitive. One rider passionately advocated for the introduction of biodiversity in horse pastures, emphasizing that this would allow important components of horse nutrition, such as herbs, to be naturally returned to the horse when pastures returned to their natural form. This could lead to savings in equine supplements and a return to sustainability, according to the rider. The following table 5 summarize the riders' viewpoints.

Table 5

Riders' opinions on stabling horses primary outdoor

Opinions	# riders	Citations
Don't want to risk injuries	3	"I think this is hard for my competition horses. They run and try to kill themselves. I don't want them to get injuries. They are too expensive."

		<p>"For many people there is too much money involved."</p>
Don't want horses to go wild	3	<p>"My horses would go wild, the bugs will bother them. [...] Nobody taught them to stay out for long."</p> <p>"When they start running I will take them inside."</p>
Would like to have the horses outside in general	8	<p>"I have my horses out everyday. No matter what weather, I think it's important that they learn what they can do with their body and what not."</p> <p>"People in general want their horses to be out."</p> <p>"I love having all of my horses out on the field."</p> <p>"Personally, I'm old fashioned. I always put them out, it's part of the sport."</p>
Want horse to also be inside to collect energy	1	<p>"The horses need the energy they can gather by standing in the box. We want something from the animals."</p>
Not enough available land	2	<p>"Especially in Germany there is not enough grassland available to have all the horses outside. When you look in Ireland it is possible, but not everywhere. The land is too expensive."</p> <p>"I think that is difficult because there is just not enough land to do it."</p>
Biodiversity promotion important for nutrition	1	<p>"That would be positively received. Especially because so many meadows no longer provide all the nutrients because they are so "dead managed", herbs, etc. could grow there again if the meadows are designed more natural."</p>
Possible for recreational horses	4	<p>"Recreational horses could and should stay out longer."</p> <p>"Sounds great, but is not possible for the sport rider. You can be a hobby rider and do that."</p>

4.3.2 FEEDING

Expert approach: switching from excessive supplemental feeds and concentrates to locally produced roughage, especially for recreational horses.

Riders' viewpoints on this approach: The interviewed riders generally shared a common perspective on transitioning recreational horses from excessive supplemental feeds and concentrates to roughage. Three riders acknowledged the challenges of implementing this transition for high-level competition horses, primarily due to concerns about the specific dietary requirements of sport horses. One rider also expressed a desire to retain control over their sport horses' energy intake and thus preferred not to rely on grassland with much energy for the horses for this purpose. They were generally receptive to the idea of offering recreational horses more outdoor time and natural dietary options, emphasizing the potential advantages of a more natural equine lifestyle. The following table 6 summarize the riders' viewpoints.

Table 6

Riders' opinions on feeding horses completely on a natural-diet

Opinions	# riders	Citations
High-performance horses need more energy from supplements	4	"Not possible for the sport. On shows not possible. Nature wise horses are not able to cope the questions we ask from them when you look in the top sport. They need the food that we feed them for that muscle and that niveau."
Want to keep control over energy intake	1	"I want to control what my horses get to eat, I want to feed them a balanced diet, and that's also why my horses come to a pasture with less energy grass."
Possible for recreational horses	4	"This would be again applicable for recreational horses." "Horse for hobby that's possible, for top sport not."
Not sure if applicable for sport horses	3	"I'm not sure how good the horses can perform then [without the extra feeding]."

4.3.3 CONSUMPTION BEHAVIOR

Expert approach: change in riders' consumption behavior - people have to stop buying so many care and equipment products.

Riders' viewpoints on this approach: Couple of riders exhibited a limited awareness of the issue of consumption, the prevailing sentiment among most riders was a recognition of the excessive consumption of equipment and grooming products within the equestrian community, perceiving it as a significant sustainability concern.

The riders uniformly asserted that their personal consumption practices were characterized by restraint, with one interviewee emphasizing that excessive consumption was more prevalent among younger female recreational riders. The following table 7 summarize the riders' viewpoints.

