Final Report

Sustainability, Cricket Gear, Clothing and Apparel: Report on Cricket Gear

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Disclaimer

This open access research has been conducted by the authors in order to raise awareness of sustainability issues relating to cricket gear which may impact on the sport. It should not be used for any other purpose.

The research is based on the analysis of publicly available information. The authors, the University of the Creative Arts do not accept liability for any factual inaccuracies and commercial or other consequences of misuse of the report for any other purpose than awareness- raising and discussion.

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1. Summary

This document presents the findings of research by The Centre for Sustainable Design ®(CfSD) at the Business School for the Creative Industries at the University for the Creative Arts (UCA) into the sustainability of cricket gear (bats, balls and protective equipment). It is part of a wider investigation by CfSD into the sustainability of cricket equipment, apparel and clothing focussing on England and Wales while considering the global context.

Findings

Overall

The study has confirmed the findings of earlier PASIC research[35]:

- Major changes have been occurring, globally and in England and Wales, to develop the game of cricket and increase participation.
- Growth in global participation is increasing demand for gear and raising sustainability concerns, especially for sustainable supply.
- There has been little consideration of sustainability issues for cricket gear and little innovation to address these issues.
- Innovation could help to improve the sustainability and circularity of cricket gear but this will depend on satisfying performance criteria and standards.
- There is a lack of data on use of cricket gear, supply chains, markets and impacts.

Participation

Participation has been researched as a measure of success in the development of the game, and as a basis for estimating demand for and consumption of cricket gear and resulting waste.

- There is continuing growth in global participation in cricket, the world's number two sport - over 300 million people play at some level[22].
- In England and Wales around 300,000 adults play at least once a month[42]. There have been major efforts by the England and Wales Cricket Board (ECB) to increase participation after a long decline.
- Around 30% of participation in England and Wales is by people of South Asian origin.
- There has been a decline in participation in state schools (however, participating numbers were not obtained) but the game remains strong in independent schools where numbers of pupils playing and owning gear could be over 200,000.
- Affordability is an issue for participation by the less affluent, cricket being a gear-intensive sport.

Structure and governance

Structure and governance have been researched in order to understand how these are impacting on participation, use of cricket gear, sustainability performance and potential openness to sustainable innovation.

- There have been major global changes in professional cricket from the traditional game to one which is highly commercialised, for example through sponsorship, broadcasting rights and new limited over formats. These changes have fostered global growth of the game, especially in the Indian sub-continent.

- The International Cricket Council (ICC) has a prominent role in governing and developing the international game.
- The England and Wales Cricket Board ECB) is an influential member of ICC as well as governing all aspects of cricket under the Laws played in England and Wales, professional and recreational. It has been a leader in the global changes, especially in introducing limited over formats to attract spectators and increase participation.
- Many aspects of the game remain conservative and traditional. Marylebone Cricket Club (MCC) remains the keeper of the Laws of the Game, including laws on cricket gear. Although ECB has restructured the upper echelons of the game in England and Wales, traditional club cricket is the core of the game.
- Financial and other challenges to club cricket highlight the importance of ECB and other support so that emerging juniors and other participants have a club to join- - many clubs have been reducing their numbers of teams.Better data on the number of clubs would help research in estimating gear usage and waste and opportunities for sustainable use.

Regulations and other requirements on cricket gear

- ICC has established regulations on clothing and gear used in ICC international matches, mainly rulings on colour and use of logos in televised matches [23].
- Technical standards for gear are established in the MCC Laws[28]. Law 5 that specifies that bats are to be made of wood is the most pertinent.
- There are various British Standards[4] on protective gear (PPE) and balls. These are product specifications for manufacture and in some cases are fairly old and are not aligned to new testing requirements for PPE.
- The British Safety Industry Federation (BSIF) has ruled that all cricket PPE is subject to Class II Regulations[3] which have led to onerous, independent testing requirements for suppliers under UKCA (UK Certification Authority) requirements. The regulations appear to have been approved by the UK government without scrutiny and consultation on their potential impacts on suppliers and the game in England and Wales.

These standards raise challenges for the scope for sustainable innovation. Equipment performance, especially the bat-ball dynamic, is an essential part of the game. The BSIF regulations will increase costs for suppliers of PPE and raise issues of affordability and waste of non-compliant gear that cannot be placed on the market.

Cricket gear industry and market

- There is no readily accessible data on market size and mix – on who buys what – as a basis for estimating consumption and impacts.
- There is no industry association specifically covering suppliers of cricket gear, with an interest in compiling market data and lobbying on behalf of the industry. This is possibly due to the diverse and fragmented structure of cricket gear supply and a lack of perceived common interest between small specialists and global brands.

- The cricket gear supply chain for England and Wales opaque and fragmented with an estimate (from industry discussions) ofover 200 cricket gear suppliers: global sporting goods companies, UK and overseas cricket gear specialist manufacturers, 'craft' bat makers, retailers' own brands, and online 'bedroom brands'. In the last two, and many other cases, gear is 'white labelled', where suppliers put their label on imported products.
- Most bat production appears to be in India and, to a lesser extent, Pakistan, with some manufacture and finishing in England. All ball and nearly all protective equipment (PPE) manufacture is in India and elsewhere.
- There has been revival of 'craft' bat making[40] in England and Wales for niche markets.
- JS Wright[26] is dominant in global English willow supply, accounting for around 95% of supply.

Better data would help in understanding the production and consumption value chain.

Cricket gear sustainability

There are various drivers for sustainability relating to cricket as a whole and specifically to cricket gear.

- .
- In England and Wales, conformance to government policy and regulatory requirements on sustainability is a potential condition for continued financial support.
- Cricket is increasingly recognised as the sport most affected by climate change due to heat impacts on matches[2]. Climate change and disease are also potential risks to willow supply for bats.
- Wider sustainability demands on the sporting goods industry may be extended to targeting cricket e.g. supply chain environmental and social issues in sports footwear and other products have been concerns for some time.
- Changing demographics – increased participation by women and children, who are generally more environmentally concerned than the traditional male demographic.

There is no data on post consumer cricket gear waste in England and Wales but a 'ball park' estimate has been made of 2400 tonnes per annum. This estimate is for redundant gear, recognising that much may be stored in homes or elsewhere rather than being immediately disposed of as waste.

So far the response to sustainability issues has been limited.

- There has been no prominent interest from ICC on sustainability issues.
- ECB and MCC have sustainability policies and ambitions[15,29] but mostly relating to stadia. So far there have been no published sustainability strategies relating to gear and clothing
- Among cricket clubs in England and Wales, no information has been found on sustainability initiatives at any level from professional to recreational clubs.

- Among suppliers, some in England and Wales reference sourcing from sustainable English willow plantations[17,26] There appear to have been few other significant initiatives, although many bat suppliers now offer repair services to extend bat life.
- Apart from the Lord's Taverners programme[27] and some others, there have few initiatives in cricket gear and clothing reuse.
- There has been little innovation in gear compared to some other sports. R&D is happening on alternative materials e.g. bamboo bats[49], but on a limited scale.

Conclusions

Drawing on the findings to date, the main conclusions are as follows:

Sustainability impacts

- Cricket gear consumption and impacts are not large compared to many products. However, cricket is an equipment-intensive sport and there are some significant sustainability issues for cricket gear, especially willow supply for bats, which could impact on the sustainability of the game as a whole and on its future development.
- Sustainability issues, including supply chain impacts and affordability, are likely to increase from the increasing global participation already being seen worldwide and, if ECB and other initiatives are successful, increased participation in England and Wales.
- These issues need to be addressed by the many parties with an interest in the game, separately or as part of addressing the wider sustainability impacts of sports goods and clothing.
- Understanding and addressing sustainability issues and impacts will benefit from better data and more transparency about supply chains, use and markets.

Sustainability response

- Compared to some other sports and many industries, cricket has been a laggard in addressing sustainability issues, and could learn from others.
- The business of cricket is opaque, influenced by tradition, power structures and commercial interests. Addressing sustainability issues will need for openness and transparency, leaning from other industries.
- Moving forward will require innovation which will require cooperation and reconciling diverse stakeholder interests, in many cases inimical to change.
- Sustainable innovation will, especially for bats and balls, depend on stakeholder acceptability and satisfying performance standards. The ongoing bat-ball dynamic as part of the essence of the game.
- The main opportunities may lie with increasing the life of gear and circularity.
- Supporting research, cooperation and innovation will require improved and more accessible data on the use of cricket gear at all levels of the game.

Recommendations

The main recommendations are as follows:

- Stakeholder at all levels with an interest in the game should seek to understand the sustainability issues relating to gear, along with wider issues, and how they can make

a positive contribution. All can contribute to improved data and sharing of information.

- There needs to be more leadership from the sport's governing bodies on this, in setting sustainability standards for the game and influencing suppliers, and, in the case of PPE, influencing sensible regulation.
- There needs to be more leadership from the supply industry, especially the global brands in demonstrating extending extension of sustainability policy and initiatives to cricket supply chains.
- In the absence of a separate cricket suppliers association, the industry should consider suitable fora for addressing common issues and sharing information.
- There is a need for further objective discussion on issues related to sustainability, innovation and cricket gear and clothing. Platform for Accelerating Sustainable Innovation in Cricket (PASIC) offers a neutral platform for stakeholders - not aligned to any particular interests - with focus on research, dissemination and innovation (see Appendix 6)
- Standards need to be established in a consultative way, considering stakeholder concerns for value, technical performance, safety, affordability and the wider benefits of a successful game. With these issues in mind, the industry should consider a Sustainability Code of Conduct where it would add value and not duplicate codes in other sports and comparable industries.
- More research is needed on life cycle impacts and risks.
- More research is needed on innovation opportunities.

While the cricket gear industry is not large, cricket is prominent in its public following. By showing leadership on sustainability and climate change it can be potentially influential in wider sustainability uptake in the UK and internationally.

2. Introduction

2.1 This document

This document is part of an investigation by The Centre for Sustainable Design ® (CfSD) into the sustainability of cricket equipment, apparel and clothing. It presents findings on issues relevant to cricket bats, balls and protective equipment (also referred to as "gear") and makes recommendations on improving the sustainability of this aspect of cricket.

The work has focussed on England and Wales while considering the global context.

The main findings are summarised in this report. Further details are set out in the Appendices.

2.2 Background

Initial research by The Centre for Sustainable Design ® (CfSD) at the Business School for the Creative Industries at the University for the Creative Arts (UCA) has found that there is increasing recognition of the potential impacts of climate change and other sustainability issues on cricket[35]. Cricket is likely to be the sport to be most affected by climate change[2]. However, so far the focus has been on venues and playing conditions. There has been little consideration of sustainability issues relating to cricket equipment, apparel and clothing, considerable volumes of which are needed to support growing global participation.

Sustainability and climate issues present challenges to the future of the game, including sourcing and supply of some items, especially willow bats, and 'end of life' waste. In this, cricket gear has some issues in common with the global sporting goods industry which is increasingly recognising the need for change and innovation towards sustainability. In the case of cricket, there have been many changes in the game over the last 5-10 years but there has been little innovation in gear design and development over the past 100 years. The risks and pressures for change require new thinking based on research. Global growth, especially in the recreational game is already leading to innovation to meet demand, for example research at Cambridge University into bamboo bats[42] and investigation of alternative woods for bats in Brazil[36] to address shortage in supply of willow bats.

This research is in important step forward towards cricket sustainability.

2.3 Purpose

The stated objectives of the overall project are to:

- Produce a framework that provides an overview of policy, governance, standards and agreements related to the business of cricket in England and Wales in the context of the global game.
- Identify government policy initiatives in England and Wales related to 'net zero' and circular economy, and how these are or will impact on cricket (professional and amateur game) and identify the implications for cricket equipment, apparel and clothing
- Align the policy context with potential sustainable innovation opportunities related to cricket equipment, clothing and apparel, to identify gaps, challenges and opportunities in England and Wales.

- Specifically identify good practice related to new circular economy related to reuse, repair, refurbishment and recycling of cricket equipment, clothing and apparel in England and Wales, and to identify new opportunities.
- Consider the feasibility of the development of a code of conduct related sustainability, cricket equipment, apparel and clothing that would 'add value' to existing standards that cricket equipment, clothing and apparel suppliers need to comply with.
- Identify opportunities for the further development of the PASIC (Platform for the Acceleration of Sustainable Innovation in Cricket).

2.4 Scope: Issues covered

1. Cricket equipment can include all equipment that is not clothing or footwear, including bats, protective gear, balls, bags, stumps, practice nets, scoring, other support equipment, etc. For simplification, this study focuses on equipment used by players in playing the game: Bats, balls and protective equipment. 'Cricket gear' is commonly used to describe such equipment and this term is used interchangeably as appropriate in the following report. The term 'PPE' applies to all protective equipment and 'softs' to pads, gloves, etc.
2. While not directly within the scope of this research, wider social issues are a consideration in cricket sustainability. As with the global clothing and sporting goods industries, there is increasing recognition of social issues in supply chains, such as working **c**onditions and use of child labour[25]. Cricket organisations have also sought to address governance and ethical issues and raise standards of conduct including, in Britain, addressing racism e.g. the House of Lords Inquiry of 2021[20]. A focus of cricketing organisations worldwide has been on increasing participation and inclusivity as a vital part of development of the game. Availability, access and affordability of gear are issues in facilitating participation, since cricket is one of the most equipment-intensive sports. There is accordingly a link and incentive for cricket to consider social and economic as well as environmental issues in increasing the sustainability and circularity of cricket equipment

2.5 Scope: Tasks and methodology

The research on cricket gear has been conducted in parallel with ongoing research into cricket clothing and apparel, excluding footwear.

This investigation for cricket gear has been mainly based on desk research using published and unpublished sources as available to gather information supporting the above objectives. Key tasks have been to develop a framework for understanding the issues and opportunities, and specifically to identify wastes and other impacts.

The desk research has been supplemented by a limited number of expert interviews and stakeholder webinars where findings and issues with gear, clothing and apparel were presented and discussed. The support of all participants is gratefully acknowledged.

2.6 Research and analytical approach

The starting point in the research has been understanding the contextual issues relating to the game as whole, specifically participation, structure and governance, policies and standards. These are necessary precursors for understanding the scale and dynamics of the game, sustainability impacts and opportunities and barriers to change and innovation.

Participation can be considered to be a strong general indicator of the present position and growth prospects for the game and, in the context of this report, demand for and volumes of cricket gear in use as well as resulting waste.

The analysis of the structure and governance of the game considers how this is influencing development of and participation in the game. It also identifies key stakeholders and influencers in the specification, procurement, supply and disposal of cricket gear. Structure, governance and standards also influence the scope for innovation. The analysis of club cricket in England and Wales provides a basis for estimating demand for, use and disposal of cricket equipment

A notable finding and challenge for the research has been the lack of data and transparency in most aspects of the game covered by this research.

2.7 Structure of this report

This report consists of the following sections and appendices:

- Section 2, this section, states the background, purpose and scope of the overall work.
- Section 3, 'The Business of Cricket' summarises findings on contextual issues for cricket sustainability, including participation and growth, the structure and governance of the game in England and Wales in the global context, and relevant policies and standards. It includes an overview of the cricket gear industry and market.
- Section 4 summarises findings on sustainability issues and impacts, including supply chain issues and waste, relating to cricket. It summaries sustainability responses relating to gear, opportunities for innovation, identifies key stakeholders and presents a simple strategic model for the business of cricket.
- Section 5 presents conclusions and recommendations on the way forward.

Further details are provided in the following appendices.

- Appendix 1: Participation and growth
- Appendix 2: Structure and governance – England and Wales.
- Appendix 3: Equipment standards.
- Appendix 4: Market and suppliers
- Appendix 5: Estimates for waste.

3. Findings: 'The Business of Cricket': Contextual Issues

3.1 Introduction

This section summarises the findings on contextual issues affecting the sustainability of cricket gear, specifically participation, structure and governance, standards and the supply chain.

Cricket has undergone major changes in recent decades and these are continuing. At the higher level, cricket has changed from being a traditional/heritage-based game to one which is highly commercialised and professionalised, with new management and business structures. The power centre has moved from London to Dubai, ICC's headquarters. India is now a centre of influence through the Indian professional League (IPL) as well as the main centre of production of cricket gear. Traditional cricket gear manufacturers have been increasingly displaced by global sports brands and online supply of labelled 'bedroom' brands' by small suppliers. New formats, especially T20 have emerged to attract spectators and led to global growth in participation. Perhaps the biggest single change from the traditional game has been the growth in female participation.

While these developments show that cricket is open to change, it remains conservative in many respects, including (in the present context) technical issues relating to gear. These issues present challenges for sustainability and the scope for sustainable innovation.

3.2 Participation and growth

Global

There has been major global growth in participation in cricket. It is now the world's second most popular sport, especially through:

- Being the number one sport in India.
- Efforts by the International Cricket Council (ICC) and others to promote the game in non-traditional countries – often supported by established cricketing countries.
- Growth in female participation.
- High interest in the limited over forms of the game.
- Extensive TV coverage

Inclusion of cricket in the 2028 Olympics will also be a major boost for the game. Migration and refugees from South Asia are also likely to be a factor in spreading the game.

These and other factors, as well as young and growing populations in developing countries, all point to continuing growth in participation.

A survey by the ICC in 2018[22] estimated that globally over 300 million people play cricket at some level from social to elite and this number is growing.

In the context of this report there is a corresponding increase in demand for cricket gear.

Increased participation can be generally associated with increased ownership of gear compared to the past when gear was often shared through the club kit bag. This is especially the case in developed countries and the growing middle classes in less developed countries. For such groups with higher disposable incomes there are social trends towards ownership,

and consumerism, encouraged by advertising, marketing and merchandising. Bat ownership is especially attractive to brands through association with sponsored star players. It is recognised there is not necessarily a direct correlation between ownership and participation in 'street cricket' in India and Pakistan where makeshift equipment is commonly used.

England and Wales

In England and Wales there has been a general decline in participation in recent years. After a 20% decline during 2016-2018, the decline has slowed. In a 2020 survey the numbers of adults playing at least once a month at any intensity were around 294,000[42]. Appendix 1 presents the numbers and discusses some of the reasons, including the decline in participation in state schools.

It is notable that the general decline does not apply to the South Asian community which is ECB estimates to account for 30% of participation. The game also remains strong in independent schools. No detailed data was obtained but the numbers playing could be over 200,000 at senior school level and over 100,000 at prep school level (there are approximately 700,000 pupils in independent schools in England and Wales).

There has been a major effort by ECB to increase participation and inclusivity[14]. *Inspiring Generations*, is a game-wide five-year strategic plan to grow cricket in England and Wales from 2020-24, especially targeting children, women and girls and the South Asian community. Limited over forms of the game (T20, The Hundred) are also aimed at increasing interest.

If these efforts are successful there could be significantly increased participation and demand for cricket gear in England and Wales. Anecdotal evidence suggests increasing numbers of juniors coming through but no statistics were obtained. To keep young players in the game it will be important for them to have clubs to join.

If affordability of gear is a barrier to participation, sustainability or other initiatives addressing this will be beneficial.

3.3 Global structure and governance

At the international governance and professional level, the main organisations are shown here.

3.3.1 International Cricket Council (ICC)

ICC

Based in Dubai, ICC has an overarching governing role for the world game and its policies and codes include the ICC Code of Conduct for players and other governance issues affecting the world game. It organises international tournaments (but not bilateral Test matches) and appoints umpires and referees for sanctioned matches. Men's and women's cricket are organised separately under the umbrella of ICC. ICC does not govern activities within member countries and does not govern the rules or Laws of the game, including, in the present context, technical and performance requirements for cricket gear which are governed by MCC (see below).

An exception is ICC regulations for clothing and equipment used in ICC international matches, which state requirements for colours and logos used in televised matches. These requirements became an issue for use of multi-coloured gloves made from production

offcuts[19] (see Section 3.5). ICC also determines the use of cricket gear for advertising in ICC international matches. This has contributed to the dominance of the cricket bat and other gear markets by global sports brands (see Sections 3.5 and 3.6).

ICC has 12 Full Members playing Test matches and other competitions, 94 Associate Members, and 5 Regional Bodies responsible for regional development. As founder members, England & Wales, Australia and India have dominated ICC's affairs, while India is increasingly influential because of its size and financial influence.

ICC's formation and ascendancy especially reflects the commercialisation of cricket, as with many other sports, and the influence of sponsors, advertising and broadcasting rights. ICC generates funds for member countries through broadcasting rights, sponsorship and other initiatives and is a substantial business entity - its 2021 revenue was USD 44.1m. In 2022 Global Partners were: Nissan, OPPO, MRF Tyres, Booking.com, BYJU'S and Emirates. Official Partners are: MoneyGram, Bira91, Coca-Cola, Star Sports and Upstox. Category Partners are: Royal Stag, Jacob's Creek and Dream11. ICC has media arrangements with Star Sports (Fox) (see ICC website). These sponsorship details are noted here to illustrate that this injection of finance has considerable implications for the development of the game and generating audience following and participation. It also illustrates the commercialisation of the game and the influence over the supply chain. One of the current Global Partners, MRF, is also a major cricket equipment brand and player sponsor[37].

