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<http://hdl.handle.net/10950/483>

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Original Article

Analysis of goals scored in the 2010 world cup soccer tournament held in South Africa

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Published online: March 25, 2013

(Accepted for publication March 02, 2013)

DOI:10.7752/jpes.2013.01002;

Abstract:

Purpose: To analyze the pattern and trends of the goals scored during the 2010 world cup soccer tournament held in South Africa to derive the latest technical and tactical innovations with the hope of applying them at the lower echelons of the game.

Methodology: The study was a retrospective one as data were derived from the FIFA (2010) data base. The analysis centered on number of goals; parts of the body used to score; distance from goal; timing of goals in minutes; nature of play preceding a goal; score at half time and winning of the game; open play and set pieces; and the position of the scorers. Data were analyzed and descriptively presented in form of tables and figures.

Results: The scoring rate of the world cup was 2.27 goals per match, which is the second lowest in the history of the world cup which was inaugurated in 1930. There were more goals from open play (75.86%) than from set pieces (24.14%); most goals came via shots (108) rather headers (26); strikers scored majority of the goals (53.10%), followed by midfielders (34.48) and defenders (11.04%); more goals were scored in the second half especially in the last 15 minutes of normal regulation time and more goals were scored from within the penalty box than outside.

Conclusions: Coaches have to focus on improving the technical and tactical build up into the penalty area; encourage more goal attempts within the penalty box; emphasize and perfect set piece execution; prudently utilize substitution to impact the game in the second half, perfect crossing and headers and to enhance the physical conditioning of the players to enable them play out the entire game without suffering physical deterioration which causes teams to make defensive errors leading to goals in the last 15 minutes of matches.

Key Words: - FIFA, Association Football, Coaches, Headers, Goal Attempt, Substitution

Introduction

Soccer competitions provide avenues at which players and the coach apply the techniques and tactics acquired. In a competitive soccer match, the teams demonstrate contrasts in techniques and tactics (Docherty, 1978; Njororai, 2000; Wade, 1970; Winterbottom, 1964). Some teams may favor open play with long passes while others may prefer a closely - knit pattern of play. In a test game, the exchanges are so rapid that the observer has little time to study each separate movement of play. The pace of the game, the emotions aroused by the occasion, the partisan spirit of the observer, and the rapid succession of activities makes it difficult for a coach to give an objective and critical analysis of the factors underlying play (Armata et. al., 2007a, b; Njororai, 2000; Winterbottom, 1964). According to Winterbottom (1964) critical assessment of an individual or a team's performance requires not only a sound technical knowledge of the game, but also a disciplined mind in order to focus on separate factors. To overcome the deficiencies of mental analysis, an objective evaluation instrument is necessary (Hughes, 1995; Reilly, 1994). Proper analysis of performance enables the coach to retain and develop what is good and improve what a team is deficient in (Winterbottom, 1964). The coach uses the data to communicate to the players with regard to the level of play and the set objectives. Such data also provides feedback for motivation and further improvement of performance (Hughes, 1995). One critical area to match outcome requiring scrutiny is the goal scoring pattern.

Scoring of goals in the game of association football or soccer is one of the most exciting aspects of the game (Mal, 1982; Mayes, 1975). Spectators love goals and players who manage to put the ball in the net also celebrate uncontrollably. Scoring of goals determines whether a team wins or loses a game. This is because the object of the game is to score goals even as you strive to stop your opponent from scoring. The football world cup tournament represents the pinnacle of the game globally. It is a dream of a player to, not only take part in the world cup final tournament but also, win it and be crowned as a world champion. Association football (soccer) is one of the most popular sports, with more than 265 million players worldwide and 207 national associations affiliated to FIFA (FIFA, 2007). The climax on the calendar is the international competition that all countries throughout the world can participate in – FIFA World Cup, an international football competition contested by the men's national football teams of the member nations of Fédération Internationale de Football Association

(FIFA), the global governing body of football. This championship has been held every four years since the first tournament in 1930 with the exceptions in 1942 and 1946 due to World War II (Wong, 2008).