Table 7

Riders' opinion on consumption behavior within the equestrian sport

Opinions	# riders	Citations
Consumption behavior in equestrian sport big issue	3	<p>"Many people should rethink their own consumption, for example when it comes to saddle pads."</p> <p>"Consumerism is also a big problem. The horse itself is not the problem. The problem is more the people and what they buy."</p>
Biggest problem young female recreational riders	1	"But I also know about the girls with the perfect matching riding sets, every week a new one."
Own consumption behavior is appropriate	8	<p>"I don't do that. I don't care which saddle pad I'm using."</p> <p>"I'm not so into buying new products. I'm using my products as long as possible."</p>
Limited knowledge about the topic	4	<p>"I wasn't aware that this is such a problem."</p> <p>"I don't have so much knowledge about sustainability and I cannot say much about this."</p>

4.3.4 TRANSPORTATION

Expert approach: reducing the transport of horses, mainly airborne transportation of horses.

Riders' viewpoints on this approach: While all riders recognized that the transportation of horses presented environmental challenges, particularly when it involved extended travel to equestrian events, most riders stated that they believed a reduction of the transportation is difficult when the sport should further exist as it is now. Some riders did express their opinion that flying horses should be reduced, especially when horses were being transported by air for small competitions or training purposes. One rider interviewed argued that there was still a lot to be done in the industry to make horse transport more sustainable. The rider expected that in the near future, horses would be pulled and transported by electric cars or trucks, which would be an option to reduce the environmental footprint of horse transportation in her opinion. The following table 8 summarize the riders' viewpoints.

Table 8*Riders' opinion on reduction of horse transportation*

Opinions	# riders	Citations
Horse transportation is an issue	8	"Transporting horses has its environmental challenges, which we all need to address." "Of course, also transportation of the horses is not sustainable at all."
Reduction difficult	6	"There is no possibility to reduce the transportation. At least not when the top sport should further exist." "Transport is a thing, horses cannot yet be driven with electric. The industry still has to do something before you can do something better in transport. I have recently already looked for an electric car which can pull trailers, but you do not get far."
Flying of horses needs to be reduced	3	"Also, that horses are flown around the world for some tournaments should probably be reconsidered. Something should be done about that." "The question is if the flying of horses always has to be. Of course, for very high-level competitions it is necessary for the sport, but that can and should certainly be reduced."
Industry has to improve so that horses can be transported with electric cars	1	"The industry still has to do something before you can do something better in transport. Someday you can transport the horses certainly also quite simply fit electro cars then that will change."

4.3.5 COMMUNICATION

Expert approach: start communication and spread more awareness on the topic of environmental sustainability.

Riders' viewpoints on this approach: The riders acknowledged that communication is an important key factor and that open dialogues, awareness campaigns, and educational initiatives were key components in fostering sustainable practices in equestrian sports. Many riders also emphasized the role of equestrian federations or magazines in spearheading these efforts and providing guidance to individuals. The following table 9 summarize the riders' viewpoints.

Table 9

Riders' opinion on communication to inform and educate people about environmental sustainability

Opinions	# riders	Citations
Communication and education about environmental sustainability key factor	7	<p>"We need to start by creating awareness. Educate each other. Awareness comes through social media also."</p> <p>"The topic needs to be more public, people should talk about it."</p> <p>"Many people want to help but don't know how. Or they just need to be made aware about the topic, but in my experience, people are willing to help if you tell them what to do."</p>
Role for equestrian federations	6	<p>"No responsibility for the federations [to spread awareness] but it should be good if they would do. The awareness should come from the FEI and from each other."</p> <p>"Federations should spread awareness about horse breeding to stop people from breeding unhealthy horses resulting from lack of knowledge."</p>
Role for magazines	1	"The topic should be more in magazines, so people start talking about it."

4.3.6 RIDERS' INDEPENDENT IDEAS

Some of the riders had ideas of their own to reduce the environmental footprint of the equestrian sport which they raised during the interviews. Accordingly, in addition to the strategies suggested by the experts, alternative approaches to mitigating the environmental impacts of equestrian sports were proposed by the riders:

- Enhanced Waste Management at shows:
 - Riders emphasized the need for better waste management at equestrian events and shows.
 - They desired more disposal options and improved organization by event organizers.
 - Facilitating waste sorting for riders and grooms to ensure proper disposal practices was seen as crucial.
- Utilization of Horse Manure:
 - Participants stressed the importance of efficiently using horse manure, such as transporting it to mushroom farms or for cow bedding, as an environmental practice.