ICC Full member countries

These are the 12 countries that play test matches (in order of admission): England, Australia, South Africa, West Indies, New Zealand, India, Pakistan, Sri Lanka, Zimbabwe, Bangladesh, Ireland, Afghanistan.

ICC Associate Members

These are the 94 governing bodies in countries where cricket is firmly established and organised but which have not yet been granted Full Membership. Many of these represent significant non-traditional areas of growth for the game, such as the US and continental Europe.

ICC regional bodies

Regional bodies have been established to organise, promote and develop the game in their respective regions: Asian Cricket Council, European Cricket Council, African Cricket Association, ICC Americas, ICC East Asia-Pacific. For example, the European Cricket League has just started and the US Cricket League is about to take off.

As noted in Section 3.2, the growth in participation from these regional developments has major implications for increased global demand for cricket gear. In some cases, such as Brazil, demand has outstripped supply and led to efforts to find suitable local alternatives to willow for bats[37].

3.3.2 Marylebone Cricket Club (MCC)

The MCC governs the Laws of the Game, a position it has held since 1788. In the present context, MCC establishes specifications for clothing, bats, balls and protective gear[28]. These Laws are summarised in Section 3.5 and Appendix 3 together with other standards

The requirements apply to the professional game and to all recreational cricket played within the Laws. For gear they are especially concerned with performance, especially the bat-ball dynamic. For example, following the. Dennis Lillee aluminium bat incident of 1979[47], the Laws have specified that bats must be made of wood so as not to damage the ball or give undue advantage to the batter.

The Laws do not apply to leisure cricket played outside of the Laws, such as junior cricket where plastic bats and soft balls are often used. In practice, most recreational cricket is played within the Laws and the vast majority of gear is aligned with the Laws.

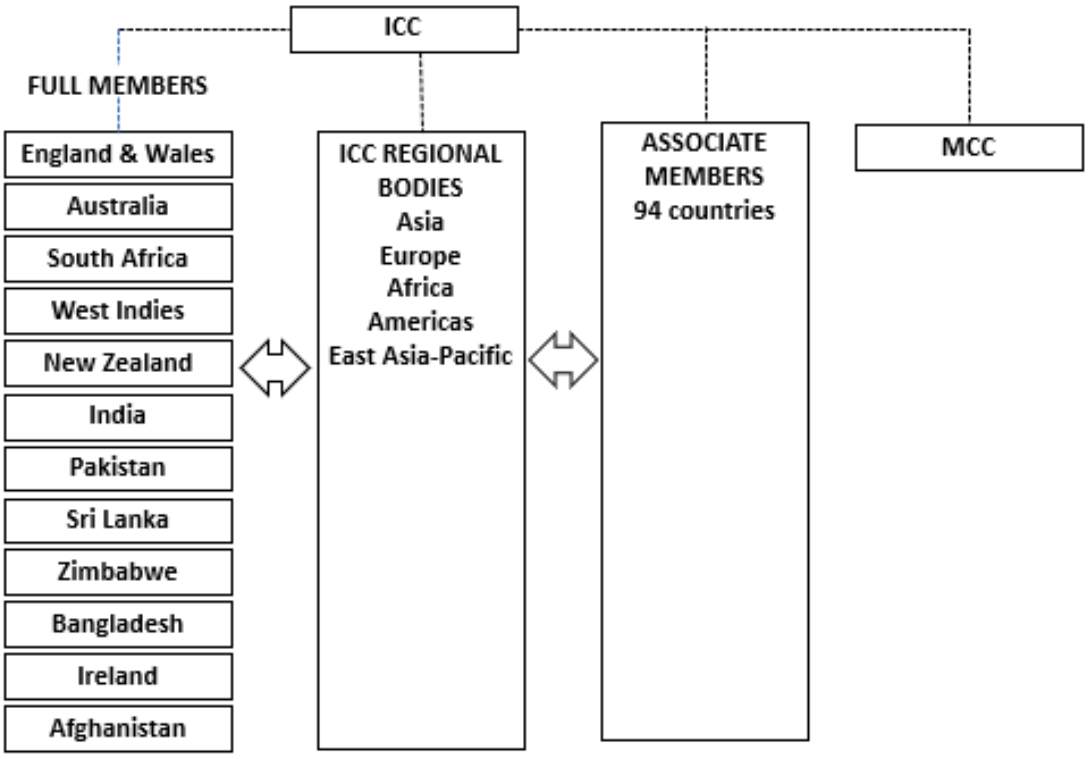
MCC has a sub-committee dealing with the Laws. From the MCC website, changes in the Laws mainly relate to play and only rarely lead to changes relating to gear.

3.3.3 Federation of International Cricketers' Associations (FICA)

FICA co-ordinates the activities of all the national players' associations that represent professional cricketers and has a representative on the ICC's Cricketing 'Playing' Committee. One of FICA's goals is that cricketers should have an input to all decisions affecting the professional game.

Figure 3.1 is a simple illustration of the international structure.

Figure 3.1: International structure of cricket



3.4 Structure and governance in England and Wales

Beneath the international structure the game is organised throughout the world at many levels through national cricket boards or associations, and cricket clubs at professional and amateur recreational, as well as at leisure recreational levels.

As noted above, this research focuses on England and Wales. Here the professional and recreational club game is run by the England and Wales Cricket Board mainly through 39 County Cricket Club Boards (18 First Class Counties and 21 National, previously Minor Counties) and an estimated 6500 ECB affiliated clubs[11]. In addition, there are independent clubs and leagues and various levels and types of recreational leisure cricket, including Saturday and Sunday leagues and schools cricket.

The general structure is summarised here and further notes are provided in Appendix 2.

3.4.1 England & Wales Cricket Board

ECB governs the game in England and Wales, including national men's and women's' teams, county championships and other competitions, professional and other standards, and general support (including financial), development and promotion of the game. It has become a substantial organisation in fulfilling these multiple roles and its total staff in 2021 was over 400, including players, coaching, umpires, administration and commercial. With a turnover of £207 million in 2020/21[13.] ECB is funded by revenue from ICC, spectators, sponsorship, broadcasting and some government support. The main sources are normally sponsorship and broadcasting. Government support is currently a small part of total revenue, although ECB has received considerable development funding in past years. In 2020/21 ECB received funding of £1.9m from the ECS Lottery Fund from Department of Culture, Media and Sport (DCMS) through Sport England. The specific purpose and form of this funding needs to be clarified. In that year ECB also received £190,000 from the Skills Funding Agency for cricket apprenticeships.

3.4.2 The professional game

First Class County and other professional clubs and teams

Supported by ECB, the professional sport comprises the clubs and teams playing First Class Cricket (as defined by ICC) at professional level: First XIs of the 18 First Class Counties, MCC, 6 Women's Regional Hub teams, and the new 12 city-based Hundred teams. Competitions include the County Championship, one-day, T20 and Hundred matches. The teams involved are listed in Appendix 2.

Although a small part of overall cricket participation and activity, the professional game is highly influential in developing and promoting the sport, for example in attracting spectators and interest , inspiring young people to take up the game, and providing coaching and other support to the amateur game. In the context of cricket gear, professional teams and players have an important role in product endorsement and marketing. Top players' use of sponsored cricket gear on TV is a major promotional medium for suppliers. In this the global 'lifestyle brand' sports goods companies are prominent (see Section 3.6).

Individual professional clubs (the 18 first class counties) receive funding from various sources including ECB, matches (entry and hospitality), members' subscriptions, commercial income (broadcasting rights and sponsorship) and other income (from trusts and other sources).

Total revenue and the mix will depend on the club and its access to revenue sources. There has been a divide in the past between those hosting highly lucrative test and other international matches and those which do not, although new competitions have attempted to address this. All have been subject to common financial and other business challenges, including COVID.

Reflecting the commercialisation of the professional game, professional clubs (as described above and in Appendix A2.2) are effectively businesses, with significant revenues and outgoings, including player, staff and other operating costs. Appendix 2.4 illustrates the income for Yorkshire Cricket Club (YCC), one of the major clubs[44]. ECB support has been important. In 2019 YCC received nearly 60% of its £18m income from international test matches and 14% from ECB. In 2020, the first year of COVID, revenue halved to £8.8m and ECB support doubled to £4.4m. Commercial income was 14% of revenue in 2019 and 10% in 2020. The club also suffered severe financial consequences following the Parliamentary Inquiry into racism at the club[20], by being required to forfeit a test match.

The constitution of First Class County Cricket Clubs varies with the club. Typically they (as well as many recreational clubs) are incorporated as Registered Societies while Yorkshire Cricket Club is incorporated as an Industrial and Provident Society. In some cases, the backing of trusts has been significant e.g. The Colin Graves Trust has been a major backer of Yorkshire in the form of reported £15m of loans to rescue the club from bankruptcy in 2000. Individual or other backers are also important. Hampshire CCC appears to have a more overt business model, being registered as a Private Limited Company, with Rod Bransgrove its major backer.

The Professional Cricketers' Association (PCA)

PCA is the representative body for past and present first class cricketers in England and Wales. Its professional members are players registered to play First Class Cricket.

It should be noted that, in considering the terms 'professional' and 'amateur', the simple definition generally used now in the sport is that a professional is someone one who is paid to play. There is some blurring here between full professionals and semi-professionals who receive some payment. In the past there were historical issues, now abandoned, in the 'gentlemen v players' term, where amateurs receiving payment for taking time from work for games were treated with disdain by 'gentlemen' not needing payment. There are also overlaps between the professional and recreational game. County Second XI teams play against recreational clubs, professional and former professionals play in recreational leagues. Overseas professional players have traditionally played in higher echelon recreational league clubs, as 'hired guns'. Sometimes this is temporary e.g. during visa preparation before playing for County Clubs, or for fitness preparation for injured members of touring teams. Sometimes the arrangement is for a season or more where clubs may also arrange a full-time or part time job.

3.4.3 Recreational amateur (Club Cricket)

The higher levels of the recreational game include many clubs playing in county-based leagues (see Appendix 2):

- 21 National County Clubs (before 2020 they were called the Minor Counties) playing in the National Counties Championship and other competitions. Competition at this level also includes the 2nd XIs of First Class Counties. Management of the National

County league and competitions is by the National Counties Cricket Association (NCCA) under ECB.

- 29 ECB Premier Leagues and clubs, intended to raise the standard of top tier club cricket, include around 285 teams.
- County and other regional and local leagues: There are over 400 teams in the upper divisions which also act as feeders for the Premier Leagues to allow promotion and relegation. There are also many leagues and divisions for second, third and fourth even fifth teams, etc, and a growing number of women's' leagues.
- The 3 non-ECB affiliated county-based leagues with 82 clubs (Lancashire League, Central Lancashire League, Yorkshire and Derbyshire League).
- The independent South Asian leagues. The number of leagues is estimated to be 13 but this number needs to be confirmed.

Past political issues may have led to some of the separations from the ECB, including, in some cases, objections to the major restructuring to from the ECB Premier Leagues. The Lancashire League is a famous old-established league which chose to stay independent. There may also have been North v South issues in attitudes to the ECB.

As noted in Appendix 1, the historical separation of the South Asian leagues has stemmed from cultural and community cohesion as well as racism. More recently this has also stemmed from real or perceived lack of access to ECB leagues and support (see Appendix 2.5).

Recreational cricket clubs - at all levels - operate with management and support organisations as well as players. They typically operate with limited resources as not-for-profits, depending on membership subscriptions, voluntary effort, sponsorship and advertising, endowments and other revenue sources, or non-financial support e.g. local councils often provide ground facilities. ECB is a major provider of funds to clubs as part of support and development programmes, mainly run through County Boards.

Extensive survey and other research and would be required to analyse the state of the club game across thousands of clubs but it is likely to be a similar story in many cases that finance is a challenge overcome by the "love for the game". Taking Yorkshire as an example of a populous county with a great cricket tradition and an extensive range of leagues and clubs, Appendix 2.5 illustrates the structure and issues in the game here.

Many other examples of First Class and National Counties could be presented showing similarities and differences from Yorkshire, reflecting size, population, social structure, history, leading personalities and other factors. A key factor is access to finance and other resources for developing the game, and maintaining clubs and teams in the face of declining participation so that emerging juniors have club to join.

Further data has been sought from ECB on structure and participation at recreational club level but this was not available for the present report.

3.4.3 Recreational leisure

There are various levels of recreational leisure, recognising that there is no firm boundary between recreational amateur 'club ricket', played at higher levels in typically more competitive Saturday leagues, and recreational leisure, typically played in Sunday 'friendlies' and 'social' games at lower levels. Many players play in both Saturday and Sunday leagues.

The general recreational leisure game includes:

- Organised leagues and clubs: Sunday local leagues and clubs; village cricket.
- Schools cricket: Independent and state schools.
- Informal: 'Park' cricket, friendly cricket, indoor cricket.

No data was obtained on the structure and numbers of clubs and participation within and outside of clubs at these levels.

As noted above, cricket in private schools represents a major part of the recreational game in England and Wales. Total numbers attending private schools are over 700,000 (Independent Schools Association). For the many of the 200,000 or more `boys over 12 – and increasing numbers of girls – cricket is part of the school curriculum. Private schools also have a major role in developing talent, being, rightly or wrongly, the main pathway to the professional game. Besides individual schools being leaders in cricket development, the English Schools Cricket Association have major role in schools cricket.

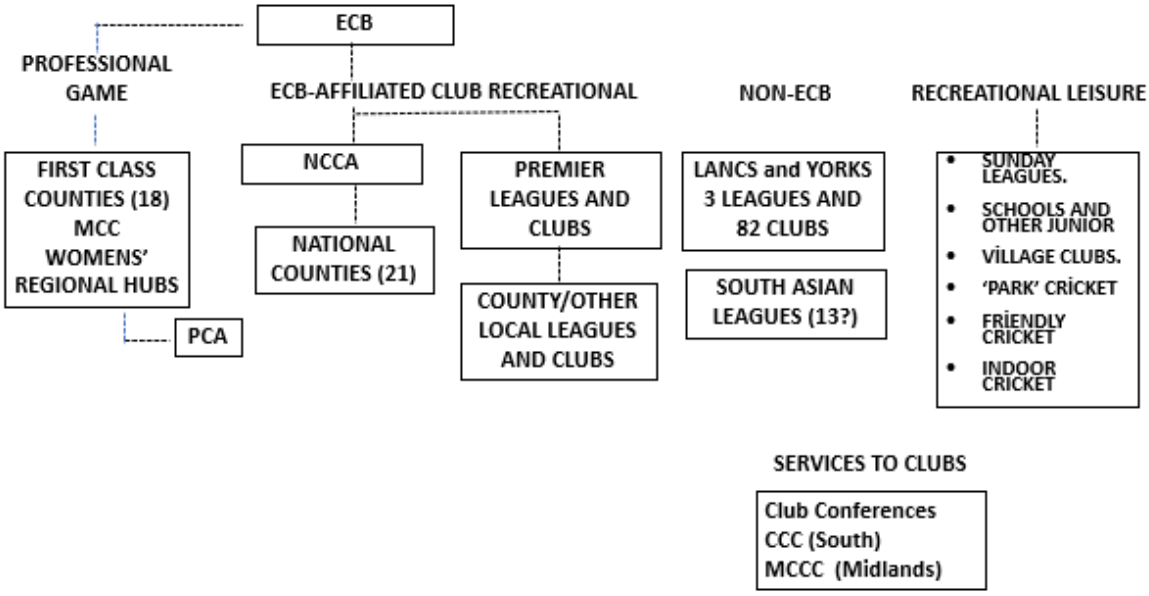
While cricket has been in decline in State schools, there are still substantial numbers of secondary schools where cricket is played and efforts to develop the game, especially by County Cricket Boards and other organisations. Recent efforts by ECB have been targeted at increasing participation in primary schools[15].

No detailed data was found on organisation and total participation in either state or private schools.

Besides ECB and public support, various organisations provide services to member clubs e.g. the Club Cricket Conference services the south of England and the Midlands Cricket Club Conference (MCCC) in the midlands. There does not appear to be an equivalent in the north.

Figure 3.2 provides a simplified illustration of the structure of the game in England and Wales

Figure 3.2: Cricket structure in England & Wales



3.5 Standards

Various standards apply to cricket gear as shown here.

ICC Regulations on Clothing and Equipment

As noted above, these ICC Regulations mainly specify the use of colours and logos on clothing and equipment in televised ICC International matches. The ban on Sam Billings' use of multi-coloured Gray-Nicolls batting gloves made from production offcuts[19] was a result of contravening these colour regulations.

There is a general requirement to follow the MCC Laws on cricket equipment (see below) in ICC matches. Also, since January 2017, if any player elects to wear a helmet when batting in an ICC match, it must be compliant with the British Standard for cricket helmets BS7928: 2013 (see below).

The ICC Regulations do not apply to non-ICC matches and it is for member country cricket boards to set their own rules on matters not stated in the MCC Laws. The Gray-Nicolls gloves referred to above are being used outside of ICC matches. However, given the domination of branding and importance of player sponsorship ICC rulings have major impact on product standards, markets and supply chains. The ICC rules for equipment permit their use for advertising, recognising this as a reasonable source of income for sponsored players. However, according to the rules laid out by the ICC, a company does not need to be manufacturing bats itself to be allowed to have its logo on a player's bat. This means that any company can purchase bats from Indian manufacturers such as SG, SS, BDM, and BAS, put their own labels on the bats and market them. The company can then complete a bat logo deal with a top player and become a 'registered sponsor' with the ICC[39].

Because of this, and the refusal of ICC to allow the real manufacturers to be acknowledged in labelling, is widely alleged that the global brands are using cricket for advertising rather than having a genuine interest in the game. The association of brands with star players is a powerful marketing pitch. This situation reinforces the lack of transparency in the supply chain of cricket gear (see Section 3.6).

MCC Laws

The MCC Laws govern rules and equipment. Relevant MCC Laws are as follows (see Appendix 3 for details):

- Law 4 specifies the size and weight of the ball.
- Law 5 and Appendix B on the size and composition of the bat: the blade of the bat must be made of wood and the handle principally cane or wood.
- Appendix E: Restrictions on the size and design of the gloves used by the wicket keeper.

The MCC Laws apply to all cricket applied within the Laws, including the professional game, as well as recreational club cricket. As noted above, they do not apply to recreational cricket played outside of the Laws, including social and child levels. However, the Laws will nevertheless influence most of the recreational game by influencing practice by suppliers and players.

A key issue for this research is the degree to which there is scope for innovation to achieve technical and performance standards with alternative materials which may be more sustainable, for example bamboo for cricket bats - see Section. 4.5.

British Standards (BSI)

BSI in the UK has published a series of technical standards related to the production of cricket gear but there is no standard related to cricket bats. These standards are relatively old and some have been withdrawn. Appendix 3.2 states the scope and currency.

As noted above, BS7928:2013 on the design and manufacture of head protectors has been adopted by ICC as the standard for its own international matches.

The standards for 'soft' PPE have not been updated to align with developments in safety standards, specifically requirements for testing – see the following section.

British Safety Industry Federation (BSIF)

BSIF is responsible for enforcing regulations applying to PPE of any type. EU Regulation 2016/425 on Personal Protective Equipment was directly applicable in the UK from 21st April 2018. The enforcement and sanctions system was implemented into UK law by the Personal Protective Equipment (Enforcement) Regulations 2018 (SI 2018 No. 390). The EU Withdrawal Act 2018 preserves these regulations and enables them to be amended so as to continue to function effectively now that the UK has left the EU.

The Regulations state classifications and requirements according to risk. Under previous regulations, cricket gear 'softs' were classed as Class 1 and subject to self declaration on testing and other requirements.

BSIF has stated (and confirmed in 2021) that all personal protective equipment worn in cricket, including as leg pads, gloves, body protection as well as helmets, etc. falls within scope of the PPE Regulation and is classified as Category II PPE[3]. This means that:

- All products need to be conformity assessed by an independent body (design and performance) in line with the Category II rules detailed within the Regulation.
- All economic operators within the supply chain must ensure that PPE placed on, and made available to the market, meets the essential safety requirements of the Regulation.
- Products also need to be appropriately labelled, including the CE mark (or relevant UK Conformity Assessment for UK and Northern Ireland (UKCA)/UKNI mark) and be accompanied by the required documentation, such as a Declaration of Conformity and Instructions for Use in a language likely to be understood by a wearer. All suppliers of protective cricket equipment, whether they are a manufacturer or brand owner, importer or retailer (distributor), must be aware of the legal obligations applicable to their role in the supply chain and ensure they comply with the Regulation.
- Products must be retested for chemical safety if there is a change in colour.
- Helmets must not be used if they have been compromised.