To determine the participating teams in the finals tournament, qualifying rounds take place during the preceding three years. They are held within six FIFA continental zones overseen by their respective confederations: the Asian Football Confederation (AFC); the Confédération Africaine de Football (CAF); the Confederation of North, Central American and Caribbean Association Football (CONCACAF); the Confederación Sudamericana de Fútbol (CONMEBOL), the Oceania Football Confederation (OFC) and the Union Européenne des Associations de Football (UEFA) (FIFA, 2011; Wong, 2008). The finals tournament features 32 teams competing over a month in the host nation(s). There are two stages: a group stage, followed by a knockout stage. In the group stage, teams compete within eight groups of four teams each. The top two teams from each group qualify to the knockout stage, which is a single-match elimination tournament (Wong, 2008). The knockout stage begins with the “round of 16” where the winners of each group play the runner-up of another group. This is followed by the quarterfinals, the semifinals, the third-place match (contested by the losing semifinalists) and the final. Therefore a total of 64 matches are played with the ultimate winner playing a minimum of seven matches.

To emerge winners, a team has to consistently score goals. Given that the world cup soccer tournament is the ultimate reflection of the development and level of modern soccer, there is interest in how techniques and tactics are executed so that lessons are derived to be applied to the lower echelons of the game (Jinshan, Xiacke, Yamanaka and Mitsuhiro, 1991; Njororai, 2004). The game is watched by millions of people worldwide and it reaches its peak during the tournament. According to Njororai (2004), “whereas for most fans, the interest is on the specific players, teams and/or general entertainment value of the spectacle, coaches, researchers and sports scientists focus on learning from it” (p. 326). During a tournament such as the world cup, researchers want to find out the reasons behind the excellent performances and derive lessons for developing young talent. Some areas that are of interest to coaches and sports scientists include the goal scoring patterns and the technical, tactical and physical characteristics of the winning teams and the overall technical and tactical innovations during the tournament (Jinshan et al., 1991; Njororai, 1996 a, b, c; 2000; 2004). According to Armata et al., (2007a), the coaching process is enhanced by the provision of additional information that “describes sport performance in detail beyond that which coaches can provide through recall of personal observations” (p. 49). Information derived from a quantitative and descriptive performance analysis can provide useful feedback which can enhance performance if appropriately implemented. A coach has therefore to act on the information derived from match observation.

According to Van Lingen (1991), a coach has to focus on a number of issues so as to improve the technical and tactical execution of the players. These areas include the following:

- a. Formulating the football problem and making the necessary connections between theory and practice.
- b. Analyzing football in such a way that a workable method can be developed in favor of the process of learning, maintaining and improving football techniques based on the reality of football.
- c. Making a correct diagnosis of the problem.
- d. Making the problem understandable and visible.
- e. Formulating the football problem properly.

The history of association football has seen a declining level of scoring leading to rule amendments after the 1990 world cup. As a consequence the scoring average went up in 1994 and 1998 but started coming down in 2002, 2006 and 2010. There is therefore need for more concerted efforts to perfect the scoring of goals via perfecting the scoring ability of the players (Njororai 1996 a, b, c; 2004; 2007a, b). One way to address the goal scoring phenomenon is by observing and identifying key aspects of the goal scoring that coaches need to pay attention too in training and competition (Armatas et al., 2007a, b; Njororai 2004, 2007b). This study therefore aimed at analyzing the scoring pattern and the trends of the 19th world cup soccer tournament and deriving some lessons that coaches and players need to address in practice. Additionally the study is meant to add to the growing body of literature on association football given its worldwide phenomenal appeal.

Material & methods

The study involved analyzing the goals that were scored during the 2010 world cup tournament. The tournament was hosted by South Africa between 10th June 2010 and 11th July 2010. Thirty two teams played a total of 64 matches scoring 145 goals. This averaged at 2.27 goals per game. The study itself was a retrospective one as the author derived the data from FIFA (2010) data base. The statistics were accessed at <http://www.fifa.com/worldcup/statistics>. Castellano et al. (2012) established the reliability of the FIFA match statistics by randomly coding five matches and compared with the FIFA website data. The resulting values using Cohen’s Kappa (K) were between 0.93 and 0.97. This demonstrates a high reliability index for the FIFA website data. The derived data was organized and presented via tables and figures. The key aspects of the analysis centered on number of goals; parts of the body used to score; distance from the goal; time of the goals in minutes; nature of play preceding a goal; score at half time and winning of the game; open play and set pieces; and the position of the scorers. Data were analyzed and descriptively presented in form of tables and figures.

Results

Rate of scoring

The average score per match was 2.27 goals. Out of the 64 matches played 47 were decided by the end of the 90 minutes regulation time, while 14 were drawn. Out of the drawn matches one was decided in extra time and two were decided through post – match penalty shoot-outs. There were 48 preliminary group matches, which produced 101 goals averaging 2.10 goals a game, while the knockout phase yielded 44 goals averaging 2.75 goals per game. The scoring rate was lower in the preliminary group phase compared to the knockout stage of the tournament.

