

Bokoji Town Long-Distance Running Dominance: What Justifies It?

Abera Assefa¹, Dagne Getachew²

¹Lecturer Hawassa University, Ethiopia

²Lecturer Jimma University, Ethiopia

Abstract: Bokoji is a town of 17,000 inhabitants in the Arsi Zone of the Oromia Region, central Ethiopia, With a latitude and longitude of 7°35'N 39°10'E/ 7.583°N 39.167°E and an elevation of 2810 m. Over the last 20 years, Bokoji athletes have won 10 Olympic gold medals, 32 World Championships and have set 10 world records, in long distance running. For this reason, different explanations have been advanced to explain why such a small population sector has dominated long distance running over time. Hence, this review paper intended to give an insight on the possible factors, which are commonly cited as reasons for Bokoji long-distance running dominance: genetic predisposition, diet, environment, metabolic efficiency, motivation, and social development. Although it is evident from this review that no possible factor is essential to the acquisition of Bokoji's long-distance running dominance, future studies should concentrate on the investigation of the proposed factors often described.

Keywords: Bokoji, Long-distance, Running dominance

1. Introduction

Bokoji, the pastoral, grain-producing village in the highlands of Ethiopia, has produced seven Olympic –winning runners: Kenensia Bekele and his younger brother Tariku Bekele, Fatuma Roba, Tiki Gelana, Derartu Tulu and her cousins Ejegehu Dibaba and Tirunesh Dibaba (Ashdown, 2014). The statistics are hard to ignore that since Ethiopia joined the Olympic games in 1956 up to 2012 London Olympic, a total of 45 medals have been collected in middle and long distance running, of which 21 gold (Gebrehiwot, 2013; Judah, 2008;and IOC,2012);owing to Bekoj 16 Olympic medals ,—10 of them gold (See Figure 1). It is important, at this outset, to point out 10 of the gold medals Bokoji athletes has ever won in Olympic Games, make up approximately 48 % of Ethiopia's total gold medals.

In this regard , Ashdown (2014) points out that the runners from this tiny town of 17000, which constitute only 2 % of

the Ethiopian's population, have hauled in more gold medals than India (population: 1.2 billion) has won in all summer Olympic categories put together. The same writer further goes on to add that the Dibaba sisters alone have won as many medals as Syria (population: 28 million) and Saudi Arabia (population: 28 million) combined. From this assertion without going into detail, one can be safe to say that Ethiopian athletics dominance have been on the shoulder of Bokoji's famous sons and daughters in the last 20 years (See figure 1). It is necessary, therefore, to take a closer look why such a small population sector has been the dominant force of long-distance running and become the pride of the entire nation, in general. In fact, the answer to this question is enormously complex, obviously not down to one single factor, and remains unclear (Hamilton, 2014). This review sets out to examine the most possible factors commonly cited as a reason for the dominance.

No.	Name	Medal Won	Olympic Game	Event
1.	Derartu Tulu	Gold	Barcelona 1992	Women's 10,000 mt.
2.	Fatuma Roba	Gold	Atlanta 1996	Women's Marathon
3.	Derartu Tulu	Gold	Sydney 2000	Women's 10,000 mt.
4.	Kenenisa Bekele	Gold	Athens 2004	Men's 10,000 mt.
5.	Kenenisa Bekele	Silver	Athens 2004	Men's 5,000 mt.
6.	Ejiegayehu Dibaba	Silver	Athens 2004	Women's 10,000 mt.
7.	Tirunish Dibaba	Bronze	Athens 2004	Women's 5,000mt.
8.	Derartu Tulu	Bronze	Athens2004	Women's 10,000mt.
9.	Kenenisa Bekele	Gold	Beijing 2008	Men's 10,000 mt.
10.	Kenenisa Bekele	Gold	Beijing 2008	Men's 5,000 mt.
11.	Tirunish Dibaba	Gold	Beijing 2008	Women's 10,000mt.
12.	Tirunish Dibaba	Gold	Beijing 2008	Women's 5,000mt.
13.	Tirunish Dibaba	Gold	London 2012	Women's 10,000mt.
14.	Tiki Gelana	Gold	London 2012	Women's Marathon
15.	Tariku Bekele	Bronze	London 2012	Men's10, 000mt.
16.	Tirunish Dibaba	Bronze	London 2012	Women's 5,000mt.