Furthermore, this law now contradicts some of the BSI 'softs' product standards that required manufacturers or suppliers self-testing

There has been wide objection to this classification for PPE other than for helmets, on the grounds that requiring it for 'softs' is imposing high costs with minimal safety benefits, and that Class 1 is more appropriate. From discussions with suppliers and others:

- There is no risk of fatal injury from an untested or slightly damaged item.
- Logos and colours change frequently but testing for every item, left and right, all sizes, is required even when there is no skin contact.
- The cost of testing is high for soft PPE suppliers, especially small manufacturers who will be less able to bear it than global sports goods suppliers.
- Costs are likely to be passed on to consumers and impact on affordability for clubs and players.
- Existing untested stock held by suppliers and clubs produced after December 2021 must be discarded.
- Retesting is required at specified intervals.
- Slightly damaged gear held by clubs could be required to be discarded.
- The volume of testing required for all products does not match the availability of testing organisations (presently there are only 2 or 3).

In the case of helmets there appears to be no definition on what 'compromised' means as a small crack is difficult to see.

Grades for willow and bats

Grades for willow and bats are a form of standard but these are industry-led rather than set by a standards or other body and developed from the craft of bat-making. Various companies have developed their own standards. The JS Wright[26] system (see Appendix A 3.6) identifies 5 main grades of willow wood used in blades according to grain width and other features (there are also further sub- grades). There are 5 main grades each for English and Kashmir willow. While the willow Silex Alba Caerulea is the same species in both cases (Kashmir willow was originally planted from English willow), different climatic and growing conditions result in differences in the wood and performance, for example grain width, density, moisture content and requirements for 'knocking in'. In general, a grade 1 Kashmir willow bat is considered equivalent to a grade 2 English willow. A major difference is price, Kashmir willow bats being much cheaper. For this reason, Kashmir willow bats are often recommended for less experienced players and juniors. Gunn and Moore has its own system (see Appendix A 3.7) and this is regarded as the industry standard.

A key issue for the cricket industry is the availability of top grade willow to meet growing demand.

3.6 The cricket equipment market and suppliers

Data was sought on market and suppliers in order to assess the scale of sustainability issues, in particular to estimate cricket gear consumption and waste in England and Wales.

Obtaining data and information on the cricket equipment industry and market, globally and in and England and Wales industry proved to be challenging.

- There is an overall lack of transparency of information in the cricket sector.
- As discussed below, there is some online market survey data but this is expensive and of uncertain quality and currency.
- There is no cricket gear industry organisation compiling such information in England and Wales. The gear market is fragmented and dominated by global sports goods suppliers for whom cricket is a small part of their business. There is no apparent

common interest between these companies and small specialist cricket gear suppliers.

- No global sports goods firm responded to requests for interview whereas small cricket specialists were helpful.
- There is a UK Sports Goods Industry Association (SGIA)[34] but no cricket data appeared to be available, and cricket is just one of many sectors covered by SGIA.
- There is also the World Sporting Goods Industry Federation but no data on cricket was found from this source.

Market size and growth

No readily accessible information was found on the size of the England and Wales market for cricket gear. Web searches showed a plethora (15 or more) of commercial market research firms selling global reports on cricket equipment (bats, balls, protective equipment) all costing USD3000 - 5000. These advertise content without revealing numbers and all appear to be very similar, as if from a single source. Besides the prohibitive price, the currency and quality of the data is uncertain. They also claim the data provided as being their intellectual property (IP), which would create issues for use in publicly available research.

The only numbers provided in these reports – in the public domain - are the current total global market value, in most cases claimed to be around 13 million USD, and, with a 3-5% growth rate, projected to be around 17 million USD by 2028. This number appears to be small, considering ICC's participation estimate of over 300 million adults. These reports claimed to provide a detailed breakdown by geographical and other market segments.

As an anecdotal indication of the market, Alan Mace of Slazenger estimated the UK market alone to be £34 million in 2016[7]. As a sense check, from participation estimates (see Appendix A1.1), with over 500,000 adult and junior participants, the current England and Wales bat market alone could be around 100,000 bats per year. With a conservative average price of £150 (including junior bats) the current bat market would be £15 million and is likely to be more. Adding other gear would put the UK market well over £30 million

Globally most growth in participation and demand for gear is well known to be in the Asian market, especially India and Pakistan, which also has many suppliers. Here, there may be no simple correlation between participation and the equipment sales. Much participation is in street cricket using reused and makeshift equipment such as taped tennis balls e.g. "tape ball cricket".

Market segments

The cricket equipment market in England and Wales can be segmented in various ways

- Equipment type: Bats, balls, protective gear, etc.
- Equipment grade, quality and price: Upmarket brands versus cheaper, especially in the case of bats.
- Age: Adults, junior – various age groups.
- Sex: Males, females.
- Geography.
- Distribution channel:

- On-line (major sports and cricket suppliers; manufacturers' direct; club shops; 'bedroom brands').
- Retail: Sports chains, speciality stores, coaching centres, etc.

- Customer types: Individuals (professionals, club recreational, leisure/social), associations, clubs, schools.

The market reports mentioned above claim to have some of this information, but no accessible data was found on the market mix.

Suppliers - general

Historically, and to some extent still in the case of bats, cricket equipment production has reflected a game steeped in tradition. In the past, the industry and market was dominated by old-established English cricket specialist firms. Today, global sporting goods suppliers dominate the market.

Slazenger was the first sports goods manufacturer to enter the cricket market in the 1930s. In the past 10-15 years Slazenger has been followed by other sporting goods companies such as Adidas, Nike, Puma and New Balance. Published information on their reasons for doing so was not found. For all the 300 million global participants mentioned above, most of these are in India where prices for gear are much lower than in Western countries. It is not evident that the international cricket gear market is as large and profitable to attract the level of market entry and competition that has been observed. However, as noted in the above discussion on ICC sponsorship, it has provided a considerable advertising opportunity for promoting their brands, especially through player sponsorship, labelling and TV coverage. These global sports goods brands have collectively come to be known as 'lifestyle brands', not necessarily driven by love of cricket, a feature of the traditional game and equipment industry.

As with many industries, production is predominantly globalised and outsourced. Most production of cricket gear is in India and, to a lesser extent, Pakistan, by specialist cricket and sporting goods manufacturers supplying the large home as well as export markets. The larger Indian manufacturers (there are many smaller firms) include SG, SS, BDM and BAS. In order to compete, most have become contract manufacturers for global brands. Some companies (e.g. Sanspareils-Greenlands - SG) produce and market their own brands as well as providing outsourced production under contract to global firms – effectively in competition against their own brand products.

The incursion of the global firms had been disruptive and regarded by some as detrimental to the cricket industry in India. Among the major cricket manufacturers, BDM refused to become a contract supplier.

"Once the multinational companies came, they took charge and put their stickers on the bats. And they are ruining our industry" Rakesh Mahajan, BD Mahajan & Sons[46]

Faced with competition from cheaper imports, the main traditional English equipment suppliers have mainly followed suit, offshoring manufacture of balls and PPE and in many cases, parts of the bat production process. This partial outsourcing involves making the bat blades in England, shipping them to India for part production (especially joining the handle to the blade), then returning them to England for finishing, packaging, sales, and distribution and retailing.

The main traditional English cricket manufacturers have themselves tended to be taken over by larger sports goods firms, for example Gunn & Moore by Unicorn, Gray-Nicolls by Grays International and Slazenger by Sports Direct.

Bat-making

Bat-making deserves a special mention as bats are so central to the game and involves very different production processes to other gear.

Bat making is distinct from many other industries in involving considerable manual and craft skills, especially for quality bats, even when there is some automation, as in the larger bat factories in India which employ up to 1000 people (compared to the largest in England employing around 30). The nature of the process for willow bats, including shaping and pressing, mostly does not readily lend itself to automation – using a bat press is the defining characteristic of bat manufacturer, and having a 'feel' for the wood since every piece is subtly different. It is for this reason that bat-making in India is concentrated in Jalandhar (Punjab) and Meerut (Uttar Pradesh) which are craft hubs. Rossiter et al[38] have prepared a podcast showing the processes. It should be noted that technology is applied in larger scale manufacture for certain activities and can even be applied to small scale manufacture. For example, B3 in Nottingham uses CAD and CNC technology for producing custom-made bats.

Traditional cricket bat making in England and Wales has been identified as a 'heritage' craft industry in danger of dying out due to costs and other disadvantages but in recent years there has been a resurgence in craft level manufacturing[40] with over 50 firms now in business. These have developed niche markets, often local, sometimes using local willow and selling to local players and clubs (see Appendix 4 for examples).

Besides the old-established firms such as Gunn & Moore (GM), some UK firms have been established by former players e.g. Duncan Fearnley, Kippax and, more recently Paul Aldred. Player endorsement is highly prized in marketing, especially star players e.g. in the 2000s the new established Woodworm brand signed up Freddie Flintoff and Kevin Pietersen which was a key issue in raising their profile.

Distribution and retailing

Cricket gear distribution and retailing has similarly seen many changes. Specialist cricket store retailing is now rare and stores are mainly part of sports goods chains. The main change has been the move to e-commerce platforms and online shops provided by suppliers (factory direct, or from retailers/ distributors). Historically, mail order firms for cricket gear existed but there has now been a shift online.

Such changes have allowed small distributors to compete with larger retailers and small manufacturers to find a market niche by cutting distribution costs. It has also allowed the emergence of 'bedroom' or 'white label' suppliers, for example importing unbranded bats and adding their own label. While individually small, collectively they are believed to account for a significant share of the market and, while offering more affordable bats (e.g. Village Cricket[50] sells low cost bats made from Kashmir willow) present a threat to craft manufacture as well as making inroads into global suppliers' markets.

Some retailers also have their own brand cricket gear, again 'white labelled.'

A feature of the online market is heavy discounting, adding to the already severe competition and profits squeeze on manufacturers with production overheads.

No data was obtained on market shares.

Balls and PPE

Production of cricket balls and PPE is mainly in India and Pakistan but has also spread to Bangladesh, China and elsewhere.

The production and supply chain of balls and 'soft 'gear resembles that of cricket clothing in some respects e.g. in involving cutting and stitching and lending itself to modern production processes to some degree. However, production processes in Asia are still likely to be labour intensive using basic production technologies e.g. sewing machines for clothing and gloves, etc.

Willow suppliers

Willow suppliers are an are also important in the bat supply chain. As noted above, around 95% of the world's supply of English willow for cricket bats is provided by JS Wright which has its own plantations, mainly in East Anglia, as well as buying willow from farmers throughout England and Wales. JS Wright is highly influential in the market, especially in the quality and price of wood sold to bat makers. For example, it only sells mixed grade batches of wood and treats all customers equally, although the large Indian manufacturers such as SG will have most buying power. There is not enough top grade willow available to meet demand and prices have been rising steeply.

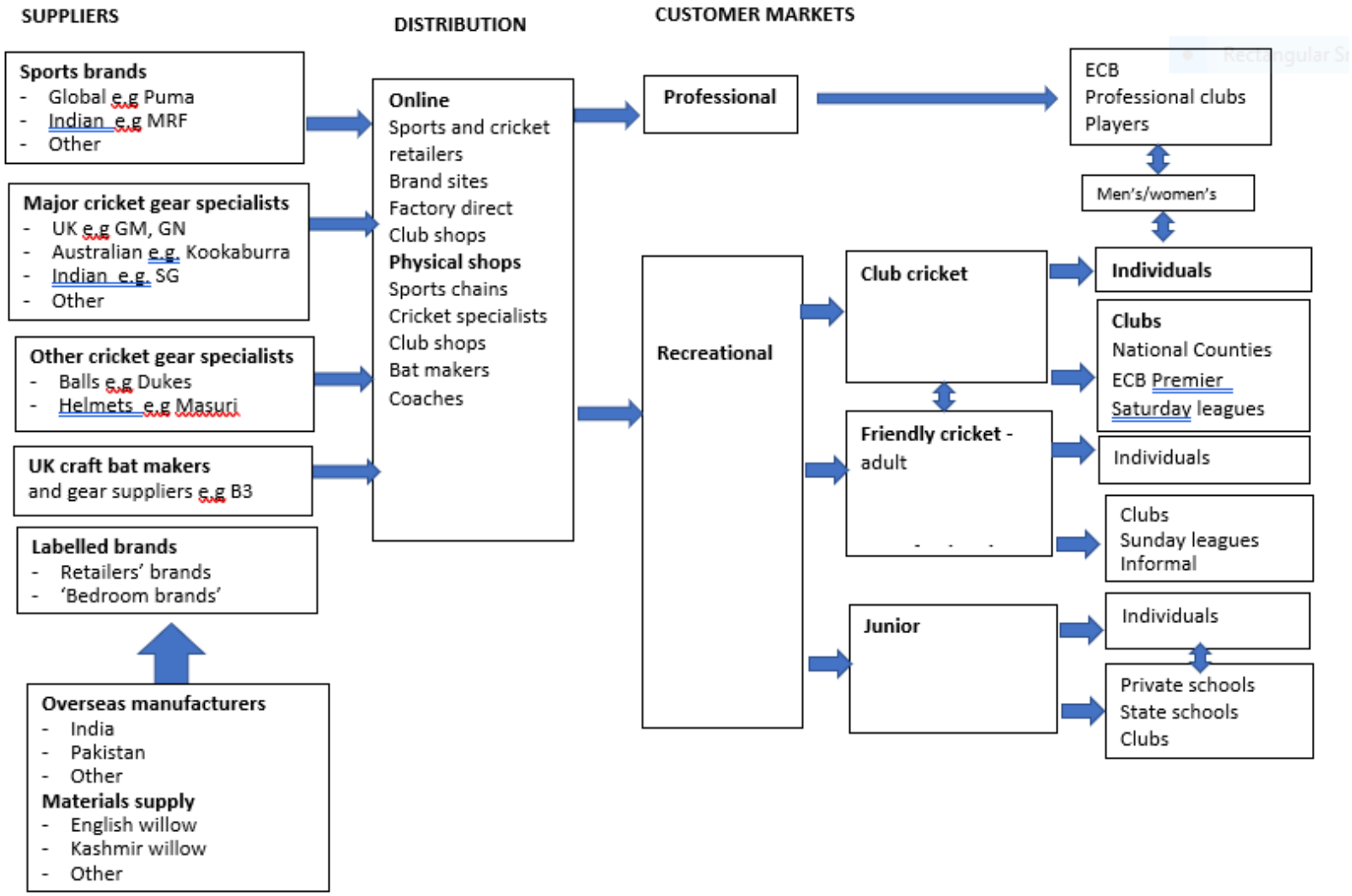
Structure of supply chain and market in England and Wales

It has been anecdotally estimated that there are up to 250 suppliers of cricket bats and other gear in England and Wales. However, there is no official data available. From the above, suppliers of cricket gear in the UK which are involved to at least some degree in the supply chain can be categorised as follows (see Appendix 4 for examples):

- Global sporting goods brands e.g. Adidas, Puma, New Balance.
- Major Indian sports brands e.g. MRF.
- Major UK cricket manufactures e.g. GM, Gray Nicolls, etc.
- Major international cricket specialists e.g. Kookaburra (Australia), SG (India).
- Smaller 'craft' bat manufacturers and gear suppliers e.g. B3
- 'White labellers' badging imported bats and other gear e.g. Retailers' own brands, 'bedroom brands'.

Using information on participation and the structure of the game, Figure 3.3 illustrates the cricket gear supply chain and market in England and Wales. This does not include a full value chain of primary and intermediary manufacturing and materials supply.

Figure 3.3. Cricket gear supply chain and market in England and Wales



4. Findings on Cricket Gear Sustainability

4.1 Introduction

This section provides a summary of sustainability issues in cricket gear production and consumption, including drivers for sustainability and responses so far by governing bodies suppliers and others.

While not a large industry compared to, for example, mass consumer products, there are some significant sustainability issues for cricket gear which could impact on the sustainability of the game as a whole and on its future development.

As an equipment-intensive sport, sustainability issues are likely to increase from the increasing global participation already being seen worldwide and, if ECB and other initiatives are successful, increased participation in England and Wales (see Appendix 1).

These issues need to be addressed by all parties with an interest on the game, separately or as part of addressing the sustainability of sports goods and clothing.

4.2 Drivers for sustainability

Drivers for sustainability affecting the game globally and in England and Wales are summarised here.

Global sustainability imperatives

- The imperative to transform the world to a more sustainable direction, as set out in the UN Sustainable Development Goals (SDGs), and create more circular economies, applies to all activities and sectors.
- Throughout the world, countries and organisations are committing to decarbonisation and this will have far-reaching impacts. Cricket has been identified as the sport most likely to affected by climate change. The heat impacts in India and the UK recently and in recent years in Australia, threaten the playability of the game in traditional seasons. Due to the record temperatures in England in July 2022, the playing times for some County Cricket games were adjusted during a 'heat wave'.

Reducing negative impacts

- As a gear-intensive sport, played by over 300 million people, cricket gear has significant life cycle environmental and other sustainability impacts, including generating waste (see below).
- Across all sports there are growing pressures to make equipment, clothing and apparel, as well as venues, more sustainable. This is not just because of the direct impacts, but because of the positive influences and leadership, through setting an example, that players and sport can bring to wider society.
- Since the 1990s there have been growing concerns about sustainability issues in supply chains for sports apparel and footwear, especially use of child labour. Such concerns have spread to some sports gear and led to specific initiatives e.g. the PLEDGE initiative for football suppliers.

UK Government policy

- In England and Wales, cricket is subject to UK Government sustainability and climate policy and commitments to the extent that these impact on its operations directly or indirectly under regulations or as a condition of government support. For example, ECB has specific obligations as a recipient of public funding from the Department of Digital, Culture, Media and Sport (DCMS) through Sport England. Through this the government has some leverage. For example, the game has been warned that government funding could be withdrawn if it fails to clean up its act on racism[20].
- UK commitments to greenhouse gas reduction and circular economy under COP26 and EU obligations are presently in a state of flux from political instability within the government and post-Brexit. However, these commitments remain general drivers for change across the economy, without specifically singling out sports in general or cricket in particular.
- Sports in general, and cricket specifically, are not key sectors for greenhouse gas reduction, except to the degree that emissions from stadia, events and other activities are within general national targets for buildings and transport energy reduction.
- Sports and cricket gear manufacture and supply is a small part of the carbon footprint of general manufacturing and supply but could be included in any future carbon tariffs on imported goods.

4.3 Sustainability issues and impacts

Sustainability issues and impacts of the game globally and in England and Wales are summarised here. This summary is mainly qualitative since no life cycle information was found for cricket gear. The focus is on environmental impacts while recognising social impacts in supply chains.

4.3.1 Resource use and other life cycle impacts

While not a comparatively massive user of resources compared to many other industries, increasing production of the various cricket gear items, together with packaging, account for significant quantities of materials globally. These include the impacts of:

- Willow (bats), cane (bat handles) and cork (balls) production.
- Leather for balls, gloves, pads.
- Plastics, rubber and fabrics in bats, gloves, pads, etc.
- Plastics in junior bats, balls, etc
- Plastics and metals in helmets.
- Plastic and other materials in packaging.

Willow, cane and cork are natural materials which can, in principle be harvested sustainably. However, burgeoning demand is placing pressures on supply. There is a shortage of top quality willow (the willow issue is considered separately below) while rattan cane for bat handles is understood to be from wild sources – mainly Sarawak and elsewhere in Malaysia and Indonesia. It is not known if this practice is sustainable.

Leather production is well known to a potentially highly polluting industry as well the greenhouse and other impacts of cattle rearing. Most of the leather production for cricket is in India and it is not known if any cleaner production practices are followed in sources.

In being mostly sourced from petroleum and contributing to the global plastics waste problem, use of plastics has inherent sustainability issues.

The following can be added too the resources used in products and packaging:

- Resources used, pollution and other impacts of production and shipping, including the carbon footprint of any shipping as part of the production process e.g. where willow is sent to India for bat manufacture and returned to England for finishing. Using standard shipping distance and emission factors, a simple calculation shows that shipping willow to India and returning it to Britain adds approximately 0.4kg of CO_2- e per bat.
- Other impacts of production and shipping, for example methyl bromide (a powerful ozone depleting fumigant) has been commonly used in shipping willow[48].

Material resource efficiency and sustainability needs to be considered as part of wider sustainability demands on sports goods, including ethical issues in supply chains.

4.3.2 Waste

No data was available on production, consumption, product life and waste from cricket gear, globally or in England and Wales, but the quantities are likely to be globally significant from over 300 million people playing the game. Post consumer waste from use of cricket gear will arise after disposal from such sources as:

- Damaged or soiled gear at 'end of life'
- Users seeking performance/quality improvement.
- Teams changing colours and logos.
- Juniors outgrowing gear.
- Players (especially juniors) dropping out.
- Goods stored in homes or clubs being gradually disposed of.

In order to understand the scale of the issue some rough estimates were made for England and Wales using the methods and assumptions described in Appendix 5.

- For bats and PPE, the annual waste estimates are based on ownership and use (including 300,000 adults and 200,000 in private schools) and average product life.
- For balls the annual waste estimates are based on estimates of matches among clubs (including 6500 ECB affiliated clubs), Saturday and Sunday leagues, schools and other junior cricket, average numbers of teams and matches and 2 new balls for most matches.