How the goals were scored

Table I and figure 1 show how the goals were scored during the 2010 world cup.

Table I: How the goals were scored

| Goal set up | Number of goals | Percent (100) |
|------------------------|-----------------|---------------|
| Open play goals | | |
| Combination play | 29 | 26.36 |
| Wing play | 29 | 26.36 |
| Through pass | 11 | 10.00 |
| Diagonal pass | 06 | 05.45 |
| Solo effort | 07 | 06.36 |
| Exceptional finish | 07 | 06.36 |
| Defensive errors | 04 | 03.64 |
| Rebounds | 15 | 13.64 |
| Own goal | 02 | 01.82 |
| Sub Total | 110 | 75.86 |
| Set Pieces | | |
| Corner kick | 10 | 28.57 |
| Direct Free kick | 05 | 14.29 |
| Free kick assist | 10 | 28.57 |
| Penalty kick | 09 | 25.71 |
| Throw- in assist | 01 | 02.86 |
| Sub total | 35 | 24.14 |
| TOTAL | 145 | 100 |

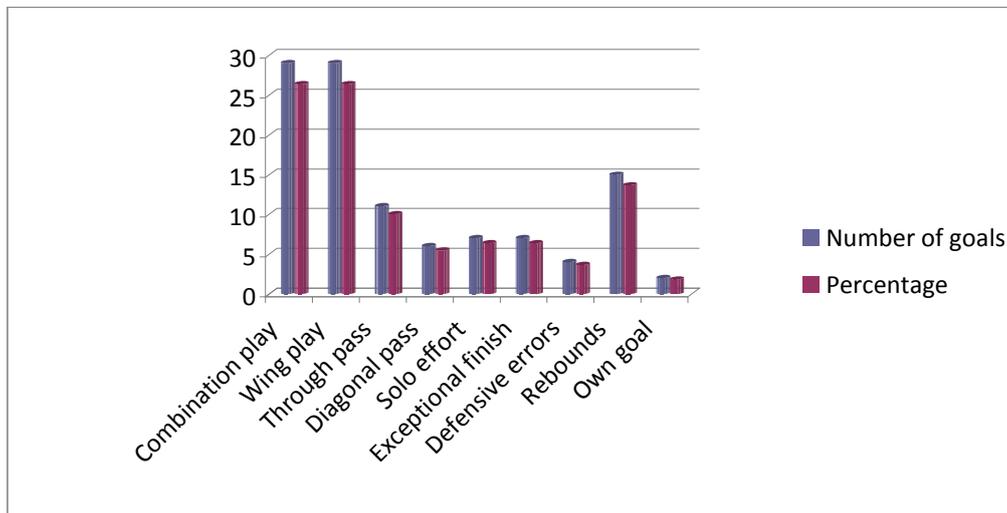


Figure 1: Goals scored from open play during 2010 world cup

Table I and figure 1 reveal that more goals were scored from open play than from set pieces. Open play yielded a total of 110 (75.86%) goals while set pieces directly and indirectly led to 35 (24.14%) goals.

Nature of scoring the goal

Figure 2 shows the proportion of goals scored via shots, headers, penalty kicks and own goals at the 2010 world cup tournament.

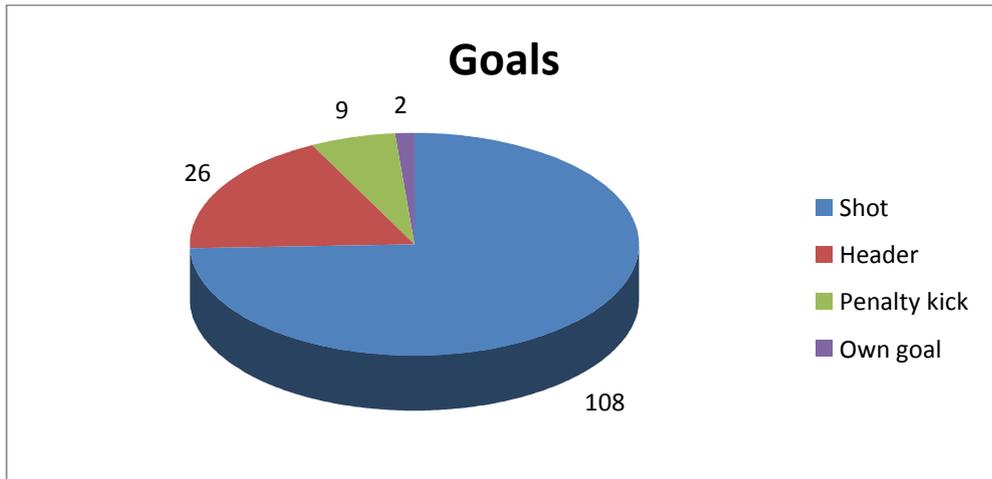


Figure 2: Nature of scoring the goal

The results showed that 108 goals emanated from shots; 26 from headers, 09 from penalty kicks and 02 from own goals. Excluding the penalties and own goals, 134 goals were scored with 26 (19.4%) being by headers and 108 (80.6%) were from the foot.