- Reducing Excessive Plastic Usage:
 - The excessive use of plastics, particularly in packaging for bedding and horse care products, was a major concern.
 - Riders recommended regulatory measures to curb plastic consumption within the equestrian community.
- Delayed Start of Equestrian Competition:
 - Some individual riders proposed delaying the start of equestrian competitions to promote better horse growth and prevent injury.
 - They suggested regulating the cessation of competition for three- or four-year-old horses, often pressured by high prize money, by organizations like the FEI and national federations.
 - These regulations would enhance the longevity and welfare of sport horses, contributing to the sustainability of the sport by reducing the need for excessive horse breeding.

The following table 10 summarizes the riders' ideas.

Table 10

Riders' own ideas to reduce the environmental footprint of the equestrian sport

Ideas	# riders	Approaches mentioned
Enhanced waste management at shows	3	- More disposal and waste separation options at shows provided by organizers
Efficient use of horse manure	2	- Reuse for mushroom farms - Reuse for cow bedding
Less plastic use	2	- Regulations measures to curb plastic production
Start riding horses at older age	1	- Equestrian federations should stop making competitions for 3-years old and 4-years old horses

4.4 SUB-QUESTION 4

Under what conditions are international riders willing to participate in initiatives to reduce the environmental footprint of the equestrian sport?

This section presented the findings from interviews with international riders regarding their willingness to engage in initiatives aimed at mitigating the environmental impact of equestrian sports. The interview responses revealed several key themes:

- 1) Cost-benefit balance: Riders recognized the significance of evaluating the financial implications of sustainable solutions against their environmental advantages. They were open to investment but emphasized that these initiatives should not impose excessive financial burdens, considering the already high costs associated with equestrianism. Initiatives had to be accessible and financially viable for a wide range of stakeholders.
- 2) Time and complexity: Participants strongly emphasized the need for practical, straightforward sustainability initiatives. Given their busy schedules, riders were keen on solutions that were not only feasible in terms of time commitment but also uncomplicated. Complexity was a concern, as they preferred initiatives that did not require excessive time to understand and implement.
- 3) Aesthetics: A subset of riders specifically noted their inclination to purchase sustainable and recyclable equipment, stressing the importance of its visual appeal. They emphasized that while environmental considerations were significant, the equipment had to align with their aesthetic preferences. These riders were willing to invest in such eco-friendly products, provided that they met both sustainability and visual criteria.
- 4) Sport development: Some riders insisted that sustainability initiatives should not impede the growth and progression of equestrian sports. While they were open to sustainability, they wanted to ensure that such efforts did not hinder the sport's development, such as by restricting the use of certain flooring types.
- 5) Clear guidance: A recurring theme was the necessity for clear guidelines and instructions on how to participate in these initiatives. Participants emphasized that they would be more willing to engage if provided specific guidance on implementing sustainable practices, such as managing horse manure or using environmentally friendly equipment. They stated that they lacked knowledge about practical steps and methods.

The following table 5 summarize the riders' conditions.

Table 11

Conditions under which riders are willing to participate in environmental sustainability initiatives

Conditions	# riders	Citations
Money	7	<p>"I recently spend lots of money for more sustainable lightning inside of the riding arena. But I think as the sport is already a quite expensive hobby, making it more expensive would get lots of people to stop with the hobby."</p> <p>"If companies start with sustainability initiatives and spend money on new strategies, things would get more expensive for the horse owner which many people don't have."</p>

		<p>"Of course, also the costs are one important key factor. I am willing to make efforts but it must be in balance with the costs [...]"</p> <p>"I would be willing to spend more when it's affecting my horse's health in a positive way. But it definitely needs to be in balance."</p>
Time/ complexity	7	<p>"It should not cost me too much time. Just give me something small to do, every day which takes only couple of minutes. Using one bucket of cleaning water instead of two. Something easy to do, I don't want to dive into that topic so deeply."</p> <p>"Riders are in their own bubble. They think about their horse, about the next competition, about what they are doing right now. They don't want to think about something else."</p>
Aesthetics	1	"When it comes to equipment it should look appealing."
Sport development	1	"It should not take away from the actual sport. The sport should not regress."
Clear guidance	3	"Tell me what to do and I will do it. Just give everyone a real small thing to do, a thing they can do every day, and they will do it!"

5. DISCUSSION

This research aims to identify economically and socially feasible approaches to enhance the sustainability of equestrian sports by reducing its environmental footprint. It provides comprehensive insights into the perspectives of equestrian experts and riders on different approaches.