In estimating average life of bats and PPE it is recognised that gear life can be extended with careful use, repair storage, repair e.g.

- Players become attached to bats they're comfortable with and suppliers often provide repair services.
- Some reuse of balls happens within clubs such as re-using balls for Sunday league games and for 'net' practice. Balls may be used many times until the seam splits.
- Hand-me downs within clubs and families.

However, all will become waste in time. There is no information on what happens to this waste. Some may be 'stored waste' in attics, garages, etc pending final disposal. In England

and Wales, there is limited reuse activity through organised schemes, with the majority of reused gear going abroad. It is not evident that there is a significant second-hand market but some may be sold privately. Most is likely to go to landfill or, in some locations, waste to energy.

For the stated assumptions annual tonnages of redundant gear going to waste in England and Wales are shown in Table 4.1 and details are set out in Appendix 5.

Table 4.1 Estimated annual waste in England and Wales for selected cricket gear
(numbers are rounded)

Gear type	Number of items (000s)	Annual waste (tonnes)
Bats	350	400
Balls	1800	300
Batting gloves	500	200
Wicket keeping gloves	50	100
Pads (batting and wicket keeping)	400	1200
Helmets	350	200
Total	**3500**	**2400**

Many assumptions have been used in these estimates and the total is especially sensitive to estimates of ownership and use at adult and junior levels, average lives of gear, and average weights. Nevertheless this estimate provides indicative figures which can be refined with time. Table A5.2 in the Appendix suggests that junior cricket contributes to 47% of waste, reflecting shorter equipment lives as young people grow. Teen years are also the time when young people are most likely to drop out of cricket.

Market information from suppliers would have helped in estimating consumption and waste, but the information was not made available.

4.4.3 Supply of willow

Use of English willow for cricket bats is part of the essence of the game because bats are the primary item of cricket gear and willow has unique qualities and performance. In spite of efforts to find alternatives none has been found and willow, especially top grade willow, continues to be highly prized. As noted above, Law 5 of the game specified the use of wood for bats.

While the environmental impacts of willow growing will depend on the scale and location it does not appear to be inherently harmful or unsustainable overall and can have environmental benefits, growing in and helping to stabilise areas prone to flooding. It also provides valuable income to farmers,

However, the game's dependence on it (and globally also on Kashmir willow) presents a strategic risk.

- Supply is concentrated in two relatively small areas of the world: English willow is almost entirely sourced from plantations in England and 95% of output is owned by or contracted to JS Wright[26]. Kashmir willow is mostly supplied from Kashmir, India.
- From the experience of JS Wright, climate change is reported as presently leading to faster growth in England without adversely affecting quality and supply. However, no comment or assessment was found on the possibility that future climate change could severely impact future supply. In England, trees have suffered storm damage in the past from extreme weather events. Increasingly dry summers could affect growth, grain width and quality. Kashmir willow trees have suffered severe damage in the past from extreme monsoon storms and floods[44], exacerbated by climate change.
- English willow was badly affected by watermark disease, *Erwinia Salicis*, in the 1990s and JS Wright reports that its occurrence in trees is increasing[26], possibly due to warmer and more humid conditions with climate change
- English willow trees take up to 15 years to mature and supply cannot be easily adjusted to demand unless suppliers cut immature trees (it was anecdotally reported that some contract farmers have been doing this, cashing in on demand and high prices, but adversely affecting the quality of wood available).

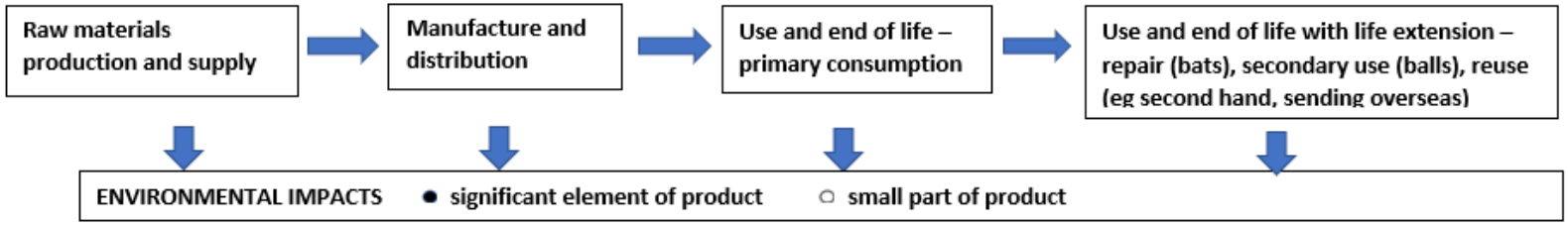
Climate and disease risks to willow supply, both in England and Kashmir, need to be better understood.

To meet demand, European willow is being used in significant volumes but it is poor quality for cricket bats manufacture. No data was found on the volumes involved.

Anecdotal evidence was provided on tests and trials of alternative woods by experienced bat makers in England but so far nothing better than willow has been found. Bamboo is an alternative material if performance requirements for bats can be satisfied, and development work has been taking place at Cambridge University[49]. So far only one type of bamboo has been used but there are over 100 types. Bamboo is fast-growing and readily available whereas English willow takes 15 years to mature. In Brazil various wood alternatives to willow are being trialled to meet growing demand for bats[37]. For all bat-making a key issue for quality products is the skill of the bat-maker but there is a limited supply of these as older bat makers retire and a need for apprentices to learn the craft.

The life cycle environmental impacts of cricket gear are shown in Figure 4.1.

Figure 4.1. Cricket gear life cycle impacts



Activity/materials	Impacts	Bats	Balls	Gloves	Pads	Helmets
Raw materials production and supply						
Willow	Land use, chemicals, energy, materials use in cultivation, harvesting; 25% waste from defects	●				
Cork	Land use, chemicals, energy, materials use in cultivation, harvesting		●			
Cane	Land use, chemicals, energy, materials use in cultivation, harvesting	Handles ●				
Leather	Impacts and ethical issues of livestock industry Water pollution, energy, materials use, waste in leather production		●	●	●	
Plastics/polymers	Impacts of petroleum extraction and refining and plastics production (greenhouse gases, air, water pollution, waste)	Grip, glues ○	Lacquer ○	●	●	●
Rubber	Natural - Land use, chemicals, energy, materials use, waste in cultivation, harvesting Synthetic – as for plastics	Grip ○		●	●	
Steel/other metals	Impacts of mining, refining, finishing (energy use, air, water pollution, waste)					●
Packaging	Impacts of packaging production – plastics as above Impacts of paper/cardboard production (land use, energy, air/water pollution waste)	●	●	●	●	●
Transport	Energy use, carbon footprint of materials/product transport in supply chain	●	●	●	●	●
Manufacture						
Product manufacture	Energy, water, materials use, waste	●	●	●	●	●
Transport	Energy use, carbon footprint for intermediate manufacturing and/or distribution	●	●	●	●	●
Use and eventual disposal (with or without life extension)						
Product waste	Impacts of landfill disposal, improper disposal	●	●	●	●	●
Packaging	Impacts of landfill disposal, improper disposal	●	●	●	●	●

4.4 Sustainability responses by the sport

Cricket has been generally slow to take on environmental and sustainability concerns. Its traditional demographic of 'beer-drinking, twenties and older, white males' is among the least environmentally conscious. However, change is arising from wider societal concerns about sustainability and climate change, changing demographics (especially female participation) and prominent players speaking out on the issues in the UK and internationally.

4.4.1 Responses by governing bodies

There have been no notable sustainability policy or other initiatives relating to cricket gear by the sport's governing bodies at international, national or local levels

ICC

ICC sets policies affecting the global game and influences general standards and conduct in members. Given ICC's influence over the world game and worldwide growth in participation, it has a potentially important role in showing leadership. However, it appears to have so far shown little interest in sustainability issues affecting the game. A review of the ICC website does not show any sustainability policy or other reference to sustainability. Its reputation in this was not helped by banning Sam Billings' 'green gloves' (see Section 3.5).

In supporting 'white labelling' of bats for commercial reasons (see Section 3.5) ICC has contributed to the lack of transparency in cricket supply chains and the domination of the gear industry by 'non-cricket' companies. This may have contributed to the lack of open discussion on sustainability issues.

ECB

ECB implements policies agreed with the ICC in England and Wales as well as having its own policies on ethics and governance, including child labour and human trafficking and combating racism and discrimination[10].

ECB recognises the climate change and sustainability challenges for the game, and that sports have a powerful platform to show leadership and inspire action. It set out its Sustainability Ambitions in April 2021[14] including tackling climate change and promoting environmental sustainability. These build on actions since 2010 to reduce its environmental footprint

Programmes and other initiatives have included building resilience to drought and floods and resource-efficient venues. It is updating its sustainability strategy to include new goals and actions. However, its focus has been on buildings and in 2021 it recruited a Sustainability Manager as part of the Facilities team. While their stated role includes supporting supply chain and procurement strategies, it is not apparent that the role has significant influence over policy. Judging from ECB's 2021 Sustainability Ambitions, there has so far not been significant consideration of sustainability in procurement of cricket gear or on other activities related to sustainability.

ECB appears to have not engaged significantly on the matter of PPE safety regulation, a major sustainability issue for the game in England and Wales, given the impacts on domestic manufacturing, affordability of gear and waste

MCC

As noted above, The MCC governs technical standards. Its policies on sustainability are aligned with those of ECB with which it shares the same headquarters at Lord's.

As for ECB, MCC recognises that climate change and sustainability are challenges for the game and in 2021 issued *Building a Sustainable Future: Environmental, Social and Governance Report 2021*[29]. This includes diverse goals.

The main environmental goals relate to venues and there is limited reference to cricket gear. However, elements relevant to products include:

- Environmental Ambitions: *Engage and research into sustainable cricket products through MCC's role as Guardian of the Laws.*
- *Working with commercial partners who have aligned sustainability goals and ambitions.*

As the home of Lord's Taverners, a charity, it also has a role in sending clothing and gear overseas, especially to the West Indies and Brazil. This initiative seems to primarily take new or fairly new kit, and not significantly include reuse opportunities in UK inner cities, etc as a means to increase participation amongst less 'well off' groups and schools. As noted in Appendix 1 there has been a big decline in cricket in state schools.

4.4.2 Sustainability initiatives by clubs in England and Wales

There appears to be some general recognition by clubs of climate change, especially the need for resilience in the face of flood risk. However, examples of environmental or sustainability policies among clubs were not found. No data was found on clubs' activities in gear reuse and recycling.

4.4.3 Sustainability initiatives by suppliers

Cricket gear specialists

A review of the websites of specialist cricket bat, ball and protective gear suppliers did not reveal any stated environmental or sustainability policies or initiatives in most cases. Exceptions include Millichamp & Hall[31], which is planting its own trees as well as promoting itself as a green company, and Willostix[50], sourcing sustainably as well as other initiatives.

Masuri, UK based suppliers of cricket helmets, has an environmental policy and Platinum Grade compliance with WRAP (Worldwide Responsible Accredited Production), including environmental and responsible sourcing performance.

The main sustainability initiative in England and Wales is in sustainable production of willow

- JS Wright, the world's main producer of English willow states that it plants 3 willow trees for every one harvested[26].
- Gray-Nicolls has a Tree Legacy planting programme[17] and various craft bat-makers source their willow locally.

Bat suppliers in England and Wales appear to generally offer repair services for bats but it is not known if this applies to all suppliers. No repair services appear to be offered for PPE although Masuri provides replacement chin guards for its helmets.

It should be noted that, from discussions, cricket bat specialists provide a lot of guidance and support for care of bats to extend their life as repair services. This is in itself a contribution to sustainability through product-life extension.

Global sports good suppliers

Major global suppliers of cricket clothing and footwear – Adidas, Puma, Nike and New Balance – have sustainability policies and initiatives as part of their long-standing response on broader sustainability issues, including working conditions in clothing and footwear supplier factories. For example Puma's 2021 Annual Report[36] contains a section on sustainability summarising the company's strategies and initiatives for reducing the impacts of the materials it uses, but there was no specific mention of cricket gear or clothing. By 2024 Adidas plans to use only recycled polyester after 2024 where applications exist[16].

It is not clear whether global sporting goods companies have been applying any sustainability considerations in procurement and manufacturing of cricket gear. No references were found in sustainability reports and no firms responded to requests for an interview.

It is also not clear how much such companies directly control supply or purchase from contract manufacturers or simply put their label on generic products (known as 'white labelling').

Repair initiatives

As noted above, there appears to be a significant level of consumer demand for minor repair and life extension of bats for reasons of attachment. 'Feel' and performance are important considerations in bat ownership, and suppliers often provide repair services as part of warranty and customer service where they have access to the skills. Furthermore, Law 5 of the MCC Laws specifies what bat repair is permissible for cricket played within the Laws.

However, no examples were found of commercial specialist bat repairers. It is unlikely that there would be sufficient work to make a living and it may be sideline activity for former bat makers in many cases.

For 'softs' and other PPE (gloves, pads, helmets) no examples were found in England and Wales of significant levels of repair or refurbishment. There is anecdotal evidence of glove repair in India where labour costs are less and skills and manufacturing capability well established, suggesting that repair can be technically possible.

No repair services were noted on the websites of manufacturers or other suppliers but spare parts are available for certain components. As noted above, Masuri supplies replacement chin cups.

Reuse initiatives

Besides the Lord's Taverners initiative noted above, some other collection and recycling schemes have been established such as Cricket Kindness[6]. There are others, sometimes separate, sometimes linked to Lord's Taverners. These include Bat for a Chance, Cricket Without Boundaries and Buckinghamshire Sports Kit Recycling[9]. However, the scale of these is small and they appear to be often about suppliers offloading surplus stock than reuse or recycling of used clothing and gear.

4.6 Opportunities for sustainable innovation

When considering the global growth in interest and participation, drivers for sustainability and lack of past innovation, there is a need for cricket to consider opportunities for innovation in gear where it will improve the sustainability of the game. Potential opportunities for sustainable innovation can build on the existing R&D, pilot and other initiatives in alternative materials noted above as well developing pathways to circularity.

Initial research on opportunities

The Centre for Sustainable Design ® at UCA and the Centre for Natural Material Innovation at University of Cambridge are conducting initial research into opportunities for innovation and these are shown in Figure 4.2. These have a particular focus on alternative materials in the supply chain to address the life cycle impacts identified above.

- Bamboo or other woods for bats[49].
- Vegan and synthetic leathers[35]
- Alternatives to plastics
- Use of recycled materials.

To these can be added opportunities to increase circularity:

- Reducing supply chain impacts
- Increasing reuse
- Remanufacture.

Feasibility considerations

The feasibility, acceptability and benefits of innovations will depend on many factors:

- Technical performance.
- Acceptability to governing and standards bodies.
- Feasibility and costs of manufacture.
- Full life cycle comparison and assessment.
- Relative costs and benefits
- Acceptability to players, clubs and other stakeholders.

Some examples of R&D, especially for bats, have already been noted and work is continuing in this and in alternatives to leather. The main challenge is satisfying stringent performance standards in a conservative game where the bat-ball dynamic is central.

There are many technical issues to address in discussion and research. As noted earlier, the MCC Laws permit repair of bats subject to constraints on use and extent of repair materials. Glues are permitted in new and repaired bats, again subject to constraints, but laminate alternatives would contain substantial amounts of glue. While this may be unacceptable for cricket played within the MCC Laws, it may be acceptable, for example, in children's' bats. There may be commercial constraints on reuse of gear in the UK. These need to be investigated and addressed if there is a potential barrier.

Threats and challenges could become opportunities. For example, the new testing regulations for PPE could be an incentive for repair and refurbishment but this would require professional repair to safety standards.

Figure 4.2. Opportunities for sustainable innovation

● Significant part of product ○ Small part of product

			Applicability				
Activity/materials	**Benefits/advantages**	**Negatives**	**Bats**	**Balls**	**Gloves**	**Pads**	**Helmets**
Raw materials production and supply alternatives							
Bamboo	Fast maturing Multiple harvesting over life Cheaper/ more plentiful in emerging cricketing nations Higher carbon absorbing than deciduous Bats: Higher density and stiffness; larger 'sweet spot'	Acceptability under MCC Law and technical performance Prototype 40% heavier Any adverse impacts in production	●	Fibre ●			
Vegan leathers	Plant based alternatives – eliminates ethical impacts and tanning impacts	Acceptability under MCC Law and technical performance Any adverse impacts in production		●	●	●	
Synthetic leathers	Eliminates ethical impacts and tanning impacts	Acceptability under MCC Law and technical performance Impacts of plastics production		●	●	●	
Plastics alternatives	Plant based alternatives – eliminates impacts of plastics production		Grip, glues ○	Lacquer ○	●	●	●
Recycled materials	Reduces life cycle impacts, waste		Grip ○		●	●	
Manufacture							
Application of cleaner production	Financial and environmental benefits of materials, energy saving, waste reduction		●	●	●	●	●
Use and disposal							
Reduced/sustainable packaging	Reduced life cycle impacts and waste		●	●	●	●	●
Secondary use (nets)	Reduced life cycle impacts and waste			●			
Repair/refurbish	Reduced life cycle impacts and waste	Potential cost, availability of service	●	●	●	●	●

4.7 Stakeholders in sustainable innovation for cricket gear

Addressing sustainability issues in cricket gear and developing innovative solutions will require stakeholder engagement on the many issues and concerns. This will be a challenge for a sport and industry where there is little openness and which has generally shown little recognition of, and engagement in sustainability issues. Aside from governing bodies, there is no specific industry association or other fora to act as a vehicle for and show leadership on addressing the issues.

It is outside of the scope of this report to recommend the way forward but a starting point is defining and classifying stakeholders with an interest in cricket gear

Stakeholder types

Stakeholder theory offers many definitions and classifications of stakeholders[32.]. For this report a stakeholder is defined as persons or organisations with an interest in cricket gear and potentially with an influence over or affected by sustainable innovation.

From the previous sections of this report. It is clear that there are many stakeholders with an interest in, and in many cases, a love for cricket. These will have a general interest in cricket gear since it is an inherently important part of the game.

- Organisations governing and developing the game: ICC, MCC, ECB, County Boards
- Financial backers: Investors, sponsors, broadcasters
- Organisations with an interest in promoting sport activity e.g. DCMS/Sport England, local government, schools and junior sport organisations.
- Followers of the game, including club members and supporters

Stakeholders with a potential specific interest and influence in the design of cricket gear and sustainable innovation include the following:

- MCC
- Gear manufacturers and suppliers
- Standards organisations
- Customers
    - Professional players and coaches
    - Recreational players
    - Clubs
    - Schools

Figure 4.3 maps stakeholders against general and specific interest in cricket gear.

Stakeholders can be broadly divided into those who have a primary interest in and love of the game and those who do not.

- The common interest and goal for most of the stakeholders is development of the game and increased participation.
- Most have an overall interest in the game and secondary interest in gear, while some have a specific interest in gear (e.g. MCC on standards).
- Global sports goods companies appear to have a primary interest in promoting their brand but nevertheless have a commercial interest in the success of cricket and a specific interest in gear. The same can be said of financial backers in general,

- Some stakeholders have an interest in PPE gear but have shown little or no evident interest in cricket (e.g. BSIF on PPE safety).
- Some stakeholders may have a general interest in promoting sport and activity but without a specific interest and remit to provide for cricket e.g. local councils and education authorities.
- Sustainability performance is only just emerging as an issue. To those with an interest in the game and gear can be added those, within or outside of the game, with an interest in sustainability.

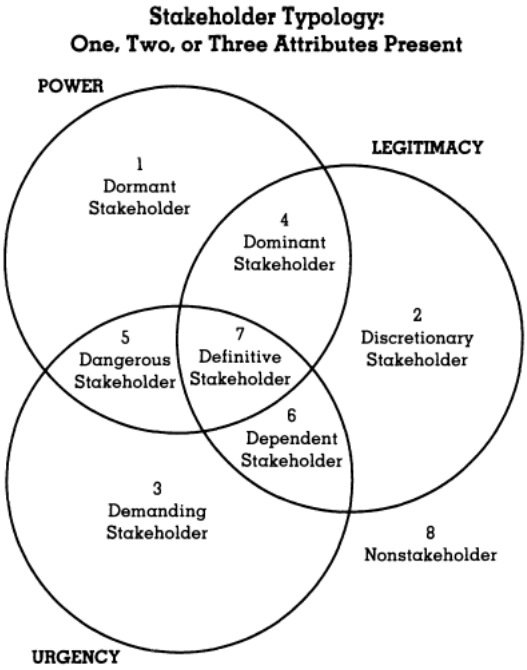
In all cases, interest will depend on individuals and situations. Many councils provide support and facilities while many have preferred to turn playing fields into housing developments. While government and many politicians may have an interest in sport and cricket, this was not reflected in passing regulations on cricket PPE safety, potentially adversely affecting the game without achieving significant safety benefits.