Who scored the goals?

Figure 3 shows the proportion of goals scored by strikers, midfielders and defenders.

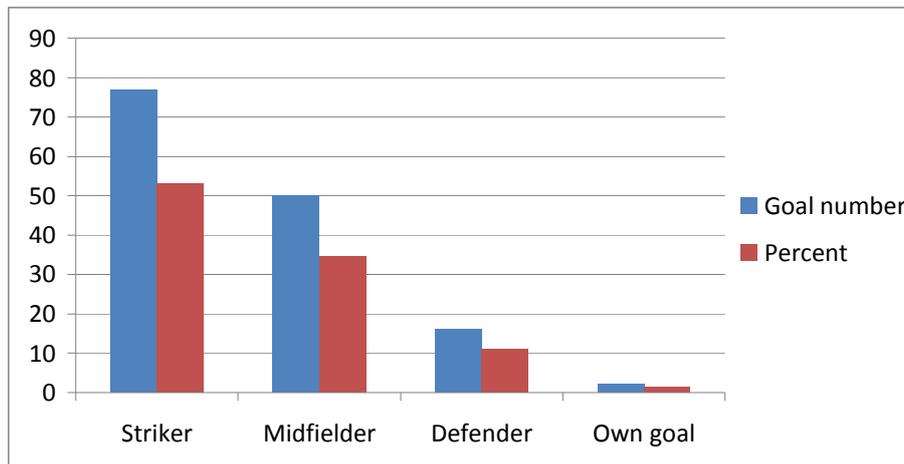


Figure 3: Who scored the goals?

As shown in figure 3, the strikers scored 77 goals (53.10%), compared to 50 (34.48% and 16 (11.04%) by midfielders and defenders respectively.

Timing of goals

Table 2 and figure 4 show the scoring trend throughout the matches during 2010 world cup soccer tournament.

Table 2: Timing of goals during 2010 world cup soccer tournament

| Timing Intervals | Number | Percentage | Rank |
|------------------|--------|------------|------|
| 1 - 15 | 14 | 9.66 | 6 |
| 16 - 30 | 23 | 15.86 | 3 |
| 31 – 45* | 22 | 15.17 | 4 |
| 46 - 60 | 22 | 15.17 | 4 |
| 61 - 75 | 27 | 18.62 | 2 |
| 76 – 90* | 35 | 24.14 | 1 |
| 91 - 105 | 01 | 0.69 | 7 |
| 106- 120 | 01 | 0.69 | 7 |
| TOTAL | 145 | 100 | |

- 2 goals scored in injury time after 1st 45 minutes and 6 after the 90th Minute.