To address the topic, of environmental sustainability within the equestrian sport, interviews were conducted with two equestrian experts to gain insights into the approaches they consider for enhancing environmental sustainability within the sport. Subsequently, interviews were conducted with eight international riders to understand their perspectives on their roles in promoting sustainability in equestrian sports. Additionally, their opinions on the approaches proposed by the experts and their conditions for participating in initiatives aimed at reducing the environmental footprint of equestrian sports were gathered. In the following section, interpretations of the results from the interviews with experts and international riders will be provided, followed by a critical reflection on the research methodology.

5.1.1 DISCUSSION OF THE APPROACHES TO PROMOTING SUSTAINABILITY

Horse management

The analysis showed that the conversion of horse husbandry to more outdoor stalls is a realistic key factor for improving environmental sustainability in equestrian sports, as the experts and a majority of riders and experts stated this to be feasible. However, the stabling of horses outside is limited to predominantly leisure horses, as the interviews revealed that a majority of riders at a high level do not want to keep their horses exclusively outside, but see a great potential for leisure horses in this respect.

This discrepancy may be attributed to the fact that sport horses that are not accustomed to being outdoors often go wild in the field, as they typically don't have the opportunity to run free, resulting in concerns about the increased risk of injuries in such unfamiliar conditions. This risk might not apply if horses were more acclimated to such conditions. In fact, stabling horses outside can actually make them less likely to have health problems for example with their digestive system or illnesses (Pitman, 2011). Furthermore, the fact that riders have expressed concerns that there is not enough space available for the horses could, according to one expert, be freed up by converting flat land currently used for the production of horse feed concentrates. As a result, some of the riders' arguments for not keeping horses mainly outside could be destroyed by education in this regard.

Horse feeding

With regard to the nutrition of horses, both experts are of the opinion that especially leisure horses should be fed more with roughage and less with supplements and concentrates in order to counteract excessive production of feed. In this context, riders agree with the experts, making this a possible approach for recreational riders. The international riders are of the opinion that these extra feeding measures are needed for the high level at which the horses perform, which also agrees with the expert's opinion. Thus, this approach also becomes a feasible approach in relation to the recreational riders, who should be educated about the feeding needs of their horses in this context.

Consumption behavior

Furthermore, the research shows that riders clearly agree with the expert's opinion to consume less care products and equipment products. Many riders themselves have already acknowledged the issue of excessive consumption within equestrian sports, aligning with research indicating that items have the greatest impact on our environment (Porcelijn, 2016). However, as all the riders interviewed claimed not to be part of the high-consumption rider community, it could be the case that riders tend to recognize the problems less in themselves. Alternatively, it could be that the group of riders who consume a lot of products is more likely to be the leisure riders, or that in this work mainly riders were chosen who are already aware of this problem and simply consume less than many others. This group of high consuming riders cannot be defined precisely because only top riders were interviewed in the course of this work and therefore the feasibility of this approach is unclarified.

Horse transportation

Furthermore, this research showed that an important key issue is also the transport of horses, focusing on primarily the airborne transportation, related to feasible approaches to make equestrian sport more sustainable. Both international riders and experts recognize the potential to reduce horse transport's environmental impact. However, the majority of riders are inclined to support such reductions only to a limited extent, as the transportation of the horses is essential for the sport to continue in its current form. From this it can be concluded that either the sport must undergo a major change or the reduction of transport can only take place to a limited extent. As supported by the IPCC (Masson-Delmotte et al., 2019), there is a need for a profound shift within all industry, as therefore equestrian sport too. However, it is essential to acknowledge that within the sport, there exists an ongoing debate, as some stakeholders are resistant to changes that might jeopardize the sport.

Communication

Another point that emerges from the work is the need for communication on the topic of sustainability in equestrian sport and the education of the equestrian sector in this regard. Experts focus on communicating to riders and horse owners the need to change the sport towards more sustainability in order to facilitate the change towards a more sustainable sector, as people act voluntarily when they act out of conviction according to one of the experts.