Figure 1: Bokoji 16 Olympic medals

Adopted from IAAF (2012) <http://www.iaaf.org>

2. Possible Factors of Dominance

Many factors have been described to explain the dominance of East African middle and long distance runners in general and Bekojis of Ethiopia in particular. Many of these factors have not yet revealed any definitive advantage, but are so fixed as cultural arguments and continue to be cited as possible suggestion of success (Fishe, 2012; Karger, 2009; Hamilton, 2014). It is worth noting that the proposed factors of dominance most often described, among others, genetic predisposition, diet, Environment, Metabolic efficiency, Motivation as well as social development background (Ellis, 2013, Micheal, 2012; Wilber & Pitsiladis, 2012; Hamilton, 2014; Larsen, 2003), while the psychological makeup is rarely considered (Hamilton, 2014). Here under the aforementioned possible factors most commonly cited as a reason for the dominance are reviewed briefly as follows:

Genetic Predisposition

Genetic endowment is often stated as an obvious reason of Bekoji's long-distance dominance, for instance, containing approximately 5% of the Ethiopian population, the Arsi region of Ethiopia, in which Bakoji is also incorporated, accounted for 14 of the 23 distance runners selected for the country's 2008 Olympic team. Explicitly in this Olympic Games, Bakoji athletes have secured four gold medals (see figure 1). It is hardly surprising that this extraordinary geographical correlation has prompted such speculation that Ethiopians have the "performance genes" for distance running (Hamilton, 2000; Onywere, Scott, Boit, Pitsiladis 2009; Scott, 2003). More recently, however, researches have emerged that the population from which Ethiopian athletes are drawn have not been isolated population and are not genetically distinct from the other Ethiopians, as the test from mitochondrial DNA (Scott, et al., 2014). This finding is also in agreement With Pitsiladis's (2012), who has spent much time taking genetic samples, and carrying out tests on the elite Ethiopian runners and general population to try and find links. After taking samples from all the elite runners they could track down, the analysis shows no obvious genetic advantage; all have a very different and diverse makeup. Similarly, if one considers the Kenyan-Nandi, which constitutes only 1.8% of Kenya's population, but supplied 42.1% of the nation's elite runners. It is interesting to note that Nandi's intermarrying between the different tribes has been occurring for many years, and factors other than just the Nandi gene pool are involved (Larsen, 2003), this again can be true to Ethiopian-Bakoji because the way of life in these two rural society is comparable. To this end, it is unjustified to implicate a role for genetics in the success of Ethiopian-Bakoji runners when no genes have been identified as being important to their performance.

Diet

Another factor, which has often been quoted for Bekoji athletes dominance is nutrition. In conformity to this, the International Association of Athletics Federation (IAAF) Consensus Statement on Nutrition for athletics published in 2007 pointed out: "Well chosen foods will help athletes train hard, reduce risk of illness and injury, and achieve

performance goals, regardless of the diversity of events, environments, nationality, and level of competitors".

However, research has found that east African athletes actually under eating by 9% per day as compared to what it would be recommend and do not drink water as much as scientists would expect them to, very little during their long training runs (Pitsiladis, 2014). Surprisingly, comparing Kenyan and Ethiopians' diets Onywere et al. (2004) found out that the traditional Kenyan diet is composed of 10% protein, 13% fat, and 77% carbohydrate. Whereas, the traditional Ethiopian diet is composed of 13% protein, a higher fat proportion of 23% and a lower carbohydrate proportion of 64%. While favorable for middle and long-distance training and performance, the Kenyan and Ethiopians' diets do not appear uniquely different from the training diets of most other international competitors and probably do not confer any distinct competitive advantage (Beis et al., 2011). In particular, providing an exemplary statement on Bakoji Athletes', Sentayehu Eshetu, who trained most of Bekoji's successful runners, has to say this: "the majority of Bekoji's young athletes face many difficulties in their bid for success -- sporting equipment does not come cheap, while most have no more than two meals a day" (Gebrehiwot, 2013; Hattenston, 2012). To this effect, one could see that Bekoji athletes' dominance is not likely a nutrition-mediated phenomenon.