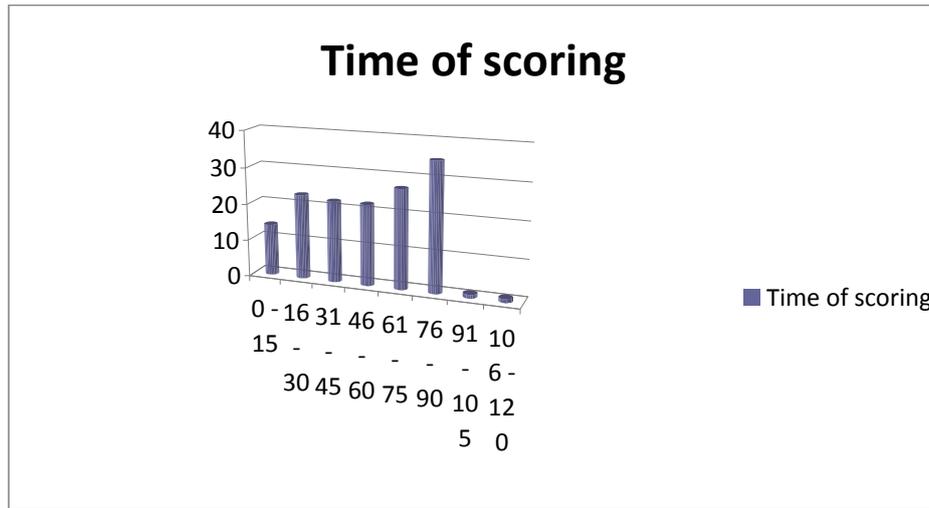


Figure 4: The timing of the goals

Figure 4 and table 2 show that the scoring peak was the 76 – 90 minutes’ period with 35 (24.14%) goals scored followed by the 61 – 75th minutes’ (22, 18.62%) interval of matches. Figure 4 shows that scoring increased as the matches progressed. It is notable that 02 goals were scored in injury time before half time and 06 goals were scored in injury time before the final whistle after 90 minutes.

Distance from Goal

Figure 5 shows that most of the goals were scored from the penalty box.

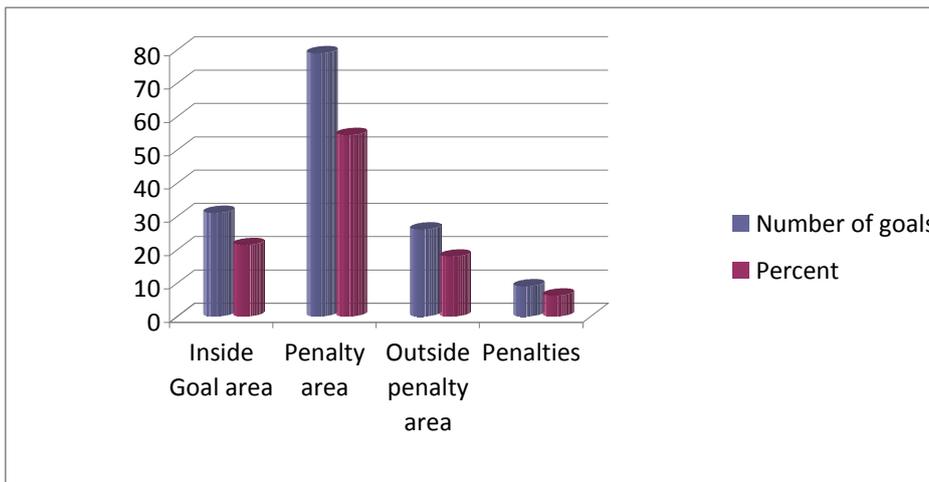


Figure 5: Distance from Goal

Figure 5 shows that 31 (21.38%) goals were scored from the goal area; 79 (54.48%) in the penalty area; 09 (06.21%) from the penalty spot and only 26 (17.93%) from outside the penalty area. Thus 82.07% of the goals originated from the penalty box.

Discussion

The scoring rate compares favorably with the 2006 tournament in Germany. The scoring rate in the 19th edition of the Soccer world cup tournament held in South Africa averaged 2.27 goals per match which compares favorably with the 2.30 per match in the 2006 world cup tournament in Germany. This average is the second lowest in the history of the world cup as it is only better than the 1990 world cup in Italy which averaged 2.21 goals per match (Jinshan et al., 1991; Luhtanen, 1991; Njororai, 2004). This average has been declining since 1994 where the average was 2.71 goals per match (Njororai, 1996a), 2.67 in France 1998 (FIFA, 2011); 2.52 in 2002 and 2.30 in the 2006 world cup tournaments in Japan- South Korea and Germany respectively (FIFA, 2012). This recent downward trend in scoring could be attributed to the emphasis on well -organized defending, ultra-cautious game tactics, declining success from set pieces; the newly introduced tournament ball that was difficult to control by players, improved standard of play from developing countries and a loss of form of elite strikers. The loss of form of elite players due to crowded soccer calendar and injuries over the long season both at club and national team levels could have contributed to the poor showing of some of the players (Njororai, 2004). A number of players known for scoring goals at club struggled at world cup including Lionel Messi (Argentina), Thierry Henry (France), Wayne Rooney (England), among others.

The open play led to the majority of goals. The free play showed an increase from the 2002 world cup where 71.4% of the goals came from open play while set pieces yielded 28.6% of the goals. It appears that there is an upward trend of free play yielding more goals as way back in 1994, open play led to 66.7% of the goals and set pieces 33.3%. The declining success rate of the set pieces could be attributed to improved defensive organization, inability of referees to notice infringements by defenders against attackers in the crowded penalty box; poor delivery of free kicks and corners; lack of imagination and preparedness on the part of the offensive teams from set pieces (Njororai, 2004; Roxburgh, 1996). The coaches have to purposely rehearse and practice to perfection the execution of set pieces if there is going to be any improvement in the success rate of set pieces. Referees too should show more commitment in ensuring that there is no infringement such as holding, shoving, shirt tagging and even encroachment on the minimum 10 metres' distance from the ball at set pieces. The shirt pulling, holding and jostling in the penalty box during set pieces such as corners, free kicks and goal mouth throw in deliveries contribute to the low rate of effectiveness in the execution of set pieces (Njororai, 2004). However, some technical executions also leave a lot to be desired. More imagination and creativity are needed on the part of coaches and players in the delivery from set pieces.