The riders also claim that they would like to participate in sustainability initiatives, but currently do not know what they can do. The presence of current environmental initiatives in equestrian sports, such as carbon-neutral horse shows (The London International Horse Show, n.d.), the utilization of horse manure for electricity generation (Hurme, 2019), and the production of sustainable equipment, signifies a positive step towards fostering eco-conscious practices within the community. However, it is essential to note that these examples represent only a fraction of the potential sustainability initiatives available. The limited scope of such initiatives may leave riders without sufficient guidance on adopting sustainable actions, underscoring the critical need for additional opportunities to educate individual riders.

5.1.2 DISCUSSION OF RIDERS' RESPONSIBILITY

Through the work it became clear that international riders are inconsistent about their own role in promoting environmental sustainability in equestrian sport. Although they all agree that the issue is everybody's business, they are unsure whether they themselves play a bigger role than free riders or others. Some see themselves as role models or influencers for other riders, while others do not. This could be related to the fame of the riders, as the more famous top riders tended to consider their role as a positive example important as their actions are followed by many riders. Thus, in the course of this work, no exact statement can be made as to whether top riders believe they play a role modeling role when it comes to the promotion of sustainable practices. However, the riders interviewed named a number of other stakeholders who they believe are responsible for promoting sustainability in sport, which again underlines the complexity and concern of the general equestrian community.

5.1.3 DISCUSSION OF PARTICIPATION CONDITIONS FOR INITIATIVES

Furthermore, the work revealed that although riders emphasized a strong willingness during the interviews to participate in initiatives, they consider several criteria to be very important. These criteria include not wanting to make too big an investment, not having to invest too much time and not wanting the application or implementation to be too complex. In addition, it was important to many riders that, if the development of sustainable products is concerned, the external appearance should play a role, so the products should look appealing. In addition, it should not get in the way of the sport and the development of the sport.

As a last point, some riders stated that clear guidance in the implementation and clear indications of what can be done are necessary. They have no ideas themselves about what can be done and do not want to spend too much time on the subject because of time constraints. Therefore, although there is an interest in improving environmental sustainability among international riders, they are not prepared to accept too great a disadvantage or too great an effort, which needs to be considered in order to identify the right approaches that would be adopted and welcomed by riders.

5.1.4 DISCUSSION OF PREDICTABILITY OF RESULTS

The approaches to reducing the environmental footprint of equestrian sports investigated within the research only partially align with broader sustainability efforts in other sports, which predominantly emphasize energy, waste management, and CO₂ emissions, as concluding from preliminary investigations (see table 1). These elements were also mentioned by the experts and riders, but not as core things that should be changed first. This reflects the complexity of the issue of sustainability, especially in the equine sector. The uniqueness of this sport probably lies in the involvement of the large animals horses, which brings with it a myriad of additional key issues as for example the feeding, the housing and the transportation that are integral to the sustainability of the sport. Thus, surprising topics were brought up in the course of this work, which can only be found to a limited extent or not at all in other sports.

5.2 REFLECTION OF METHODOLOGY

With regard to the interviews with international riders, the sample for the interviews consisted of 8 riders. The predominantly common perspective and repeated opinions of the riders suggest that the sample size was appropriate for the purposes of this study, although some considerations need to be made. During the course of the interviews it became clear that some riders were reluctant to participate in the study, mainly due to the sensitive nature of the sustainability issue. Some riders who had already confirmed their participation were no longer willing to be interviewed and in general the riders were skeptical about the topic. The fact that the willingness to participate was so low may be because riders are concerned about making statements that could potentially damage their image, while others were only willing to participate anonymously.

This selective willingness to engage with the topic may have resulted in a sample of riders who were already interested in sustainability and had a higher willingness to do something to promote environmental sustainability more likely than other riders, called selective non-response (Non-respons, n.d.). Therefore, the results presented in this study may not fully represent the wider community of top riders meaning that their opinion cannot be generalized on all international rides, making the research potentially less reliable.

In addition, sustainability is an issue where there are clear societal 'right' and 'wrong' attitudes (UNDP, 2021). This social context may have influenced riders' responses during the interviews, resulting in a social desirability bias. It is possible that riders gave answers that were consistent with the socially accepted viewpoint, rather than expressing their true feelings or behavior. This bias can affect the accuracy of the information collected in the interviews and it is important to recognize its potential influence on the results as it could have an impact on the reliability of this research.