Key stakeholders

Given the many stakeholders and interests it is useful to prioritise. Some key stakeholders are obvious, for example the MCC in being the keeper of the Laws on cricket gear.

Stakeholder theory offers useful bases and models for classification and priority. Mitchell et al[32] have set out the "Principle of Who or What Really Counts" around three key attributes which should be the focus of attention: Power to influence, legitimacy of influence and urgency of attention. This model uses Venn diagrams to further classify overlaps (Figure 4.3). The model is dynamic in that stakeholders' positions can change over time.

Figure 4.3 A Stakeholder Typology by Mitchell et al[32]



Such stakeholder theory has been mainly developed in the business context of the firm but the principles can be applied more widely. The detailed terms do not all necessarily lend themselves to the present report, where the situation analysed is more complex than for a single business in relating to interests in the wider game as well as a set of products.

Nevertheless, some key features can be seen in play. Cricket is a sport dominated by power structures and commercial interests. Key influencers are the governing bodies, MCC, financial backers and sponsors and the global sports brands.

While the governing bodies have most legitimacy, players are especially important as they endorse and help sell gear.

At the foundation are the gear producers. Among these the most powerful are the global brands. They have appeared as 'dominant' as well as 'dangerous' or threats to the traditional cricket industry, both in the UK and India[46]. The same can be said of the incursion of the 'bedroom brands'. The most significant 'dangerous' stakeholder to recently emerge has been BSIF, given the threat to the viability of small cricket gear distributors and bat makers dependent on supplying PPE. These could be classed as 'urgent stakeholders' with pressing concerns.

Whatever approach is used to address sustainability issues and risks needs organisations and individuals willing to take a lead in recognising sustainability as an opportunity not just a threat.

Figure 4.3. Cricket gear stakeholder map

● Specific interest in cricket gear ○ General interest in cricket

Stakeholders	Main concerns, issues relevant to gear	Bats	Balls	Gloves	Pads	Helmets
GOVERNANCE AND GENERAL DEVELOPMENT						
Governing bodies						
ICC	Overall promotion and development of the world game	●	●	●	●	●
MCC	Laws of the game	●	●	●	●	●
ECB	Overall promotion and development of the E&W game	●	●	●	●	●
NCCA	Development of the National Counties game	●	●	●	●	●
County Cricket Boards	All aspects of the game in their counties	●	●	●	●	●
Government/regulatory						
DCMS/Sport England	Interest in promoting sport Interest in effective use of Lottery and other support for development; good governance. Promoting and implementing sustainability policy. Health & safety regulation	○	○	○	○	○
Local government	Interest in promoting sport and activity Provision of grounds and facilities Supporting local clubs Waste management Health & safety regulation	○	○	○	○	○
Standards organisations						
BSI	Product standards	●	●	●	●	●
BSIF	Standards and testing of PPE			●	●	●
Professional organisations						
PCA	Professional standards, gear performance, player safety	●	●	●	●	●
Support organisations						
Club Conferences	All interests of cricket clubs	●	●	●	●	●
Financial support						
TV, broadcasting	General commercial interests	○	○	○	○	○
Sponsors	Use of gear for advertising	●	●	●	●	●
Individual and other backers	General support for their clubs/the game	○	○	○	○	○

CRICKET GEAR SUPPLIERS						
Cricket gear manufacturers						
Major UK cricket specialists	All applicable business and technical issues	●	●	●	●	●
Small UK specialists	All applicable business and technical issues	●	●	●	●	●
Major sporting goods suppliers	All applicable business and technical issues	●	●	●	●	●
Raw materials suppliers	Impacts on business	●	●	●	●	●
Intermediaries and distributors						
Retailers	All applicable business and technical issues	●	●	●	●	●
Importers	All applicable business and technical issues	●	●	●	●	●
Other distributors	All applicable business and technical issues	●	●	●	●	●
CRICKET GEAR CUSTOMERS						
The professional game						
ECB	Procurement for national teams/international games	●	●	●	●	●
First Class Counties/other clubs	Procurement for teams and games	●	●	●	●	●
Professional players – men and women	Purchasing/sponsorship	●		●	●	●
National County cricket						
NCCA and National County Clubs	Procurement for teams and games	●	●	●	●	●
National County players -men and women	Purchasing (sponsorship?)	●		●	●	●
Club cricket						
ECB Premier, county and district league clubs	Procurement for teams and games	●	●	●	●	●
Non-ECB clubs	Procurement for teams and games	●	●	●	●	●
Club players	Purchasing	●		●	●	●
Leisure/friendly/social cricket						
Sunday league/other clubs	Procurement for teams and games	●	●	●	●	●
Individuals – adults, juniors	Purchasing	●	●	●	●	●
Schools	Procurement for teams and games	●	●	●	●	●

4.6 Model for sustainable innovation

In considering sustainability risks and opportunities for innovation, a simple SWOT model is presented in Figure 4.4. for the game in England and Wales.

This provides a structure for developing common understanding, for example on presenting the issues to stakeholders, priorities for innovation, and stakeholder engagement in addressing the issues.

Key elements of the model include the overall sustainability of cricket as well as gear issues:

Strengths

Considering cricket as a whole, cricket in England and Wales has a number of strengths.

General

- In spite of decline, there are significant numbers playing and following cricket (including 100,000 people of South Asian origin)
- Clubs have been lost and teams reduced but the club game is strong overall, with huge voluntary effort based on love for the game
- Although the sport has become dominated at the top by commercial interests this has introduced funds for developing the game.
- Efforts to increase participation appear to be bearing fruit, with more juniors coming through.

Gear

- England is the main supplier of English willow.
- Although older bat-makers have been retiring, considerable skills remain.

Weaknesses

The game in England and Wales has a number of weaknesses.

General

- At the top, domination by and dependency on commercial interests who do not necessarily understand the game.
- Long term decline in participation; a lack of accessibility and inclusivity.
- Conservatism
- A lack of transparency

Gear

- Dependency on a slow growing crop in a small area of the world - English willow
- Gear-intensive and expensive compared to other sports
- Lack of industry association supporting and lobbying for the cricket gear industry
- Domination by global brands
- Reliance on cheap labour in India and Pakistan
- Fragmentation and lack of common interest among suppliers.
- Lack of responsiveness to sustainability issues.
- A lack of information
- Limited sustainable innovation to date

Threats

General

- Decline in participation, especially in state schools, and losing players to life's demands, competing interests
- Lack of government support, provision of facilities.
- General sustainability and climate threats to the game.

Gear

- Climate and disease threats to willow supply
- Public, regulator and market demands to improve sustainability performance.
- Safety standards increasing costs and pushing smaller bat makers out of business.
- Global firms a threat to cricket specialists
- 'Bedroom brands' undercutting and a threat to cricket specialists.
- Online discounting threatening profitability of firms.
- Materials, transport and other costs increasing
- Costs and affordability increasing exclusivity
- Lack of reuse infrastructure for cricket gear and clothing

Opportunities

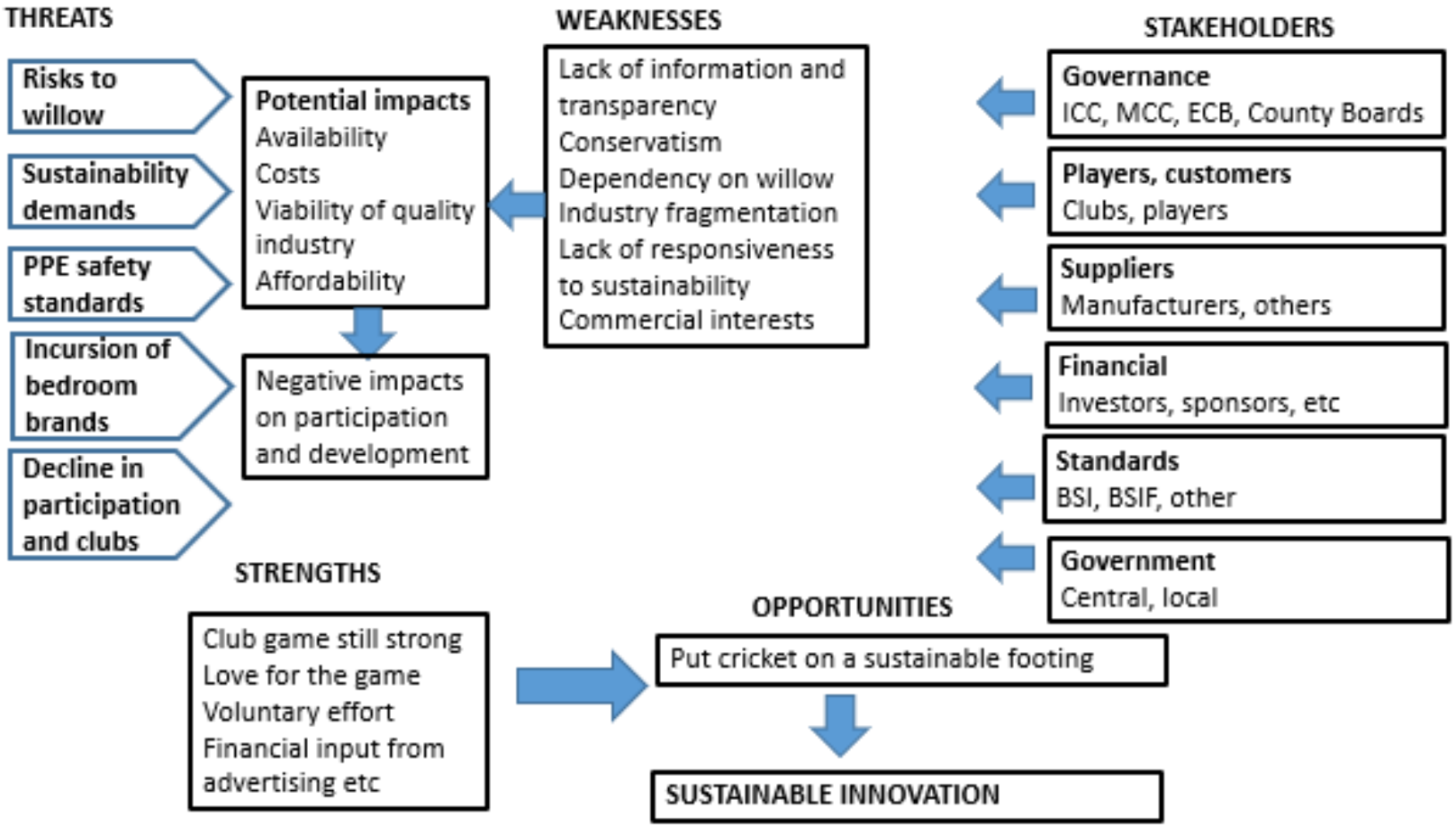
General

- Cooperation between stakeholders to improve the sustainability of the game and support its development.
- Learning from other sports and industries.
- Growth of the women's game.
- By showing leadership on sustainability and climate change cricket can be potentially influential in wider sustainability uptake in the UK and internationally, and enhance its standing and following.

Gear

- Addressing the sustainability of cricket gear through sustainable innovation.
- Increase accessibility and affordability e.g. Reuse of cricket gear to engage participation in state schools and deprived areas.
- Exploring new areas for materials and component reuse resulting from 'end of (1$^{st)}$ use' waste.
- Reduce life cycle impacts and waste and increase circularity.
- Contribute to jobs and local economies from increased manufacture in the UK, and in repair and recycling.

Figure 4.4 Model for sustainable innovation in cricket gear



5. Conclusions and Recommendations

5.1 Conclusions

Drawing on the findings to date, the main conclusions are as follows:

Sustainability issues

- While not a large industry compared to many others, there are some significant sustainability issues for cricket gear which could impact on the sustainability of the game as a whole and on its future development.
- Supply chain and other impacts and issues are likely to increase from the increasing global participation already being seen worldwide and, if ECB and other initiatives are successful, increased participation in England and Wales.
- These issues need to be addressed by the various stakeholders with an interest in the game, separately or as part of addressing the wider sustainability impacts of sports goods and clothing.
- Understanding and addressing sustainability issues and impacts will benefit from better data and more transparency about supply chains, use and markets.

Sustainability response

- Compared to some other sports and many industries, cricket has been a laggard in addressing sustainability issues, and could learn from others.
- There is a clear need to address sustainability issues in the cricket gear supply chain to address risks and support participation growth and future development
- The business of cricket is opaque, influenced by tradition, power structures and commercial interests.
- Moving forward will require innovation which will require cooperation and reconciling diverse stakeholder interests, which are in some cases inimical to change.
- Sustainable innovation will, especially for bats and balls, depend on acceptability and satisfying performance standards. The bat-ball dynamic as part of the essence of the game.
- Besides new materials, the main opportunities may lie with increasing the life of gear and circularity.
- Supporting research, cooperation and innovation will require improved and more accessible data on the use of cricket gear at all levels of the game.

5.2 Recommendations

- All stakeholders, at all levels, with an interest in the game should seek to understand the sustainability issues relating to gear, along with wider issues, and how they can make a positive contribution. All can contribute to improved data.
- There needs to be more leadership from the sport's governing bodies on this, in setting sustainability standards for the game and influencing suppliers, and, in the case of PPE, influencing sensible regulation.
- There needs to be more leadership from the supply industry, especially the global brands in demonstrating extending extension of sustainability policy and initiatives to cricket supply chains.

- In the absence of a separate cricket suppliers association, the industry should consider suitable fora for addressing common issues and sharing information.
- There is a need for further objective discussion on issues related to sustainability, innovation and cricket gear and clothing. Platform for Accelerating Sustainable Innovation in Cricket (PASIC) offers a neutral platform for stakeholders - not aligned to any particular interests - with focus on research, dissemination and innovation (see Appendix 6)
- Standards need to be established in a consultative way, considering stakeholder concerns for value, technical performance, safety, affordability and the wider benefits of a successful game. With these issues in mind, the industry should consider a Sustainability Code of Conduct where it would add value and not duplicate codes in other sports and comparable industries.
- More research is needed on life cycle impacts and risks.
- More research is needed on innovation opportunities.

While the cricket gear industry is not large, cricket is prominent in its public following. By showing leadership on sustainability and climate change it can be potentially influential in wider sustainability uptake in the UK and internationally.

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Appendix 1: Cricket participation in England and Wales

Overall participation - adults

Overall participation in cricket by adults has declined in England and Wales in recent years.

The results of a survey by Stativa Surveys[42], showed the number of people who played cricket at least once a month at any intensity for any duration in England between 2016 and 2020. The survey was conducted online and the latest update on it was conducted for the time period between May 2018 to May 2020 with a total of 190,401 respondents. The survey concluded that as of May 2020 approximately 294,000 adults in England played cricket on a monthly basis compared to approximately 364,000 in 2016 (Figure A1.1)

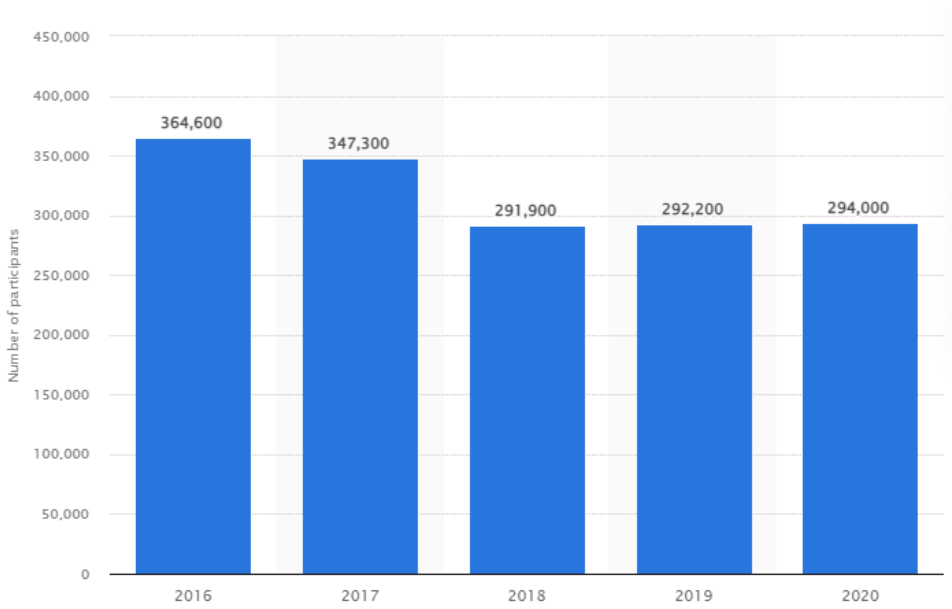

Figure A1.1 Cricket participation in England and Wales 2016-2020

Nevertheless, around 65% of the population of England follow cricket and cricket is only exceeded by football in its popularity.

Reasons for decline

No research data was found but, from discussions and commentary, various factors may have contributed to the general decline in participation, especially the failure to capture interest from a young age:

- A decline in playing cricket in state schools is believed to be a major factor (see below)
- There is a perception amongst some young people that cricket is 'posh' and boring compared to football as found by Freddie Flintoff in his Field of Dreams BBC documentary series (see https://www.bbc.co.uk/programmes/m00190pg/episodes/guide)

- Access to, and time spent with technology leading to a general decline in physical activity in young people.
- Life's demands leading to many leaving the game in late teens and then people in their twenties leaving due to family and other commitments.
- A long decline in public parks and spaces as councils have sold them for housing development will not have helped the recreational game - over 20,000 playing fields have been lost in England since 1990[8].
- Access costs, especially costs of equipment may be a factor at junior level, given that cricket is more equipment intensive than football, the number one team sport.
- The end of free to air TV in 2005 (benefiting ECB and the upper echelons with lucrative TV deals) may also have contributed to the decline in national interest and participation in the following years when England's Ashes victory in the same year should have stimulated pride and interest. There has been belated recognition of the importance of media access with free streaming services following COVID and a large number of cricket related podcasts.

Increasing female participation

Increased female participation is a positive note. The ECB's 2021 report[12] estimates that in England and Wales in 2020: 216,000 women played cricket occasionally and 60,000 regularly; 33,000 girls played cricket regularly, and there were 855 clubs with women and girls' sections.

Participation in the South Asian community

It is notable that the general decline in England and Wales does not apply to the South Asian community where the sport is buoyant due to the strong cultural affinity with cricket. ECB estimates that people of South Asian descent estimated to account for over a third of all recreational participation but there is little published information on South Asian participation. At the higher levels of competition, separate South Asian leagues began to form in 1980 and there is estimated to be 13 now with 300 teams and over 5000 players. The number of clubs and teams at lower and social levels is unknown. Some further notes on South Asian leagues are provided in Appendix 2. It should be noted that, while these separate leagues exist, many South Asian players play at all levels for county-based and other amateur recreational teams. However, as has been widely pointed out, they are under-represented in the professional game.

The separation of the South Asian leagues has to some extent stemmed from past and present widespread racism which has recently come to the fore with Yorkshire Cricket Club (YCC) being investigated by a Parliamentary Select Committee20. YCC was ordered to clean up its act and, until it did so, was banned from holding lucrative test matches at Headingly and faced the threat of withdrawal of Sport England funding. Besides being morally unacceptable it is not beneficial for the national game or, at the pinnacle, the success of the national team if a major source of talent is being lost. National success is known to be important for interest and participation in any sport. Various articles that players from public schools are much more likely than players of Asian descent to achieve professional status. The same applies to players from state schools, few of whom make it to the

professional level unless they gain cricket scholarships to private schools – another major source of lost talent.

A bigger challenge is bringing the Afro-Caribbean community back into play, but there have been some initiatives e.g. Surrey Cricket Club's African Caribbean Engagement (ACE) Programme, supported by ECB.

Participation in junior cricket

While cricket has been reported as declining in state schools, no detailed figures were readily available on the level of decline and the current level of participation recognising that there have been considerable efforts to increase participation through Chance to Shine (see https://www.chancetoshine.org/ and below) and other programmes. Before Chance to Shine was launched in 2005, research indicated that cricket was played regularly in less than 10% of state schools, and was only the sixth most popular sport played in schools, with many cricket pitches lost when school playing fields had been sold for development
The above Stativa survey of Cricket in the UK found that 7.1% of children aged 5-16 had played cricket in the previous month in 2020, small growth after the percentage had sunk to 5% in 2019. More detailed figures may be available in the commercial Stativa report but the numbers can be estimated. There are approximately 9 million pupils in 20,000 state schools in England and Wales, of which around 3,500 are secondary (source: British Educational Suppliers Association). There are approximately 4 million secondary school students. From these numbers, the number of secondary and primary school cricket participants is around 300,000 in each group.

Cricket remains strong in private schools which also continue to be the main nursery for the professional game in England and Wales. In many private schools, cricket is part of the curriculum for all pupils with special facilities and coaching for those individuals interested pursuing cricket to higher levels.

There has been much commentary recently on the lack of social balance in the professional game in England but their importance of private schools in player development is unquestionable, including providing cricket scholarships to talented pupils form state schools. There are approximately 700,000 pupils in around 2300 independent schools in England and Wales, preparatory and secondary, boys, girls and mixed (source: Independent Schools Association). Of these a significant number are own and use of cricket gear. No figures are available on the number of private school pupils playing and owning gear but it could be 200,000 or more.