Soccer is dependent on kicking hence shooting is more natural than heading. Compared to other tournaments, the goals from headers declined from 23.6% in the 2002 to only 17.93% in 2010 world cup tournament. However, the rate of scoring with headers was close to the 18.2% scored in the 1994 world cup but much lower than the 24.3% registered for headers in the 1990 world cup (Njororai, 2004). The success of headers is depended on the quality of crosses, corners and free kicks as well as the tactical deployment of players. However, set pieces yielded only 35 goals throughout the tournament. There is therefore room for improvement on techniques and tactics that would yield more goals from headers.

It is noticeable that the scoring by defenders has fluctuated from 11.3% in 1990, 7.8% in 1994 to 13% in 2002 (Njororai, 1996a, 2004) and back down to 11.04% in 2010. However, there was a surge upwards in the goals scored by midfielders from 26.7% in 2002 to 34.48% in 2010. Conversely, there was a decline in the scoring by the strikers from 60.3% in 2002 to 53.10% in 2010. These changes reflect the versatile nature of the modern association football player who can not only defend and create but also surge forward to score (Njororai, 2004). The tight marking of the strikers may explain the decline in scores by attackers and the loss of form by some strikers during the world cup due to possible exhaustion from a long season with their clubs.

The increased scoring towards the end of the second half of matches is attributed to pronounced physiological deterioration of defenders as compared to forwards (Reilly, 1994; Njororai, 1996a, c, 2004, 2007a, b). Nepfer (1992, 1995, 1998) also attributed scoring of more goals towards the end of a match to good or poor physical condition, lack of concentration in defense due to mental and physical fatigue and all or nothing efforts to decisively influence match outcome. Studies by Armata et al., (2007a, b) identified a number of factors that could explain the increased scoring in the second half and especially towards the end of a match. According to the authors, goal scoring was time dependent. The critical factors contributing to the increased scoring in the second half included fatigue and physical deterioration; the increasing tempo of soccer matches; tactical roles of the players; dehydration and hyperthermia; diminished cognitive function which all combine to compromise decision making hence increased defensive errors as well as loss of concentration. In general, there were 59 (40.69%) goals scored in the first half and 84 (57.93%) in the second half, with 02 others coming in extra time of the matches. In the 2002 soccer world cup in Japan- South Korea, there were also more goals in the second half (91) compared to the first half (67).

It is apparent that coaches have to use substitutions carefully to cope with physical deterioration of the starting players. Using substitutes, who bring fresh legs into the game, could also be a contributory factor to increased scoring towards the end of matches (Njororai, 2007b). Sound use of substitutes helps to maintain peak performance by a team. Pulling out players who appear to have flagged in their efforts at the right time can help sustain a team's tempo or even provide a lift (Njororai, 2007b). Judicious use of substitutes contributes enormously toward the outcome of a match. Of course, substituting is a gamble and one only knows how well the decision worked after the game. In the 2006 and 2010 world cup tournaments, substitutes scored 23 and 15 goals respectively hence there is an important goal scoring contribution that substitutes bring into the game.

The 2010 world cup tournament had 82.07% of the goals originating from the penalty box. This is slightly lower than the 85.7% for the 2002 world cup; 86.1% for the 1990 edition, but more than the 76.7% registered in the US'94 world cup (FIFA, 1991; Jinshan et al., 1991; Njororai, 1996a, 2004). It is therefore vital that coaches emphasize successful build up and goal attempts from the penalty box where the chances of scoring are highest (Cohen, 1975; Docherty, 1978; Njororai 1996a, c; 2004). The high proportion of goals from the penalty box sends a message to coaches that there is need to practice and perfect the tactics and techniques that effectively penetrate and allow for goal attempts from close range. Whereas long range goals are spectacular for television replays, their ineffectiveness in leading to goals is high and therefore should only be used sparingly to cause surprise or by a player who can steer the ball with accuracy and power over a distance (Cohen, 1975; Njororai, 1996a, c; 2004).