The combined approach of interviewing equestrian professionals and international riders was valuable for this study. It allowed for the exploration of different viewpoints and provided a broader understanding of the challenges of environmental sustainability in equestrian sport. This approach ensured that a range of perspectives and opinions were assessed in order to identify viable approaches for all stakeholders. However, it should be noted that in order to provide comprehensive feasible approaches, more opinions from different stakeholders should be considered in order to make more comprehensive statements about the feasibility of the approaches.

The research process proved to be more difficult than originally anticipated. As many different approaches were mentioned, delving deeper into the approaches was difficult in terms of time, which meant that less detailed technical guidance could be given to the riders, affecting the depth of the overall findings and adding to the complexity of interviewing the riders. This proved to be a miscalculation of the complexity and time-consuming nature of the research work. In addition, the reluctance of riders to participate in the study presented an unexpected challenge in recruiting an adequate number of participants, which ultimately led to an extension of the project timeline. This research provides valuable sustainability approaches and opinions for equestrian sport, but due to the complexity and time constraints they lack the depth required for practical implementation, making it clear that more comprehensive research would have been needed for the chosen topic.

6. CONCLUSIONS AND RECOMMENDATIONS

Environmental sustainability is an increasingly pertinent concern in the world of sports, including the equestrian sector. This research has endeavored to investigate feasible approaches to mitigate the environmental impact of equestrian sport. By conducting interviews with equestrian experts and international riders, the research aimed to explore feasible approaches for reducing the environmental footprint of equestrian sports.

The insights obtained throughout this study serve to inform sustainable practices, stimulate individual initiatives, and facilitate a better understanding of the market for sustainable products and services in equestrian sports.

6.1 CONCLUSIONS

The two equestrian experts identified five principal approaches as feasible to reduce the environmental footprint of the sport:

- A transition towards outdoor stabling to promote biodiversity
- A shift towards exclusive roughage-based diets, particularly horses that are not high-level performing
- Reducing the consumption behaviors of riders and horse owners
- Reducing long-distance horse transport
- Better communication and education about the topic of environmental sustainability to support the other approaches

While these recommendations offer a promising path toward sustainability, the implementation of new approaches may necessitate the formulation of regulations at the national level or by equestrian sport federations, acknowledging the unique contexts of individual countries.

The whole equestrian community, including riders and governing bodies like the FEI and national federations, collectively shares the responsibility for implementing sustainable practices in equestrian sport, according to the interviewees. A part of the international riders sees themselves as role models, recognizing their pivotal role in inspiring change. Their commitment to personal responsibility underlines their willingness to contribute to the sport's sustainability. Equally, the role of the FEI and national federations in enforcing and encouraging sustainability initiatives within the equestrian sector cannot be understated.

The recommended approaches are, to a large extent, feasible according to international riders, particularly those engaged in recreational riding. While a complete transition from indoor to outdoor stabling might not be universally practical for sport riders, a middle-ground approach is conceivable. Effective communication and education campaigns that highlight the benefits of outdoor stabling of the horses and focus on roughage-based diets could sway riders toward more sustainable practices. International riders exhibit a consensus on the necessity of reducing the consumption of riders and horse owners and minimizing long-distance horse transport, especially the airborne transportation of horses. The potential for implementing these changes is indicated by the interviewees, as they expressed willingness to take part in initiatives aimed at improving sustainability.

It seems that there is a willingness among riders to participate in sustainability initiatives within equestrian sports. However, this enthusiasm is accompanied by a set of conditions set forth by riders, including considerations related to financial feasibility, practicality, aesthetics, sport development, and the availability of clear guidance.

It can be concluded that riders are willing to contribute but may be reluctant to make significant sacrifices for the cause, indicating a less urgent perception of the issue's significance and a need for further education about the necessity of a change. Acknowledging and addressing the mentioned conditions is pivotal in harnessing the riders' active engagement in reducing the environmental footprint of equestrian sports.