Environment

Ethiopia's most accomplished runners tend to hail from the Shewa and Arsi zones (Bekoji is in Arsi), while Kenyans best are usually from Nandi County. All these regions run along the steep edges of the Great Rift Valley, at elevations of 2000m to 2500m. (Ashdown, 2014, Wilber & Pitsiladis, 2012). And, if altitude helps to build endurance, Bekoji is much higher than many other towns in the steep edges of the Great Rift Valley, with an elevation of 2810 mt. (Ashdown 2014).

Indeed, the physiological strain placed on humans training at altitude due to the lower concentrations of atmospheric oxygen, is noticeable; some researchers have suggested that one of the main factors for success in long distance running is the ability to train on a consistent basis at race pace or faster, even at altitude. Principally, utilizing a traditional approach to altitude training – "live high" and "train high" (Baker, Horton, 2003; Bushell, 2012; Larsen, 2003). Although Hamilton, (2000) indicated that if altitude were the only factor involved, then all African countries with high altitude populations, as well as countries such as Nepal, Peru, and Mexico, should be producing many world-class athletes. At this stage, on common sense grounds, it might be said that altitude natives might have similar, indeed larger, chronic adaptations to altitude that would predispose them to superior values for aerobic metabolism. Evidence to support this assumption is, however, generally lacking (Lucia et al., 2006). Overall, it is clear that living and training at altitude results in a variety of physiological adaptations, the exact nature, and relative importance of these adaptations to the success of these athletes from altitude are still to be elucidated (Hamilton, 2000).

Metabolic Efficiency

Kenyan and Ethiopians differ in their body shapes or somatotypes. The Kenyans are predominately ectomorphic with long, slender, and lighter legs. The Ethiopians are more mesomorphic with shorter, thicker thighs and lighter skin. Saltin et al., (1995) also demonstrated that elite Kenyan distance runners were more metabolically economical than elite Scandinavian distance runners. While it may appear the ectomorphic somatotype of elite Kenyan runners may contribute to their enhanced Biomechanical and metabolic efficiency, this has yet to be evaluated in elite Ethiopian distance runners (Bushell, 2012).

Motivation

Almost half of the Kenyan population and 39% of Ethiopian citizens live below the World Health Organization poverty line. Success in distance running can translate into economic and social advancement not only for the athlete but also for his or her immediate and extended family, for the rest of their lives (Bushell, 2012; Ellis, 2013); these fosters an attitude for hard work and mental toughness. In this regard, Onywera et al., (2006) reported that among Kenya's elite distance runners, 33% indicated that economic success was the primary reason they trained and competed, while 14% listed 'Olympic glory' as the main reason they ran. Further fueling this motivation is the great "tradition of excellence" that connects today's outstanding Kenyan and Ethiopian distance runners to their legendary predecessors. In Kenya, this tradition of excellence began with Kip Keino's 1500m gold medal performance in the 1968 Mexico City Olympics. Similarly, in Ethiopia with Abebe Bikila winning the 1960 Rome Olympic marathon. This motivation for economic success aligned with a deep tradition of excellence should not be discounted as an important factor behind the success of the Kenyan and Ethiopian distance runners (Bushell, 2012). However, it should not have to be credited as the only decisive factor for athletes' success, since there is a lack of clarity about exactly what constitutes the incomparable successful history of Bekoji Athletes.

Social Development

Traditional social and cultural factors have often been described as "advantage", and, although these factors' contribution have not yet answered; thought to be as proposed factors for Bekoji athletes' dominancy. In line with this, Pitsiladis, (2014) pointed out that there is even one school in Bekoji Ethiopia, which has produced 7 or 8 Olympic/world champions. This could be as the result of running to and from school as children and adolescents, early acquaintance contribute to the development of athletes ability in later life (Saltin, 1995). On the other hand, there is still handful of successful athletes those who had never been required to run to school, even in Bekoji. Another cultural argument says that running barefoot develops good habits, but if this were true then surely the far more populated countries of South Asia, where living without shoes is also common, would dominate long distance running (Oakley, 2014). In addition, in many places of Ethiopia there would have been, at least, world champions like Bokoji or running dominancy would not have been concentrated in

Bekoji, as majority of rural dwellers in Ethiopia still living without shoe.