Efforts to increase participation

Along with wider governmental efforts to increase physical and sporting activity for the well-known benefits, the England and Wales Cricket Board (ECB) has been addressing inclusivity participation and other issues through a range of initiatives as part of *Inspiring Generations*, a game-wide five-year strategic plan to grow cricket in England and Wales from 2020-24[40].

Initiatives include

- *South Asian Action Plan*, which contains ECB's comprehensive and ambitious 11-point action plan to better engage with South Asian communities.
- *Transforming Women's and Girls' Cricket* is one of six priorities within *Inspiring Generations* and represents the largest growth opportunity for the game.

- ECB's *Equality, Diversity, Inclusion* Plan outlines 12 key actions the ECB will deliver by 2023 to support its vision of cricket being a game for everyone. This complements the strategies laid out in *Inspiring Generations.*

These are linked to strategies and initiatives to developing the game, including reducing barriers in access to facilities for the recreational game, increasing provision for children and schools.

The Chance to Shine programme, supported by ECB, other cricketing bodies, private donors and Sport England has educational aims, using cricket as a means of developing personal skills and values in the children involved - including leadership, teamwork, respect, individual and collective responsibility, and general standards of conduct - rather than trying to identify cricketing talent. It has nevertheless helped produce some top women's players. It is estimated that 200,000 children were involved in its first four years of operation. By 2015, over 2.5 million children had participated, at 11,000 state schools. The current programme aims to reach another 1 million children,

There are multiple actions at the elite level including talent development and the new Hundred, hundred-ball competition (see Appendix 2.2), introducing new city-based teams of existing professionals and aimed at encouraging wider spectator interest. Interest, in turn, can encourage participation.

ECB's All Stars and Dynamos programmes, linked to the Hundred, engaged over 100,000 children in 2021.

In the context of the purpose of the present research, if these efforts in England & Wales are successful, they will result in increased participation and the increased demand for cricket gear.

Appendix 2: Structure and governance in England and Wales

A2.1 The England and Wales Cricket Board (ECB)

Structure and functions

Established in 1997 and based at Lord's, the ECB is the single national governing body for cricket in England and Wales and is responsible for developing and supporting all areas of the game from elite to recreational levels.

ECB's legal status as a company limited by guarantee means it can prioritise the long-term health and sustainability of the sport rather than generating a return to shareholders. It is owned by its 41 members – comprising the chairs of the 18 First Class Counties, the 21 Cricket Boards of the non-First-Class Counties, the National Counties Cricket Association and the Marylebone Cricket Club (MCC).

Its functions include:

- Managing the professional game, including national men's and women's teams, county championships and other competitions, professional and other standards.
- Leading the sport's efforts with regard to the integrity of cricket, including anti-doping and anti-corruption initiatives, and safeguarding of all who play and administer the game.
- Being responsible for the National Cricket Performance Centre, currently based at Loughborough University in Leicestershire.
- Under its auspices, organisation of amateur and recreational matches on a regional basis, with the top level being the ECB Premier Leagues.
- Promotion and development of the game. It has a range of programmes to increase participation, including getting children active. The *Inspiring Generations* strategic initiative was noted in Appendix 1.

ECB is a substantial organisation with 2021 turnover of £207m (£273m in 2019)[13] and staff of 416 (74 players, 158 coaching and support and 184 administration, commercial and support)

Financial

The ECB is responsible for the financial direction and commercial exploitation of England cricket.

In a typical year, the ECB's income is derived from:

- Broadcast rights deals.
- Sponsorship from commercial partners.
- ICC distributions.
- ECB share of England ticket sales at One Day International and Test matches in England and Wales.
- The Hundred ticket sales (see below).
- Other income including participation programmes, coaching courses and Sport England.

Government funding is a relatively small part. In 2021 ECB received £1.9 million from the ESC Lottery Fund (from Sport England under DCMS). All of this was earmarked for ECB's participation and growth programmes[10].

The ECB is responsible for the generation of income from the sale of sponsorship and broadcasting rights, primarily in relation to the English team. In 2017 the ECB signed a new media rights deal valued at £1.1 billion to cover the five years between 2020 and 2024. This deal will be used to fund a broad range of initiatives across the sport at all levels, including a guaranteed £475 million to fund the county network – First-Class Counties, National Counties and County Boards.

An important role in this funding is administering the County Grants Fund which aims to support affiliated Cricket Clubs to create welcoming environments, provide enhanced facilities and playing opportunities, and to develop environmentally sustainable clubs.

The fund has three themes:

- Creating Welcoming Environments.
- Providing Enhanced Facilities and Playing Opportunities for Women's and Girls' Cricket and / or Disability Cricket.
- Tackling Climate Change (with a particular emphasis on flood and drought resilience).

Current major sponsors of ECB are IG, Cinch, Royal London, Vitality, Microsoft, Sky Sports, BBC, Lifebuoy, Castore and Liverpool Victoria.

As with many activities, cricket has been greatly affected by COVID, and this has disrupted the finances of cricket organisations. Based on average pre-COVID income for 2020-24 and how ECB planned to distribute that funding as follows:

- 44% (£118 million) directly to its 'cricket network:' all the organisations that help to run cricket, from First Class County Clubs and County Cricket Boards to recreational clubs and cricket's charities income directly to help support their running costs, improve their facilities and generally grow cricket.
- 14% (£38 million) to support the running and growth of cricket from the grassroots up, including central administration and technical support, provision of umpires for county cricket, digital scoring apps for league cricket, managing integrity issues (e.g. anti-doping) and activities that ECB delivers in partnership with the network (e.g. county age group programmes, coaching and official courses, and running national programmes to grow the game).
- 14% (£38 million) of the ECB's income is spent on England Men's, Women's and Disability teams, including player salaries, support teams, tour costs, training facilities and technology so they can succeed and inspire a new generation.
- ECB will invest £39m per year to deliver The Hundred, but it will make £10 million profits from year one. The new tournament which will benefit all of cricket by helping to reach new, diverse, audiences and grow the game, not least through helping to drive national programmes. £9 million a year is allocated to practical support for network partners but in its programmes there is no specific reference to cricket gear.

A2.2 The professional game

A professional player can be simply defined as one receiving payment for playing cricket, not by their standard of play. In practice, in England and Wales, being professional means registered with the Professional Cricketers' Association (PCA) (see below) as playing First Class Cricket and adhering to its rules of conduct. All others are recreational players. However, the term recreational covers a wide spectrum from elite level to social play.

The term 'amateur' is still used for non-professionals, but less so than historically. In the past the 'gentlemen versus players' distinction reinforced class division and elitism. 'Professionals' were often regarded with disdain, being usually working class players needing payment for losing time in their regular jobs. 'Gentlemen' amateurs needed no such payment.

In England and Wales today, most professionals are those playing for First Class County clubs and in other competitions as described below.

All other clubs and players are officially recreational, from National County clubs (previously Minor Counties) at the highest level, down to local club, league and social level.

There is some blurring at the boundaries. The 2nd XIs of First Class Counties play in competitions and friendlies against National County teams. National County and ECB Premier League clubs sometimes have former first class players and overseas professionals and some clubs employ the services of professionals as coaches. Also, first-class players returning from injury will sometimes appear at club level as match practice -

First Class Counties

These are the 18 county clubs playing First Class Cricket (as defined by ICC) at professional level (Table A2.1)

Table A2.1 First Class counties

Derbyshire, Durham, Essex, Glamorgan, Gloucestershire, Hampshire, Kent, Lancashire, Leicestershire, Middlesex, Northamptonshire, Nottinghamshire, Somerset, Surrey, Sussex, Warwickshire, Worcestershire and Yorkshire.

Key notes are:

- Their main competition is the County Championship, others include one-day and T20 and matches against touring teams.
- Each club typically has Ist and 2nd teams at the professional level and various county age group teams.
- Besides competition, they have important regional roles in developing and promoting the game.
- They provide players for the England team as well as having overseas players.
- They also provide players for the new Hundred competition with eight city-based teams (Table A2.2):
- With wide variation facilities from Test match grounds to much smaller and rotating grounds, they depend on ECB for funding while also receiving income from attendance, advertising and sponsorship.

- As members of ECB they are involved in policy development as well as implementation of ECB policies and programmes.
- They have a variety of management structures, some run as businesses, others as trusts. The example of Yorkshire Cricket Club is provided in Appendix A2.3.
- In the context of this report, club and team equipment is acquired through club purchasing and from supplier sponsors, supplementing player-owned equipment.

Table A2.2 The Hundred Teams

Manchester Originals, Southern Braves (Southampton), Trent Rockets (Nottingham), Oval Invincibles (Kent), London Spirit (London), Northern Superchargers (Leeds), Birmingham Phoenix and Welsh Fire (Cardiff).

Other first class

Some other teams are classified as First Class:

- Marylebone Cricket Club (MCC)
- The six MCC-sponsored university teams for some of their matches against first class (Cardiff, Cambridge, Durham, Oxford, Leeds/Bradford and Loughborough).
- Women's' Regional Hubs: Six teams partnered with counties in their area and having at least 6 professionally contracted players (Table A2.3).

Table A2.3 Women's' Cricket Hubs

Central Sparks – Herefordshire, Shropshire, Staffordshire, Warwickshire, Worcestershire **Lightning** - Derbyshire, Leicestershire, Lincolnshire, Nottinghamshire, Loughborough University. **Northern Diamonds** - Durham, Northumberland, Yorkshire **North West Thunde**r - Cheshire, Cumbria, Lancashire **South East Stars** - Kent & Surrey **Southern Vipers** - Berkshire, Buckinghamshire, Dorset, Hampshire, Oxfordshire, Sussex. Isle of Wight Cricket Board **Sunrisers** - Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Huntingdonshire, Middlesex, Norfolk, Northamptonshire, Suffolk, Marylebone Cricket Club **Western Storm** - Cornwall, Devon, Glamorgan, Gloucestershire, Somerset, Wiltshire, Cricket Wales.

Professional Cricketers' Association (PCA)

- The PCA is the representative body for past and present first class cricketers in England and Wales.

A2.3 Recreational

Following the definition of professional in Section A 2.2, most of the rest of the game is recreational, including, as they are defined, National County clubs, down to local clubs.

In this report a distinction is made between amateur recreational clubs and players playing at competitive levels, and recreational leisure at friendly or social levels.

The National Counties Cricket Association (NCCA) represents the pinnacle of recreational cricket in England and Wales. Below NCCA, most club level recreational cricket in England and Wales is delivered through 39 County Cricket Boards and over 6500 clubs. At the highest levels of these are various levels of clubs affiliated with the ECB

National counties

The National Counties, known as the Minor Counties prior to 2020, are the cricketing counties of England and Wales that do not have First Class status. The game is administered by the *National Counties Cricket Association (NCCA),* which comes under the England and Wales Cricket Board (ECB). There are currently twenty teams in National Counties cricket: nineteen representing historic counties of England, plus the Wales National Counties Cricket Club.

Of the thirty-nine historic counties of England, seventeen have a First-Class County cricket team (the eighteenth First Class County is Glamorgan in Wales) and eighteen participate in the National County Championship. Since 2021, Cumberland and Westmorland have been represented by Cumbria in the National Counties championship. The remaining two historic counties, Huntingdonshire and Rutland, have associations with other counties (Huntingdonshire with Cambridgeshire and Rutland with Leicestershire), although Huntingdonshire has its own Cricket Board and took part in the English domestic one-day competition between 1999 and 2003. The Isle of Wight, historically a part of Hampshire but now a county in its own right, also has its own Cricket Board. The National County teams are shown in Table A2.4

Table A2.4 National County Teams

Bedfordshire, Berkshire, Buckinghamshire, Cambridgeshire, Cheshire, Cornwall, Cumbria, Devon, Dorset, Herefordshire, Hertfordshire, Huntingdonshire, Lincolnshire, Norfolk, Northumberland, Oxfordshire, Shropshire, Staffordshire, Suffolk, Wiltshire, Wales National Counties.

Under the new National Counties structure, designed to make the Minor Counties game more competitive:

- There will be slightly less three-day cricket, but there will be automatic promotion and relegation within the current Western and Eastern Divisions.
- The 10-team divisions will split to two groups of five in a series of changes to the county game at its second tier.
- All play in the National County Championship.
- It will also mean a drop in three-day matches from six to four per season, while offering an increase in Twenty20 games.

There are also plans to bring back games against first-class sides. If approved, it will mean a chance for every National Counties side to play against first-class opposition for the first

time since Minor Counties sides were excluded from English cricket's premier one-day competition in 2006.

County Cricket Boards

The 39 County Cricket Boards are the governing bodies for recreational cricket in their respective counties: 18 First Class Counties and 21 National Counties. The 39 Chairs of the County Cricket Boards, the Chair of the MCC and the Chair of the National Counties Cricket Association together form the 41 members of the Board of ECB.

Working with county clubs, and ECB or NCCA, one of their key goals is to promote the game of cricket at all levels across their county working in partnership with other appropriate agencies and organisations, including schools and local cricket clubs. They also organise county leagues and championships.

ECB - affiliated Premier Leagues and clubs

Club cricket is usually played in league or cup format. Games are limited by either time or overs. A less common, but more traditional, format is limiting the game by time only. Games can range from a few hours in the evening to three days.

Saturday league cricket is the most serious format of club cricket. The game will usually be a limited overs contest of between 40 and 60 overs per side, with bonus points awarded based on runs, wickets, and whether or not the match was a "winning draw" or an outright win to one-side. This format of cricket covers teams that vary in standard between occasional players in the lower divisions to professional and ex-professional players in the highest leagues.

At the highest level are currently 29 ECB Premier Leagues operating within county or regional organisations (see table A2.5). These comprise around 285 teams. Features include:

- They are funded by the ECB and introduced in 1997 and intended to raise the standard of top tier of club cricket and to bridge the gap between recreational cricket and the First Class game.
- The Leagues have to meet the published ECB assessment criteria and they receive accreditation on an annual basis. The assessment criteria explicitly require strong junior sections that can provide cricket coaching and matches for the next generation of cricketers
- Premier Leagues are expected to establish links to other leagues in order to allow ambitious clubs to aspire to Premier League status over time; this includes relegation and promotion.
- Besides playing in their own premier divisions there is a Premier League Championship knockout competition.

Table A2.5 ECB Premier Leagues

Birmingham and District Premier League	North East Premier League
Bradford Premier League	North Staffordshire and South Cheshire League
Cheshire County Cricket League	North Wales Cricket League
Cornwall Cricket League	North Yorkshire and South Durham Cricket League
Derbyshire County Cricket League	Northamptonshire Cricket League
Devon Cricket League	Northern Premier Cricket League
East Anglian Premier Cricket League	

Essex Cricket League Hertfordshire Cricket League Home Counties Premier Cricket League Kent Cricket League Leicestershire and Rutland Cricket League Lincolnshire Premier League Liverpool and District Cricket Competition Middlesex County Cricket League	Nottinghamshire Cricket Board Premier League South Wales Premier Cricket League Southern Premier Cricket League Surrey Championship Sussex Cricket League West of England Premier League Yorkshire Premier League North Yorkshire South Premier League

Establishing the ECB Premier League and other factors have led to reorganisation of clubs at county and regional league levels, an ongoing process at club level.

ECB-affiliated clubs and leagues

Beneath the ECB Premier Leagues are ECB-affiliated clubs, leagues and divisions also in the top echelons of amateur recreational. In many cases these specifically act as 'feeder leagues' to the Premier Leagues to allow relegation and promotion and maintain standards.

- ECB states that there are around 400 teams in the higher divisions and around 6500 clubs overall.
- Beneath the higher divisions are second, third, fourth or more divisions and teams e.g. the Surrey Championship has 6 divisions for premier, firsts, seconds, thirds, fourths and fifths.

No detailed data has been obtained on the number of clubs, leagues, teams and players. Anecdotal evidence suggests that declining participation has led to clubs reducing the number of teams and in some cases clubs closing or merging. The average number of teams per club is 2 or 3 – this needs to be confirmed.

Non ECB- affiliated county leagues and clubs

These are higher level amateur recreational leagues and clubs not affiliated with ECB. They include

- Lancashire League (14 clubs).
- Central Lancashire League (16 clubs).
- Yorkshire and Derbyshire League (52 clubs).

There appear to be historical and political reasons for such separation, including disagreement with the restructuring to form the ECB Premier Leagues and possible antagonism towards ECB.

Asian leagues and clubs

As noted in Section 1.1, at the highest recreational level there are estimated to 13 leagues with 300 teams and over 5000 players.

General adult recreational

An addition to the competitive 'Saturday cricket' recreational game are various types and levels of formal and informal leisure cricket, sometime competitive at levels equalling Saturday cricket, but mostly friendly:

- Sunday local leagues and clubs

- Evening cricket
- Village cricket.
- ‘Park’ cricket
- Indoor cricket

Friendly cricket often takes place on a Sunday. These games tend to follow the more traditional format of declaration cricket in which a time limit or number of overs - typically 80 to 120 - is set for the whole match. It is then up to the team batting first to declare their innings early enough to give themselves time to bowl the opposition out and force victory. Evening cricket is the least formal format of club cricket, and the route by which many new players are introduced to the game. It tends to follow the 20-20 version of the game, with additional time saving measures such as using 15 8-ball overs and not re-bowling wides or no-balls (which then count as 2 runs each rather than the standard 1). This version of the game also puts an emphasis on inclusivity, with rules such as each bowler being limited to 2 overs each, and batsmen retiring after reaching 25 runs being used to ensure that every player has a part to play in the outcome of the game.

- Village cricket teams may play in Saturday or Sunday leagues, or both, depending on their level.
- ‘Park cricket ‘ is a term for teams without formal clubs and facilities.
- Indoor cricket was introduced for players to continue playing and practising in winter.

Again, no information was obtained on the number of clubs, formal or informal, participating in friendly cricket in its various forms. Many Saturday League clubs and have Sunday League teams including Saturday League players. Many players have no formal club membership.

Various membership organisations exist, including the Club Cricket Conference (CCC) (south of England) and Midlands Club Cricket Conference (MCCC) provide services to clubs at all levels of the recreational game. There does not appear to be a similar organisation for the North of England.

Junior cricket

As noted in Appendix A1.1, schools cricket is a major part of the game, with 0.5 million or more pupils participating at some level within their schools. There are many leagues and competitions for school teams organised by age, for boys and girls, at local, county and national levels for the various forms of cricket, including T20 and 100 Ball. As also noted above, independent schools are most prominent in inter-school competition, especially these with cricket development programmes

There are many organisations involved in arranging leagues, fixture and competitions including county cricket associations and the English Schools Cricket association and Schools Cricket. Journals, including The Cricket Paper and School Sport Magazine, support and sponsor competitions.

At the higher levels of junior cricket are the junior teams of cricket clubs and junior county championship teams and competitions. Support for junior team development is often a condition for ECB and other funding for clubs.

No data was obtained, but detailed research would reveal the number of teams, leagues, competitions and fixtures at junior level.

Examples

The following examples in Table A2.6 summarise the structure of the game in Yorkshire, both the largest county in England and the county with a particular passion for the game and high participation levels. The separation of the Asian game reflects continuing racism issues (see Appendix A1 and A 2.4)

Table A2.6 Illustration of the cricket structure in Yorkshire

Yorkshire Cricket Board

The Yorkshire Cricket Board is the governing body for ECB -affiliated recreational cricket in Yorkshire. One of its key goals is to promote the game of cricket at all levels across the County working in partnership with other appropriate agencies and organisations, including schools and local cricket clubs. There are nearly 700 cricket clubs and teams affiliated to the YCB, with in excess of 1450 senior recreational teams across Yorkshire playing cricket every weekend. It works closely with its cricket partners of Yorkshire County Cricket Club and the Yorkshire Cricket Foundation to promote all forms of cricket within Yorkshire.

ECB Premier Leagues

The ECB Premier leagues in Yorkshire are:

- Bradford Premier League
- Yorkshire Premier League North
- Yorkshire Premier League South
- North Yorkshire and South Durham ECB Premier League
- West Yorkshire Area Cricket League

As an example, the Yorkshire Premier League North was formed in early 2016 following the re-structuring of club cricket within Yorkshire. Of the initial twelve competing teams, six were from the now disbanded Yorkshire ECB County Premier League - Castleford, Driffield Town, Harrogate, Hull, York, and Yorkshire CCC Academy. The other six teams were from the York & District Senior Cricket League - Acomb, Dunnington, Scarborough, Sheriff Hutton Bridge, Stamford Bridge, and Woodhouse Grange. The League headquarters is based in Sowerby, Thirsk.

A process of promotion and relegation is in operation. In the case of the Yorkshire Premier League North (YPLN), the bottom two teams being replaced each season by the top two teams from the York & District Senior Cricket League. A 50 over knockout competition is also competed for in conjunction with the Yorkshire South Premier League. Teams also compete in a T20 tournament, and there is also an U19 T20 for younger players.