For answering the main question, feasible approaches to reduce the environmental footprint of equestrian sport, as highlighted by equestrian experts and international riders, encompass five key approaches. A transitioning to outdoor stabling for horses, with a focus on leisure horses, while maintaining practical solutions for high-level riders represents a possible approach according to both experts and riders. Dietary changes, emphasizing roughage over supplements and concentrates, gain support from both experts and riders, particularly for recreational riders. Reducing excessive consumption in equestrian sports, including care and equipment products, is acknowledged as a critical step toward sustainability. Moreover, minimizing long-distance horse transport, particularly air travel, emerges as a crucial element in environmental sustainability. However, it's crucial to emphasize that while riders are willing to make changes, they contend that extensive international travel with horses for competitions is perceived as an integral part of the current state of the sport. Hence, the assertion that the sport should undergo a fundamental transformation is rooted in the belief that such changes are necessary to achieve true sustainability. A collaborative effort from all stakeholders in equestrian sport is essential for implementing these strategies and promoting sustainability. Countries have to look in their own situation and should implement regulations if needed. Spreading knowledge and ideas about sustainability in equestrian sport is crucial to driving meaningful change. According to the interviewees, equestrian federations should take the lead in crafting effective communication and education. These campaigns should highlight the environmental benefits of outdoor stabling, roughage-based diets, and reduced consumption as well as reduced transportation of the horses while providing clear, actionable guidance.

6.2 RECOMMENDATIONS

Based on the findings from this research, the following recommendations are proposed to enhance sustainability within equestrian sports:

Short-term recommendations:

1. Equestrian sport federations should enhance environmental sustainability education within the equestrian community. This educational initiative should focus on promoting the advantages of outdoor stabling for horses, the benefits of roughage-based diets, particularly for leisure horses, and the environmental impact of care and equipment product consumption. Including magazines as a medium for communication can be an effective way to disseminate this knowledge.
2. The FEI should consider host countries for equestrian competitions based on proximity to the majority of participating riders. This approach can significantly reduce the environmental impact associated with long-distance horse transportation.

Long-term recommendations:

3. National governments and national equestrian sport federations should conduct comprehensive assessments of their respective countries to address sustainability issues specific to their regions. This may include initiatives to enhance biodiversity, reconfigure land use practices, and implement necessary regulations or guidelines to foster environmental responsibility.
4. Equestrian sport federations, and where applicable, government bodies, should prioritize the reduction of unnecessary product production and promote the production of sustainable and recyclable products. This can involve discontinuing the acceptance of specific products deemed non-essential, ultimately shifting towards a more sustainable and environmentally conscious product selection.
5. Further research is recommended to develop a better understanding of the environmental impacts of equestrian sports and to identify more comprehensive and in-depth approaches to reduce these impacts.

In conclusion, this research offers invaluable insights into the feasible approaches for reducing the environmental footprint of equestrian sport. The collaboration between experts, riders, governing bodies and other stakeholders is according to the interviewees essential for the effective implementation of sustainable practices. With practical and well-communicated initiatives, the equestrian community can take meaningful steps toward sustainability. The recommendations presented in this report are designed to guide and inspire stakeholders as they work towards a more sustainable future for equestrian sport. In conclusion, while this study has collected valuable opinions and approaches, additional research involving a diverse range of stakeholders is necessary to develop detailed and effective strategies, given the study's limitations in complexity and time constraints.

6.2 FURTHER RESEARCH

Further research in the field of sustainability in equestrian sports is essential. To comprehensively address the complexity of this issue, future studies should expand the scope to include a wider range of stakeholders, including more experts who can give in-depth and evidence-based insights in feasibility of different approaches. Besides more experts it is recommended to include also a wider range of riders and horse owners, in order to gather viewpoints from all different involved parties. Additionally, region-specific investigations will help tailor sustainability strategies to diverse global contexts, ensuring practical and economically viable approaches. This expanded research will enrich the dialogue and enhance the promotion of sustainability in equestrian sports.

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APPENDIX

A. INTERVIEW STRUCTURE

Equestrian experts interview structure

Used to answer sub-question one.

- 1) What does sustainability mean to you?

At this point the term sustainability, environmental sustainability and environmental footprint will be defined as used it in this thesis. Thereby, the nine planetary boundaries will be mentioned.

- 2) In your opinion, does equestrian sport adequately address the topic of environmental sustainability and why?
- 3) What are the environmental sustainability concerns that you are familiar with?
Follow-up question: In your opinion, which of these concerns should the equestrian sport focus on addressing and why?
- 4) What possible approaches do you think there would be to address these sustainability issues you mentioned?
- 5) Which of these approaches do you believe would be the most suitable for addressing these concerns, taking into consideration feasibility, both socially and economically, as well as effectiveness?
- 6) Are there any potential problems or obstacles that could arise from the implementation of these approaches?
- 7) Which parties and stakeholders would be involved in implementing these approaches?
- 8) Which parties or stakeholders would likely benefit from implementing the approaches?
Follow-up question: What benefits are they likely to have?
- 9) Which parties or stakeholders would likely have to make sacrifices through the implementation of the approaches?
Follow-up question: What sacrifices are they likely to have to make?
Follow-up question: In your opinion, would these sacrifices be justified?