Conclusions and Recommendations

The 2010 world cup soccer tournament recorded the 2nd lowest scoring average since the initiation of the tournament in 1930. The average of 2.27 was only slightly higher than the 2.21 registered in the 1990 world

cup in Italy. As the quality of the teams across the globe level off in terms of their technical, tactical, physical conditioning, psychological preparation and their exposure to sound scientific training, scoring of goals is going to depend more on a team's technical efficiency and a team's tactical effectiveness in front of goal. Of concern however are the long seasons that players have to endure culminating in loss of form during the world cup which comes at the end of the regular seasons. The failure by pre-tournament favorites such as Italy, France and Argentina could have contributed to the lowered scoring rate at the 2010 world cup. The time may be ripe for another look at the laws of the game to inject a new impetus in the game. Rule changes have been known to lead to an upward surge in goals such as the amendment to the off side rule and back pass rules in 1993 and implemented at the 1994 world cup where an average scoring went up to 2.71 goals per match. One possible area for consideration is incorporating goal line technology to enable referees make accurate decisions. This new addition to the rules of the game, hopefully would enhance officiating of the game.

The peak for scoring and conceding goals is between the 76th and 90th minutes of the game. Coaches should therefore be aware of the higher rate of scored and conceded goals in the second half of matches and particularly the last 15 minutes. The latter period is critical in a match that is relatively balanced. A coach should therefore prepare a team's all around capacity in terms of physical condition, technique, tactical sophistication and mental concentration so that one can withstand the varied situations in a match in terms of leading or trailing in scores. The use of proper diet and recuperative therapies during match preparation throughout the tournament are also vital in sustaining a player's physical and mental state. Above all, coaches should monitor and focus the players to remain in peak condition in the last second half of the game by using strategic substitutions during the game (Njororai, 2007; 2012). A decline between the first and second half in the physical performance of players has been observed and it is associated with a decline in technical executions involving passing and receiving the ball (Hoff, 2005; Njororai, 2012). Several factors combine to lead to increased goal scoring in the second half of matches including the onset of fatigue, tactical choices, fluid balance and lapses in concentration. A coach should therefore monitor the distance as well as the work rate of players so as to change the tactics or even make a substitution to avoid the opposition exploiting this emerging physical weakness. Substitution of players before the onset of fatigue towards the end of the game may restore the imbalances in work rate. According to Carling et al. (2008), substitute players have been shown to cover significantly more ground at high intensity during the final 15 minutes than the other players already on the pitch.

Overall, it is clear from this analysis that coaches have to focus on improving the technical and tactical build up into the penalty area; encourage more goal attempts within the penalty box; emphasize and perfect set piece execution; prudently utilize substitution to impact the game in the second half, perfect crossing and headers and to enhance the physical conditioning of the players to enable them play out the entire game without suffering physical deterioration which causes teams to make defensive errors leading to goals in the last 15 minutes of matches.

References

- Armatas, V., Yiannakos, A., & Sileloglou, P. (2007a). Relationship between time and goal scoring in soccer games: Analysis of three world cups. *International Journal of Performance Analysis in Sport*, 7 (2), 48 – 58.
- Armatas, V., Yiannakos, A., Galazoulas, C. & Hatzimanouil, D. (2007b). RGoal scoring patterns over the course of a match: Analysis of Woman's high standard soccer matches. *Physical Training*, January, p.1, 1p.
- Carling, C., Bloomfield, J., Nelsen, L., & Reilly, T. (2008). The Role of Motion Analysis in Elite Soccer: Contemporary Performance Measurement Techniques and Work Rate Data. *Sports Med.*, 841 – 862.
- Castellano, J., Casamichana, D. & Lago, C. (2012). The use of match statistics that discriminate between successful and unsuccessful soccer teams. *Journal of Human Kinetics*, 31, 139 – 147.
- Cohen, J. (1975). Psychological aspects of sport with particular reference to variation in Performance. In: Whiting H.T.A. (Ed). *Readings in Sports Psychology*, (85-121) London: Lepus books.
- Creek, F.W.S. (1970). *Soccer*. London: Teach Yourself Books.
- Docherty, T. (1978). *The ABC of Soccer sense: Strategy and Tactics Today*. London: FIFA (1994). FIFA World Cup USA 1994: *Statistics*. Zurich: FIFA.
- FIFA (2007, July). Big Count 2006: Statistical Summary Report by Association. FIFA.
- FIFA (2010). 2010 FIFA World Cup South Africa Player Statistics. Retrieved from <http://www.fifa.com/worldcup/statistics>
- Hoff, J. (2005). Training and testing physical capacities for elite soccer players. *Journal of sports sciences*, 23 (6): 573 – 582.
- Hughes, M. (1995). Notation Analysis in Football. In Reilly, T., J. Clarys and A Stibbe. *Science and Football II, Proceedings the Second World Congress of Science and Football*, (151-159), Veldhoven, The Netherlands, May 22-25, 1991.
- Jinshan, X., Xiaoke, C., Yamanaka, K., & Matsumoto, M. (1995). Analysis of the Goals in the 14th World Cup. In Reilly, T., J. Clarys and A Stibbe. *Science and Football II*,