The league winners qualify to take part in the Yorkshire Championship, together with the winners of the Bradford Premier League and the Yorkshire South Premier League, and the leading Yorkshire club in the North Yorkshire and South Durham Cricket League.

Each League has its own management structure for administering their league and support. This includes having rules and codes of conduct. For example, the YPLN has an anti-discrimination policy.

Other YCB affiliated Leagues

There are 24 leagues across Yorkshire.

For example, the York and District Senior Cricket League (next level below and feeder to the YPLN) has 89 clubs in 14 divisions and also manages a Sunday division.

An example of a club in this league is Easingwold. Its Ist XI is in Division 1 west of YDSL and its 2nd XI is in Division 2.

Asian cricket leagues

Cricket plays an important part in the lives of many South Asian migrants and their descendants. After settling in cities like Bradford, cricket enthusiasts moved from informal games in back streets and parks to forming their own teams, developing tournaments and establishing leagues

The *Quaid-e Azam Sunday Cricket League (QeAL)* in Bradford, was the first Asian cricket league in Yorkshire, founded in 1980 and the first Asian league to be recognised by the ECB. Quaid E Azam league consists of 4 sections, each with 10 teams: Premier, Crescent, Star and Jinnah, all playing in West Yorkshire

However, this league has severed ties with the Yorkshire Cricket Board (YCB) and ECB as accusing both bodies of 'neglect and preferential treatment' with issues raised including being locked out of the Yorkshire pyramid in its funding. The QASCL league subsequently refused to pay its affiliation fee until action was taken. Some of the clubs in this league have wanted to play at a higher level. It appears that clubs have applied to join other leagues in the Yorkshire pyramid structure but despite having the facilities and meeting the criteria, they have not been able to join other leagues because club members from the other leagues don't want to vote them in.

Media

Cricket Yorkshire is an example of a news website championing recreational cricket in Yorkshire. It conducted a survey in 2020, although the sample of 500 was small it was considered to be a useful snapshot. Included the question

What are the key issues to address in recreational cricket for the 2021 season?

These were some of the most common topics that came to the fore:

- Player retention (juniors and seniors)
- Volunteers retention
- Opening facilities
- Finances & funding
- BAME participation
- Improving facility standards
- Player discipline towards officials
- Start times & formats – less overs or not?
- Keeping teens in cricket

Accessibility and cost of gear and clothing was not specifically mentioned.

A2.4 Management and finance

Cricket clubs at all levels operate with management and support organisations, mostly run as not for profit except for some professional clubs run as businesses. Key points are:

- ECB is a major provider of funds to clubs through county cricket boards as part of support and development programmes.
- In common with all major sports the game relies on commercial sponsorship, especially at the higher levels, including advertising and TV rights.
- Sponsorship is important at all levels.
- At most recreational levels the game operates with limited resources and is dependent on players proving most of their gear and clothing and on voluntary support.

Example of a professional club: Yorkshire Cricket Club

Yorkshire County Cricket Club is the most successful team in English cricketing history with 33 County Championship titles, including one shared.

Its 2020 Annual Report (the latest available)[52] presents the club as a substantial business entity, with the full range of professional cricket and support activities, management of its Headingley stadium, as well as other activities, all under the strategic direction and governance of its Board of Directors. Key issues reported included:

- The need to address racism in the club is acknowledged. The Parliamentary Inquiry into racism at the club began change with various sackings and Lord Patel appointed as Chairman.
- It has established the Yorkshire Cricket Foundation to support community programmes, with a particular focus on young people.
- This report highlights the impact of the pandemic on this major cricket club, with loss of venue-related revenue, as well as other commercial income and sponsorship. ECB support has been especially important.

An extract from its 2020 annual Report is shown here.

for the year ended 31 December 2020

	NOTE	2020	2019
		£	£
Income:			
International ticket and hospitality revenue		1,485,362	10,483,782
Domestic ticket and hospitality revenue		296,882	1,095,209
Subscriptions		604,827	811,815
England and Wales Cricket Board		4,424,128	2,536,345
Commercial income		888,849	3,001,265
Other income		1,086,334	67,900
		8,786,382	17,996,316

Expenditure is recorded for major items including player and staff wages, facilities maintenance and other costs. There is no specific reference to costs of gear and clothing. At this level it is common for suppliers to provide these items free to sponsored players for promotional purposes.

Merchandising of gear and clothing at the Headingley shop (online and venue) will provide valuable additional income but the details were not stated

Example of an ECB Premier League: Castleford Cricket Club

No public information has been found on the management finances of recreational cricket clubs except to the degree that historic accounts can be accessed. As noted above, ECB – affiliated clubs pay membership charges and have access to ECB funds through County Cricket Boards. Also, as noted above, at all levels clubs run on limited resources with reliance on voluntary effort and local support and sponsorship.

Castleford Cricket Club is an example of an ECB Premier league club which has enjoyed cricketing success but which relies on such support to survive. Its grounds are maintained by Wakefield Council and have suffered damage from flooding while an arson attack on its buildings in 2002, which threatened the existence of the club. Sponsorship for equipment has been important, with a new scoreboard installed by Durant Cricket. Funding for a new scorebox came from The Coalfields Regeneration Trust and Wakefield Council who awarded Castleford CC grants towards the project and to new cricket covers. Criteria for such grants include, at a minimum, having a junior development programme. In Castleford's case, junior cricket is thriving with teams competing in the Pontefract and District Junior Cricket League across various age groups. Junior cricket is viewed as an essential source of future senior players and Castleford also field a number of young players in the ECB Yorkshire League.

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Appendix 3: Cricket equipment standards

This Appendix considers aspects of standards for cricket gear which may be relevant to sustainability and the scope for innovation and repair. For example, new safety standards for PPE impose significant testing requirements and costs on manufacturers and cost/ affordability of gear for players.

In all cases performance is a key issue, especially given the importance of the bat-ball dynamic to the game of cricket. This appendix covers standards relevant to bats, balls and protective equipment. Standards also exist for other equipment such as wickets

A3.1 The Laws: MCC equipment standards

The Laws and Appendices to the Laws[28] specify requirements for gear used in cricket played within the Laws. They do not apply to recreational cricket played outside of the Laws, including social and child levels**.**

Law 4: The ball.

This law specifies sizes, weight and materials for hard balls made from leather, cork and twine. The main aspects of the specifications are shown in Table A3.1.

Table A 3.1 Aspects of Law 4 on cricket balls.

- The size and weight of the cricket ball in men's cricket.
- A slightly smaller and lighter ball is specified in women's cricket
- A slightly smaller and lighter ball is also used in junior cricket (Law 4.6).
- Only one ball is used at a time, unless it is lost, when it is replaced with a ball of similar wear.
- It is also replaced at the start of each innings, and may, at the request of the fielding side, be replaced with a new ball, after a minimum number of overs have been bowled as prescribed by the regulations under which the match is taking place. The gradual degradation of the ball through the innings is an important aspect of the game.

Standard practice in use varies with the level e.g.

- Recreational league cricket: 1 ball per innings
- The Hundred: One ball per 'end', so 2 balls per innings and 4 in total.

Law 5: The bat.

The basic requirements and measurements of the bat are set out in Law 5 with detailed specifications in Appendix B of Law 5. Requirements are summarised in Tables A3.2 and A3.3

Table A 3.2 Law 5 requirements for bat size, shape and materials.

- Under Law 5 the blade is to be made solely of wood and the handle principally of cane and/or wood
- The upper portion of the handle may be covered with a grip as defined in Appendix B.2.2 (normally rubber).
- Types A, B and C are specified. Type A bats may be used at any level of cricket. Bats of Type B, Type C, Type D and any other bats may be used only at or below levels determined by the Governing Body for cricket in the country concerned. Type D bats are for use by junior players in junior cricket only. Bats that do not qualify for any of the four categories A to D are not recognised in the Laws.

- Appendix B on the bat. Adhesives are permitted where essential and in minimum quantity.
- The handle may be glued where necessary and bound with twine along the upper portion. Providing Law 5.5 is not contravened, the upper portion may be covered with materials solely to provide a surface suitable for gripping. Such covering is an addition and is not part of the bat, except in relation to Law 5.6
- Twine binding and the covering grip may extend beyond the junction of the upper and lower portions of the handle, to cover part of the shoulders of the bat as defined in B.3.1.
- No material may be placed on or inserted into the lower portion of the handle other than as permitted above together with the minimal adhesives or adhesive tape used solely for fixing these items, or for fixing the handle to the blade.
- As a proportion of the total volume of the handle, materials other than cane, wood or twine are restricted to one-tenth for Types A and B and one-fifth for Type C and Type D. Such materials must not project more than 3.25 in/8.26 cm into the lower portion of the handle.
- The surface of the blade may be treated with non-solid materials to improve resistance to moisture penetration and/or mask natural blemishes in the appearance of the wood. Save for the purpose of giving a homogeneous appearance by masking natural blemishes, such treatment shall not materially alter the colour of the blade.
- Permitted coverings, repair material and toe guards, not exceeding their specified thicknesses, may be additional to the dimensions above, but the bat must still pass through the gauge as described in B.8.
- Type D bats must meet the stated specifications. They may be laminated but using only wood and with no more than three pieces.

Table A 3.3 Law 5 requirements for bat protection and repair.

- Protection and repair is permitted subject to not contravening other specifications and solely for the purposes of *either* protection from surface damage to the face, sides and shoulders of the blade *or* repair to the blade after surface damage. Material that is not rigid, either at the time of its application to the blade or subsequently, may be placed on these surfaces.
- For repair of the blade after damage other than surface damage, solid material may be inserted into the blade. The only material permitted for any insertion is wood with minimal essential adhesives. To prevent damage to the toe, material may be placed on that part of the blade but shall not extend over any part of the face, back or sides of the blade.
- For any part of the bat, covered or uncovered, the hardness of the constituent materials and the surface texture thereof shall not be such that either or both could cause unacceptable damage to the ball.
- Any material placed on any part of the bat, for whatever purpose, shall similarly not be such that it could cause unacceptable damage to the ball.
- For the purpose of this Law, unacceptable damage is any change that is greater than normal wear and tear caused by the ball striking the uncovered wooden surface.

Protective equipment

Appendix 2 of the Laws defines protective equipment (Table A 3.4).

Table A 3.4 Requirements of protective equipment

General

- External protective equipment is any visible item of apparel worn for protection against external blows.
- For a batsman, items permitted are a protective helmet, external leg guards (batting pads), batting gloves and, if visible, forearm guards.

- For a fielder, only a protective helmet is permitted, except in the case of a wicket-keeper, for whom wicket-keeping pads and gloves are also permitted.
- A protective helmet is headwear made of hard material and designed to protect the head or the face or both. For the purposes of interpreting these Laws of Cricket, such a description will include faceguards.
- Equipment - a batsman's equipment is his/her bat as defined above, together with any external protective equipment he/she is wearing. A fielder's equipment is any external protective equipment that he/she is wearing

Wicket-keeping gloves.

Restrictions on the size and design of the gloves worn by the wicket-keeper are stated in Appendix E, including specifications on permitted webbing, including a diagram showing requirements.

A3.2 British Standards Institute (BSI)

BSI in the UK has published a series of standards related to the production of cricket equipment and apparel[4] but there is no standard related to cricket bats. Table A3.5 shows current and superseded standards for cricket gear.

Table A3.5 British Standards for cricket gear

Standard no.	Specification	Date published	Status
Balls			
BS5993: 1980	Specification for leather-covered cricket balls	29/08/1980	Superseded, withdrawn
BS5993:1987	Specification for leather-covered cricket balls	31/03/1987	Superseded, withdrawn
BS5993:1994	Specification for leather-covered cricket balls. Specifies the construction details, quality and performance of cricket balls: Dimensions, mass, construction, manufacture, finish, marking, performance requirements and methods of test for four grades and three sizes of cricket balls.	15/01/1995	Current
Headgear			
BS7928:1998	Specification for head protection for cricketers.	15/11/1998	Superseded, withdrawn
BS7928-2:2009	Head and face protection for cricketers. Face protectors for cricket wicket-keepers.	31/12/2009	Current
BS 7928:2013+A1:2019 (Amendment) - TC	Specification for head protectors for cricketers. It specifies the requirements for the materials, construction, markings and information to be supplied for head and neck protectors to be worn by cricketers in adult and junior cricket.	12/11/2020	Current

Other protective equipment			
BS 6183-1:1981	Protective equipment for cricketers. Specification for batting gloves, leg guards and boxes.	31/12/1981	Superseded, withdrawn
BS 6183-1:2000	Protective equipment for cricketers. General requirements. Provides definitions, requirements and test procedures for cricketers protective equipment. As well as marking requirements and information to be supplied with the equipment.	15/02/2000	Current
BS 6183-2:2000	Protective equipment for cricketers. Genital protectors.	15/02/2000	Current
BS 6183-3:2000	Protective equipment for cricketers. Leg protectors for batsmen, wicket-keepers and fielders, and thigh, arm and chest protectors for batsmen.	15/05/2000	Current
BS 6183-4:2001	Protective equipment for cricketers. Gloves for batsmen.	15/03/2001	Current

BS7928:2013 on the design and manufacture of head protectors has been adopted by ICC as the international standard. It specifies the methods to assess the impact attenuation properties during a drop test of the helmet and the protection provided against a ball or faceguard contacting a specified no contact zone of the face during a projectile test. It does not cover specific testing against a women's size ball and does not consider head protectors (helmets) for use in Kwik cricket, Incrediball, street cricket, or any other variant of the game (Kwik cricket and Incrediball are high-speed versions of cricket, played with plastic bat and ball and cones aimed mainly at encouraging children to take part in the sport, with an emphasis on participation and enjoyment).

Head protectors for cricketers can also be worn by close fielders and wicket-keepers. However, the testing protocol is designed for protection against batting related ball impacts, rather than those encountered in these fielding positions.

A3.3 Grades of willow for cricket bats

Bat makers select the wood used for a cricket bat and grade the pieces of willow according to some physical characteristics. There is no independent cricket bat grading standard, and it is down to the willow suppliers and manufacturers.

In general, higher grades of wood perform better. However, other factors such as where the wood is grown also make a big difference. A grade one wood will usually perform better than grade three or four, but the difference between one or two grades may not be hugely noticeable at lower levels of play.

JS Wright, accounting for 95% of the global supply of English willow has established the grades shown in Table A3.6[26].

Table A3.6 JS Wright cricket willow grades

Grade One The most expensive, and the best looking of all the cricket bat willow. There are at least six straight grains that are visible on the face of the bat, and while there are occasionally small knots or specks on the back of the bat or around the edges, the actual playing surface will look clean. ***Grade Two*** Grade two is still a very high-quality blade. It might have more red wood visible than grade one, but this does not significantly impact on the playability of the bat. The number of grains tends to be similar to grade one bats, but there may be the odd blemish. ***Grade Three*** Many manufacturers say that grade three is their best-selling type of bat. It tends to have a tint on the front of the wood but this does not mean that it is not playable. These bats can be almost as good as the above grades for "ping" though there is some debate on whether they last as long. It is likely there will be some specks around the face. ***Grade Four*** Grade four tends to be discoloured in general, but the playability is not affected. They often only have four grains running along the face, and they may have more butterfly marks and specks. ***Grade Five*** Grade five tends to have a lot of stain in it and does not look as good as even grade four wood, but it is still playable, especially for practicing.

Manufacturers often have their own grades. Those for Gunn and Moore (GM) shown in Table A3.7. Old established firms have tended to set industry standards but grade types are often reflected in brand names and particular features in materials and finish. For GM, trade mark finishes and toe guards also apply as standard.

Table A3.7 Gunn and Moore cricket bat grades

ORIGINAL L.E. ***** • The very best unbleached seasoned Grade 1 English Willow • Selected for grain structure and weight • Limited by willow availability • Bats individually tested to ensure 5 Star performance • Fitted with top quality treble spring multi-piece cane handle for outstanding feel, flex and control
ORIGINAL ***** • Superior unbleached seasoned Grade 1 English Willow • Predominantly straight grained with a hint of colour and minor cosmetic blemishes • Fitted with top quality treble spring multi-piece cane handle for outstanding feel, flex and control
SIGNATURE L.E. ***** • Prime unbleached seasoned Grade 1 English Willow • Predominantly straight grained with colour on one edge and minor cosmetic blemishes • Fitted with top quality treble spring multi-piece cane handle for outstanding feel, flex and control
909 ***** • Unbleached seasoned Grade 1 English Willow • Predominantly straight grained with colour on one edge and minor cosmetic blemishes • Fitted with top quality treble spring multi-piece cane handle for outstanding feel, flex and control

808 ***** • Superior unbleached seasoned Grade 2 English Willow • Minor blemishes, may have some colour to one edge • Fitted with good quality treble spring multi-piece cane handle for outstanding feel, flex and control •
707 / SIGNATURE ****** • Seasoned unbleached Grade 2 English Willow • Minor blemishes, may have some colour to one edge • Fitted with good quality treble spring cane handle
606 *** • Superior Seasoned unbleached Grade 3 English Willow • Minor blemishes, may have some colour to one edge • Fitted with good quality treble spring cane handle
MAXI *** • Seasoned bleached Grade 3 English Willow • Minor knot marks with some minor stain/speck • Fitted with treble spring cane handle
404 *** • Seasoned bleached Grade 3 English Willow • Knot marks with some stain/speck • Fitted with treble spring cane handle
303 * • Seasoned Grade 4 English Willow • Grained GM polycarbonate Dura Cover • Fitted with treble spring cane handle

Appendix 4: Cricket equipment products and suppliers

A4.1 Product classifications

Suppliers and distributors of cricket gear tend to use similar general product classifications as well as their own grading terms. Table A4.1 shows the main classifications

Table A 4.1 Cricket gear product classifications

Product type	Categories
Bats	
Size, weight	Senior/junior Men's/women's
Wooden bats	English willow, Kashmir willow, European willow
Grade	Suppliers grade
Balls	
Size/weight	Senior/junior Men's/women's
Colour	Red/white/pink
Material	Hard/soft (field, indoor, junior)
Purpose	Match/training/bowling machine
Grade	Suppliers grade
Batting gloves	
Size/weight	Senior/junior Men's/women's
Material/Grade	Suppliers grade
Wicket keeping, gloves, glove inners, wicket keeping pads and face shields	
Size/weight	Senior/junior Men's/women's Gloves and pads: Standard and lightweight
Material/Grade	Suppliers grade
Batting pads	
Size/weight	Senior/junior Men's/women's Standard/lightweight
Material/Grade	Suppliers grade
Helmets	
Size/weight	Senior/junior Men's/women's
Material/Grade	To BS 7928:2013 Standard e.g. (mild steel and stainless steel), Lightweight (e.g. titanium)
Other PPE: Thigh pads, thigh guards, arm guards, chest guards, box etc	
Size/weight	Senior/junior Men's/women's as relevant
Material/Grade	Suppliers grade

A4.2 Market sales for cricket gear

No accessible, published market data on cricket gear was obtained during this research. As noted in the main report, data of uncertain quality and currency is available at considerable cost.

A4.3 Cricket gear suppliers

There are estimated to be over 200 cricket gear suppliers (manufacturers or branded suppliers) to the England and Wales market. Table A 4.2 provides an illustrative list including the main larger suppliers and some of the approximately 50 'craft' bat makers which have emerged in England and Wales.

Table A 4.2 Examples of cricket gear suppliers

Manufacturer type/ company	Base country
Major global and other ports goods suppliers	
Adidas	Global
CEAT	India
MRF	India
New Balance	US
Nike	Global
Puma	Global
Sareen Sports	India (including TON brand)
Slazenger	UK
Major brand cricket gear and clothing specialists	
Aero	New Zealand
CA Sports	Pakistan
D&P Cricket	South Africa
DSC Cricket	India
FC Sondhi	India
Gray-Nicolls	UK
Gunn & Moore	UK
Kookaburra	Australia
Laver & Wood	New Zealand
Sanspareils – Greenlands (SG)	India
Sommers	Australia
Spartan Sports	HQ in China
Specialist suppliers, include	
British Cricket Balls	UK
Dukes Cricket Balls	UK
Masuri – helmets and other PPE	UK
Shrey – helmets and other PPE	India
Examples of smaller UK cricket specialists, including craft bat bakers	
Aldred B3 Cricket Blank Bats Boom Boom Cricket	

Charlie French Cricket
Chase Cricket Ltd
Choice Cricket
CP
Duncan Fearnley
Garrard & Flack
Hell4Leather Cricket
Heritage Cricket
Hunts County Bats
IEDii Cricket
Kippax
Millichamp & Hall
Mongoose
Newbery
Python Cricket
Robert Pack Cricket
Red Ink Cricket
Salix
Warsop Cricker
Wes Brookes Lionheart Cricket
Wombat
Woodstock
Woodworm
XX Cricket (Norfolk Cricket bat Company Ltd)

Appendix 5: Estimating waste from cricket gear

A5.1 Methods for estimating waste

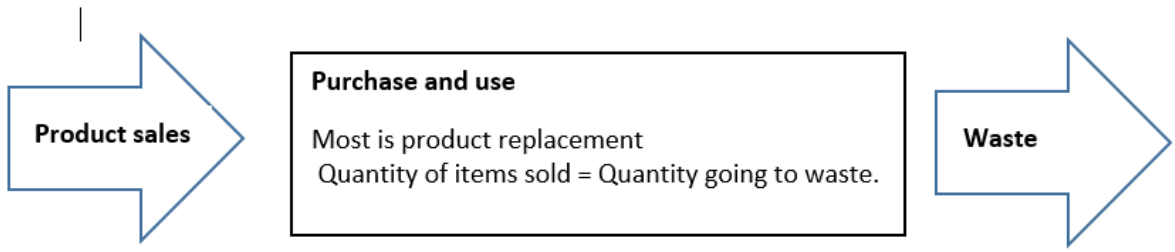
Various methods can be used to estimate end of life waste from cricket gear depending on data availability.