3. Conclusion

If anything has clearly emerged from this review paper, it is that there is hardly one major influential factor, which explains the exceptional success of Bekoji athletes. In other words, the exact natures of these variables: genetic predisposition, diet, environment, metabolic efficiency, motivation, and social development, and their relative importance, as well as the role of nature and nurture, are not exhaustively studied phenomenon. Although at this stage, our understanding is still far from complete and most likely the reasons of their success are many, as Fisher (2012) summarized it, "ideal environments + a tremendous amount of hard work and focus on a specific thing = success beyond what most people achieve". More information on these variables would help to establish a greater degree of accuracy on this matter. Therefore, further studies, which consider these variables, will need to be undertaken.

References

- [1] Baker, J., and Horton, S. (2003). East African running dominance revised a role for stereotype threat. *Br J Sports Med.* 37:553–555.
- [2] Bosch, A.N., Goslin, B.R., Noakes, T.D., and Dennis, S.C. (1990). Physiological differences between black and white runners during a treadmill marathon. *Eur J Appl Physiol.* 61:68–72.
- [3] Bushell , M. (2012). *Why are Kenyan and Ethiopian distance runners so good?* Retrieved April 5, 2014, from <http://runnersphysio.com.au/wp-content/uploads/2012/03/Newsletter-No.4.pdf>
- [4] Christensen, D.L., Van Hall, G., and Hambraeus, L. (2002). Food and macronutrient intake of male adolescent Kalenjin runners in Kenya. *British Journal of Nutrition.* 88, 711–717.
- [5] Ellis, J. (2013). Tiny town that breeds Olympic champions-CNN.com Retrieved August ,2014 from <http://edition.cnn.com/2013/02/27/sport/bekoji-ethiopia-running/index.html>
- [6] Ethiopian Statistic agency report. (2005).
- [7] Gebrehiwot, M . (2013). *Bekoji, tiny town that breeds Olympic champions/Ethiosports.* Retrieved June 12, 2014 from <http://www.ethiosports.com/2013/02/27/bekoji-tiny-town-that-breeds-olympic-champions/>
- [8] Hamilton, B. (2000). East African running dominance: what is behind it? *Br J Sport Med,* 34:391–394.
- [9] Judah, J. (2008). *Bikila Ethiopia's Barefoot Olympian.* United Kingdom: Reporting Press.
- [10] Larsen, H.B. (2003). Kenyan dominance in distance running. *Comp Biochem Physiol A Mol Integr Physiol.* 136:161–170.
- [11] Lucia, A. (2006). Physiological characteristics of the best Eritrean runners—exceptional running economy. *Appl. Physiol. Nutr. Metab.* 31, 1–11.
- [12] Oakley, B. (2012). East African runners what makes them so dominant? Retrieved March 2014, from <http://news.bbc.co.uk /sport /2/hi/Olympic-games/world-Olympic-dreams/default.stm>

- [13] Onywera, V.O. (2009). East African runners; Their genetics, lifestyle and athletic prowess. *J Sports Sci.* 54:102–109.
- [14] Onywera, V.O., Scott, R.A., Boit, M.K., and Pitsiladis, Y.P. (2006). Demographic characteristics of elite Kenyan endurance runners. *Journal of Sports Science.* 24(4), 415-423.
- [15] Onywera, V.O., Kiplamai, F.K, Boit, M.K., and Pitsiladis, Y.P. (2004). Food and macronutrient intake of elite Kenyan distance runners. *International Journal of Sport Nutrition & Exercise Metabolism.* 14(6), 709-720.
- [16] Saltin B, Larsen, H., and Terrados, N. (1995). Aerobic exercise capacity at sea level and at altitude in Kenyan boys, junior and senior runners compared with Scandinavian runners. *Scand J Med Sci Sports.* 5:209–21.
- [17] Scott, R. A., Georgiades, E., Wilson, R.H., Goodwin, W.H., Wolde, B., and Pitsiladis, Y.P. (2003). Demographic characteristics of elite Ethiopian endurance runners. *Med Science Sports Exercise.* 35:1727–1732.
- [18] Weston, A.R., Mbambo, Z., and Myburgh, K.H. (2000). Running economy of African and Caucasian distance runners. *Medicine and Science in Sports and Exercise.* 32(6), 1130-113