- Proceedings the Second World Congress of Science and Football*, (203-205), Veldhoven, The Netherlands, May 22-25, 1991.
- Luhtanen, P. (1995). A Statistical Evaluation of Offensive Actions in Soccer at World Cup level in Italy 1990. In Reilly, T., J. Clarys and A. Stibbe. *Science and Football II, Proceedings the Second World Congress of Science and Football*, (215-220), Veldhoven, The Netherlands, May 22-25, 1991.
- Mal, B. (1982). Scoring Ability in Football. *SNIPES Journal*, 5 (2), 19-23.
- Mayes, H. (1975). Goals are News. *Football News*, 1 (12), December, 36-37.
- Nepfer, J. (1991). Italy '91: *Technical Report- U-17 World Championship for the FIFA/JVC Cup*. Zurich: FIFA.
- Nepfer, J. (1992). *Barcelona '92: Technical Report*. Zurich: FIFA.
- Nepfer, J. (1998). *Technical Report: FIFA World Cup France '98 10 June – 12 July*. Zurich: FIFA.
- Njororai, W. W. S. (1996a). Analysis of goals scored in the USA '94 World Cup soccer tournament. In L. O. Amusa, M. Wekesa & A. L. Toriola (eds). *The making of an African athlete: A multidisciplinary approach. Proceedings of the 2nd Conference of the Africa Association for Health, Physical Education, Recreation, Sports and Dance, 8-13 September, 1995*, pp. 129-134. Gaborone, Botswana: AFAHPER_S.D.
- Njororai, W. W. S. (1996b). Goals scored in the Africa Cup of Nations Soccer Tournaments 1957 1994. In L. O. Amusa, M. Wekesa & A. L. Toriola (eds). *The making of an African athlete: A multidisciplinary approach. Proceedings of the 2nd conference of the Africa Association for Health, Physical Education, Recreation, Sports and Dance, 8-13 September, 1995*, Pp. 119-128. Gaborone, Botswana: AFAHPER_S.D.
- Njororai, W. W. S. (1996c). Scoring pattern in the 1994 Africa Cup of Nations Soccer Tournament. *AJPHERD*, 2 (2), 72-79.
- Njororai, W. W. S. (2000). An analysis of technical and tactical performance of national soccer teams of Kenya, Germany and Argentina. Unpublished Ph.D Thesis, Kenyatta University, Nairobi, Kenya.
- Njororai, W. W. S. (2004). Analysis of the goals scored at the 17th World Cup Soccer Tournament in South Korea- Japan 2002. *AJPHERD*, 10(4), 326-332.
- Njororai W. W. S. (2007a). More than physical: Technical ability and personality traits also are factors in performance. *Soccer Journal*. September/October, 14- 18.
- Njororai W. W. S. (2007b). Scoring Goals: What the coach should know about the timing. *Soccer Journal*. November/December, 34- 36.
- Njororai W. W. S. (2012). Physical demands of soccer: lessons from team USA and Ghana matches in the 2010 FIFA WORLD CUP. *Journal of Physical Education and Sport* ® (JPES), 12(4), Art 60, pp. 407 – 412.
- Reilly, T. (1994). Physiological Aspects of Soccer. *Biology of Sports* 11, 3-20.
- Roxburgh, A. (1996). *Euro '96 Technical Report*. Nyon: UEFA.
- Van Lingen, B. (1995). Football and Science. In Reilly, T., J. Clarys and A Stibbe. *Science and Football II, Proceedings the Second World Congress of Science and Football*, Veldhoven, The Netherlands, May 22-25, 1991.
- Wade, A. (1972). *The FA Guide to Training and Athletic Performance*, London: Longman.
- Winterbottom, W. (1964). *Soccer Coaching*. London: William Heinemann Ltd.
- Wong, D. (2008). Characteristics of world cup soccer players. *Soccer Journal*, January-February, 57 – 62.