International riders interview structure

Used to answer sub-question two, three and four.

Question 1 – 4 used to answer sub-question two.

Question 5 – 7 used to answer sub-question three.

Question 8 used to answer sub-question four.

The questions in the main part depend in part on the experts' answers. In this sense, other questions than the ones listed here could be added later by default if needed.

- 1) What does sustainability mean to you?

At this point the term sustainability, environmental sustainability and environmental footprint will be defined as used it in this thesis. Thereby, the nine planetary boundaries will be mentioned.

- 2) In your opinion, does equestrian sport adequately address the topic of environmental sustainability and why?
- 3) Which parties do you think are responsible for addressing the issue of environmental sustainability in equestrian sports?
- 4) Considering the influence of international riders as role models, how essential is their role in promoting sustainability within the sport?

At this point, the nine planetary boundaries will be explained. Furthermore, all the environmental sustainability concerns mentioned by equestrian experts will be addressed, along with the concerns that the equestrian sport should address based on the experts' recommendations.

- 5) What approaches do you have in mind to tackle these concerns and promote environmental sustainability within equestrian sports?

At this point, the approaches presented by the experts to promote environmental sustainability in equestrian sports will be explained.

- 6) What potential problems or obstacles do you think could arise in implementing these approaches?
Follow-up question: In your opinion, would these problems or obstacles be justified?
- 7) Based on your knowledge and experience, which approaches do you think are socially and economically feasible to reduce the environmental footprint of equestrian sports and why?
- 8) What key factors do you think influence the willingness of international riders like yourself to participate in initiatives to reduce the environmental footprint of equestrian sports?

Please consider aspects such as financial considerations, time constraints, complexity of implementation, availability of initiatives, behavior and example set by other riders, promotion of initiatives by equestrian associations, and any other relevant factors that you think may influence willingness to participate.

B. CODING SCHEME

Table 12

Codes overview of all conducted interviews

Main-themes	Themes	Sub-themes
Horse management	Outdoor stabling	Injuries
		Horses going wild
		Horses don't want to be outdoor
		Horses not used to be outdoors
		Land management
		Horse welfare
		Wants horses to be out
	Biodiversity	Natural diet
		Reintroduction natural elements
Horse feeding	Roughage	Restructuring land
		Horse welfare
		Natural diet
		Locally sourced
	Supplements/ concentrates	Horses energy
		Sport horse nutrition
Products	Consumption	Control energy intake
		Recyclable products
		Useless products
		Exhibitions
		Brands
	Care product consumption	Saddle pads
		Plastic products
		Regulatory measurements
	Waste management	Shows
		Waste separation
Emissions	Airborne transportation	Show organizers
		Host countries
		Flying for training
	Road transportation	Flying for competition
		Electric cars
		Industry development
		Competitions
Communication	Education	Stop transportation
		Education institutes
		Equestrian federations

		EEF
		Communicate ideas/ approaches
	Convincing	Why and how
	Awareness	Talking
Water management		Magazines
	Watering surfacing	/
	Water pollution	/
	Showering horses	/
Horse manure	Collect manure on ground	Water pollution
	Recycling manure	Mushroom farms
		Energy generation
		Cow bedding
Energy management		Biogas plant
	Solar panels	Stable owners
		Regulations
	High energy use	Solarium
Implementation		Lights in stable
	Bio energy	Geothermal heat
	Responsibility	Stable owners
		Breeders
		Riders
		Horse owner
		Equestrian federations
		Government
		Competition organizers
		Equipment companies
		Magazines
	Regulations	No money for
		No time to deal with more regulations
		Difficult, could harm
Surfacing		Necessary
	Material	Gras
		Sand
Conditions		Plastics
	Money	Balance is key
	Time	Too busy
	Complexity	No time to think about
	Guidance	No ideas
	Aesthetics	Match fashion standards
	Sport development	No compromises restricting the sport
	Willingness	High
		Medium