Method 1: Based on annual sales

This method applies to all gear. A simplifying assumption is that, in England and Wales, where the market is mature and growth modest, most new sales are replacing items that have been discarded. It is recognised that there will be some items purchased by new participants and additional items purchased for existing players but it is assumed that this is a small part of the total, say 1-2%. The number of items will be the value divided by the average price and the tonnage of waste the number items times the average weight (excluding packaging) (see Figure A5.1).

This is presently a hypothetical model since gear sales data was sought for England and Wales but none was found.

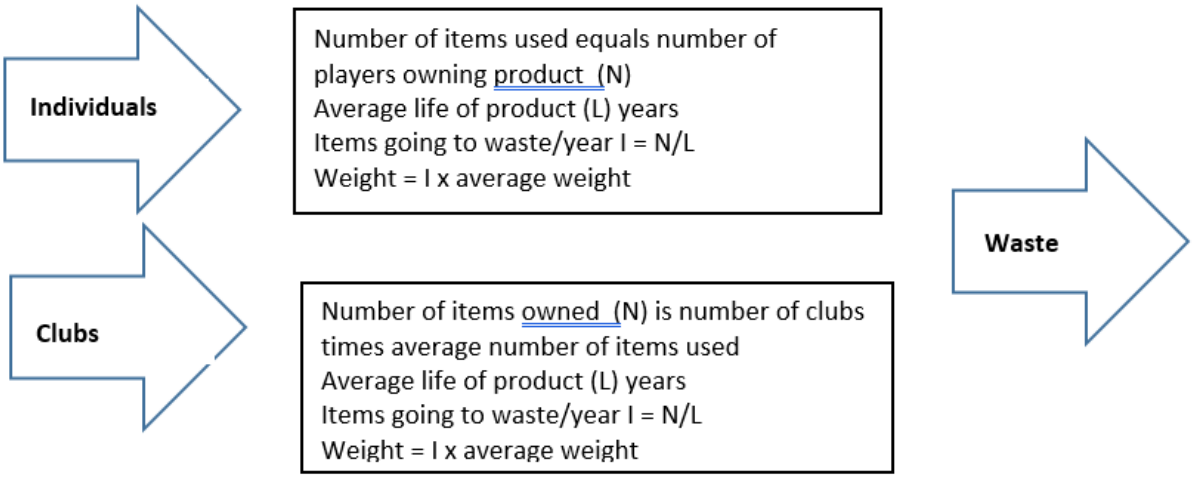
Figure A5.1 Method 1 model for estimating waste cricket gear



Method 2: Based on numbers of users and average product life

This method applies to bats, gloves, pads and helmets. The starting assumption is that waste is gear is a function of numbers of players, use by individuals owning their own gear or using club gear, and average life for the product type. Product life will vary with quality and degree of wear. Use and waste per player will be higher for professional players and for upper echelon recreational but lower for social levels. Without having detailed data on which to base consumption for different levels of play an average is developed for club recreational cricket, the bulk of all use and an adjustment made for other users – friendly, schools and professional. Any repair or other extension of product life is reflected in average lives.

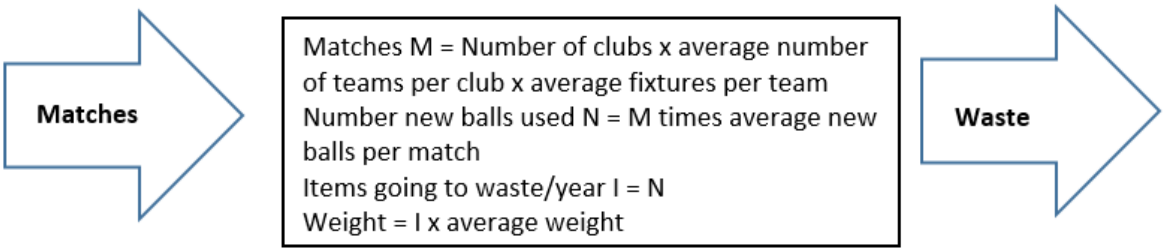
Figure A5.2 Method 2 model for estimating waste from bats and PPE



Method 3: Based on numbers of matches

This method applies to balls since there are specific rules and requirements relating to use in matches. The starting assumption is that waste balls are a function of the number of matches (number of clubs, teams and fixtures) and number of new balls per match. Again, an average is taken, recognising that numbers per match are higher at the professional levels and old balls are used at lower levels and for practice.

Figure A5.3 Method 3 model for estimating cricket gear waste



A5.2 Estimates of waste

Since no total sales value or unit sales numbers were obtained, 'end of life' waste in England and Wales has been estimated using method 2 for bats and PPE and method 3 for balls.

The estimates are based on the stated assumptions below and these can be adjusted if better data becomes available.

Some simplifying assumptions are made for England and Wales.

Numbers of players

1. Assume 300,000 adult players, playing at least once a month.
2. Assume 2000 professional and semi-professional players in County, National County and other higher levels of the game.
3. Assume 200,000 private school pupils at senior level (over 12) playing hard ball cricket (there are more than 700,000 pupils in 2300 independent schools; most boys' schools

and many mixed and girls' schools include cricket in the curriculum and many offer cricket development to high levels).

4. Assume 100,000 pupils in State schools playing at significant levels. Of 10 million pupils in 3500 State secondary schools assume 2000 include cricket in sports and many have active intra and inter-school activity.
5. There are significant numbers playing cricket at primary school and using wooden bats, but in private (prep) schools and mostly using soft balls.
6. Since cricket participation declined significantly in recent years, with a steep drop in 2010-2020, former players are also a potential source of waste as they release it. Approximately 50,000 players stopped playing during 2016-20.

Gear ownership

7. It is assumed that all players in the above groups (not including primary school pupils) own at least one bat and set of PPE (there has been a societal trend towards ownership and consumption; for performance, comfort and hygiene reasons players will tend to have their own rather than use a club or communal kit bag).
8. Professional and higher echelon adult recreational and junior players own several bats and more than one set of PPE.
9. Recreational clubs and schools, private and state, provide some gear, especially PPE, for non-owners.
10. Recreational clubs, schools and match organisers provide balls for matches and net practice.

Average life and weight – bats

11. Bat life will vary with quality, frequency of use, style of play and care in treatment and storage. Use and waste per player will be higher for upper echelon recreational and lower for social cricket. A good bat well looked after can last 10 years. A heavily used or poor quality, not cared for bat 1-2 years. There is anecdotal evidence of poorer quality bats entering the market and lack of careful use among some players, but also many players seeking to repair and refurbish their bats.
12. An average life of 4 years is assumed for adult bats.
13. Juniors will need to replace bats as they grow and the average life is, shorter assumed to be 3 years.
14. The average weight of an adult bat is 1.4 kg and junior bat 1 kg.

Ownership, average life and weight - PPE

15. As for bats, it is assumed that all players own at least one pair or item of gloves, batting pads and helmet. In the case of wicket keeping pads and gloves, this is a specialist activity. It is assumed that all wicket keepers own their own gloves and wicket keeping pads but these players are 10% of all cricket players.
16. Ownership will depend on level of play (higher at higher levels).
17. Life will depend on quality, use and care and in many cases (changing colours with sponsorship): Assume average lives for adult gear is 3 years for batting gloves, 3 years for wicket-keeping gloves, 5 years for pads and 5 years for helmets
18. Assume average lives for junior gear, shorter to allow for growth is 2 years for batting gloves, 2 years for wicket-keeping gloves, 3 years for pads and 2 years for helmets.

19. Many clubs and schools provide PPE for those needing it, which extends the quantity of ownership; for these average lives are 5 years.
20. Average weights for adult PPE (for pairs in the case of gloves and pads) are 0.6 for batting gloves, 3kg for wicket keeping gloves, 5kg for pads and 0.8 kg for helmets.
21. Average weights for junior PPE (for pairs in the case of gloves and pads) are 0.3 kg for batting gloves, 2kg for wicket keeping gloves, 3kg for pads and 0.5 kg for helmets.

Numbers of matches (for estimating use of balls)

22. There are 1000 professional matches a year using an average of 4 balls.
23. There are 6500 ECB –affiliated clubs with an average of 3 Saturday league teams (including juniors) and 20 fixtures per season. There are 2 new balls per match.
24. There are 500 non ECB-affiliated clubs playing in Saturday Leagues with 3 teams and 20 fixtures per season and 2 new balls per match.
25. There are 6500 ECB–affiliated clubs with an average of 2 Sunday league teams and 12 fixtures per season. There are 2 new balls per match.
26. There are 500 non ECB–affiliated clubs with an average of 2 Sunday league teams and 12 fixtures per season. There are 2 new balls per match.
27. There are 10,000 informal recreational teams playing 12 matches per season, 50% with new balls.
28. There are 2000 private schools with an average of 4 teams playing 12 inter-school matches per season, as well as intra-school house matches, all using 2 new balls.
29. There are 2000 state schools with an average of 3 teams playing 6 matches per summer term.
30. There are 50 junior teams playing in county and national championships, involving 1000 matches and 2 new balls per match.
31. Old balls are used for lower level games and practice, but some new practice and bowling machines.
32. Average weight is 0.163 kg

The calculations are set out in table A5.1 below.

Table A 5.1. Estimates of annual redundant cricket gear – England and Wales

Method/Assumptions	**Estimated annual waste**
BATS	
Method 2 Number of players, ownership, average life of bats	
Professional/top recreational players Players =2000; average bat ownership 4. Average bat life 1 year Redundant bats/year= number of players x ownership ÷ average life of bats = 2,000 x 4/1 = 8,000 Weight = 8000 x 1.4 kg = **11.2 tonnes** **Club recreational players** Players = 300,000. Assume a third own two bats or more. Average bat life 4 years with some repair Redundant bats/year= number of players x ownership ÷ average life of bats = 300,000 x 1.33 /4 = 100,000 Weight = 100,000 x 1.4 kg = **140 tonnes** **Private school players - senior** Players = 200,000. Assume 50% own two bats or more Redundant bats/year = number of players x ownership ÷ average life of bats (3 years)	**410 tonnes (t)** of which adult = 193 t junior = 217 t

= 200,000 x 1.5 /3 = 100,000 Weight = 100,000 x 1 kg = **100 tonnes** **State school players - secondary** Players = 200,000. Assume 20% own two bats or more Redundant bats/year= number of players x ownership ÷ average life of bats = 200,000 x 1.2 /3 = 80,000 Weight = 80,000 x 1 kg = **80 tonnes** **Private (prep) primary school players** Assume 100,000 pupils have wooden bats with an average life of 5 years. Redundant bats/year = 20,000. Weight 20,000 x 0.7 kg = **14 tonnes** **Recreational club-owned and shared team bats** Say 7000 formal clubs and 5000 informal teams own 50,000 bats for sharing/practice with an average life of 5 years Redundant bats/year= number of bats ÷ average life of bats = 10,000 Weight = 10,000 x 1.4 kg = **14 tonnes** **Private school-owned bats** Say 2300 senior and 1000 prep schools own 100,000 bats for sharing/practice with an average life of 5 years Redundant bats/year= number of bats ÷ average life of bats = 20,000 bats Weight = 20,000 x 1 kg = **20 tonnes** **State school bats** Say 2000 schools own 30,000 bats for sharing/practice with an average life of 5 years Redundant bats/year= number of bats ÷ average life of bats = 6000 Weight = 6,000 x 1 kg = **6 tonnes** **Former players (pre-2020)** Say each year 20,000 former players release a bat as waste Weight = 20,000 x 1.4 kg = **28 tonnes** Note: does not including plastic bats, other primary school cricket	
BALLS	
Method 3 Number of matches, new balls per match	
Professional/ National County/T20 Assume 1000 matches per year with an average of 4 new balls = 4000 balls Weight = 4000 x 0.163 kg = **0.65 tonnes** **Club and other recreational cricket – red ball** • Saturday Leagues: 7000 clubs x 3 teams x 20 fixtures x 2 new balls per match = 840,000 balls. Weight = 840,000 x 0.163 = **137 tonnes** • Sunday leagues: 7000 clubs x 2 teams x 12 fixtures x 2 new balls per match = 336,000 balls. Weight = 336,000 x 0.163 = **55 tonnes** • 10,000 informal teams playing 12 fixtures a season, 50% with 2 new balls = 120,000 balls. Weight = 120,000 X.163 =**20 tonnes**. **Schools and other junior cricket – red ball** • Private schools, inter-school competition: 2000 schools x 4 teams x 12 matches x 2 balls = 192,000 balls. Average weight 192,000 x 0.15 kg = **28.8 tonnes** • Private schools: Estimated use in intra-school matches: 2300 schools x 4 houses x 3 matches x2 balls = 55,200 balls = **8 tonnes** • State schools inter-school matches: 2000 schools x 4 teams x 12 matches x 2 balls = 192,000 balls. Weight = 192,000 x 0.15 = **29 tonnes** • Junior county championships: 36 counties x 3 teams x 12 matches per season x 2 balls = 2600 balls, weight **0.4 tonnes**. **Other** • Add redundant balls gradually released from when participation levels were higher and poor quality balls unfit for practice • Add redundant batting machine balls – quantities unknown • Estimate **10 tonnes** for these sources	**290 tonnes**

Notes It is assumed that all new hard balls are used secondarily for lower level games and in nets before becoming waste Note: does not include soft balls used in junior and indoor cricket.	
BATTING GLOVES	
Method 2 Number of players, ownership, average life of gloves	
Professional/top recreational players Players =2000; average glove ownership 4. Average glove life 1 year Redundant gloves/year = number of players x ownership ÷ average life = 2,000 x 4/1 = 4,000 Weight = 8000 x 0.6 kg = **4.8 tonnes** **Club recreational players** Players = 300,000. Assume a third own two pairs or more. Average glove life 3 years Redundant gloves/year= number of players x ownership ÷ average life = 300,000 x 1.33 /3 = 133,000 Weight = 133,000 x 0.6 kg = **80 tonnes** **Private school players - senior** Players = 200,000. Assume 50% own two pairs of gloves or more Redundant gloves/year= number of players x ownership ÷ average life (2 years) = 200,000 x 1.5 /2 = 150,000 Weight = 150,000 x 0.3 kg = **50 tonnes** **State school players - secondary** Players = 200,000. Assume 20% own two pairs or more Redundant gloves/year= number of players x ownership ÷ average life (2 years) = 200,000 x 1.2 /2 = 120,000 Weight = 120,000 x 0.3 kg = **40 tonnes** **Private (prep) primary school players** Assume 100,000 pupils have gloves with an average life of 3 years. Redundant gloves/year = 33,000. Weight 33,000 x 0.2 kg = **6 tonnes** **Recreational club-owned and shared team gloves** Say 7000 formal clubs and 5000 informal teams own 10,000 pairs for sharing with an average life of 5 years Redundant gloves/year= number of pairs ÷ average life = 10,000/5 = 2000 Weight = 2,000 x 0.6 kg = **12 tonnes** **Private school-owned gloves** Say 2300 senior and 1000 prep schools own 100,000 pairs for sharing with an average life of 5 years Redundant gloves/year= number of pairs ÷ average life = 20,000 pairs Weight = 20,000 x 0.3 kg = **6 tonnes** **State school gloves** Say 2000 schools own 30,000 pairs for sharing with an average life of 5 years Redundant gloves/year= number of pairs ÷ average life = 30,000/5 = 6000 pairs Weight = 6,000 x 0.3 kg = **1.8 tonnes** **Former players** Say each year 20,000 former players (pre- 2020) release a pair of gloves as waste Weight = 20,000 x 0.6 kg = **12 tonnes** Note: Does not include glove inners	**210 tonnes** of which adult = 109 t junior = 101 t
WICKET KEEPING GLOVES	
Method 2 Number of players, ownership, average life of pads	
Use same assumptions as for batting gloves except 10% of players own w/c gloves, average weight for adult gloves is 3kg/pair and for junior gloves 2kg. Adult batting glove waste is 109 tonnes. W/c glove waste is 109 x 10% x 3/0.6 = **55 tonnes** Junior batting glove waste is 101 tonnes. w/c glove waste 101 x 10% x 2/0.3 = **67 tonnes**	**120 tonnes**

PADS – batting and wicket keeping	
Method 2 Number of players, ownership, average life of pads	
Batting pads Use same assumptions on ownership and use as for batting gloves except average weight for adult pairs is 5kg/pair and for junior pads is 2.5 kg, average life for adult pads is 5 years (compared to 3 for gloves)and junior pads is 3 years. (compared to 2 for gloves) **Wicket keeping pads** In addition, add 10% to batting pads in each case to allow for 10% of all players owning wicket keeping pads. **Totals** Adult batting glove waste is 109 tonnes. Pad waste is 109 x 1.1 x 5/0.6 x 3/5 = **600 tonnes** Junior batting glove waste is 101 tonnes. Pad waste 101 x 1.1x 2.5 /0.3 x 2/3 = **620 tonnes**	**1200 tonnes**
HELMETS	
Method 2 Number of players, ownership, average life of helmets	
Use same assumptions on ownership and use as for batting gloves except average weight for adult helmet is 0.8kg and for junior helmets is 0.5kg, average life for adult helmets is 5 years (compared to 3 for gloves) and junior helmets is 3 years.(compared to 2 for gloves) **Totals** Adult batting glove waste is 109 tonnes. Helmet waste is 109 x 0.8/0.6 x 3/5 = **88 tonnes** Junior batting glove waste is 161 tonnes. Helmet waste 101 x 0.5/0.3 x 2/3 = **112 tonnes** It is recognised that the estimates may be high: some players do not own and use helmets and there may be more sharing at club and school level than is indicated. The availability of new lightweight helmets may be leading to a short term increase in disposal rates. Because of these uncertainties the estimate is rounded to 250 tonnes.	**200 tonnes**

Waste items and weights are summarised in Table A5.2 below.

Table A5.2 Summary of waste items and weights (totals are rounded, gloves and pads are pairs)

	Items (000s)			**Weight (tonnes)**		
	Adult	**Junior**	**Total**	**Adult**	**Junior**	**Rounded total**
Bats	138	217	340	193	217	**400**
Balls	1305	450	1760	223	67	**300**
Batting gloves	185	335	520	109	101	**200**
W/c gloves	18	32	50	55	67	**100**
Pads	120	250	370	600	620	**1200**
Helmets	110	220	330	88	112	**200**
Total	**1880**	**1500**	**3370**	**1270**	**1180**	**2400**

Appendix 6: PASIC (Platform for Accelerating Sustainable Innovation Cricket)

The Centre for Sustainable Design ® (CfSD) have partnered with British Association for Sustainable Sports (BASIS) to launch a new initiative to open discussions around sustainability, innovation, cricket equipment, clothing, and apparel. PASIC (Platform for Accelerating Sustainable Innovation in Cricket) is an online platform that aims to stimulate discussions, facilitate connections/networking and complete R&D projects related to sustainable innovation in cricket equipment, clothing and apparel. PASIC is a neutral, research-based platform that focuses specifically on cricket.

CfSD is based at the University of Creative Arts' (UCA), Business School for the Creative Industries (BSCI) and was established in 1995. CfSD focuses on research and knowledge transfer related to sustainable innovation and product circularity and completes research, training, and consultancy projects worldwide. The Centre has organised over a thousand conferences, workshops and webinars for businesses, policymakers and academia and participated in numerous UK and European funded projects. Further details of research, projects and events can be found on the Research and Projects pages of the CfSD website.

BASIS exists to help develop best practice strategies and integrate sustainability into the sports sector primarily focused on venues, facilities, and grounds. Its membership spans a variety of sports including cricket and members including MCC, ECB and county cricket clubs. Through webinars, workshops, and forums, BASIS encourage an open dialogue between leading academics, sustainability professionals and professional sports people, with the aim of inspiring systematic sustainable change within their organisations.

More information can be found on the following at the following website addresses

- The Centre for Sustainable Design www.cfsd.org.uk
- BASIS https://basis.org.uk/
- PASIC www.cfsd.org.uk/projects/cricket
- University for the Creative Arts www.uca.ac.uk
- Business School for the Creative Industries www.uca.ac.uk/business-school