Chapter I

INTRODUCTION

The perception that man lives in close relationship with all living thing, plants and animals its quite old. Ancient and medieval philosophers have often emphasised the inter-relatedness of the entire living world. Recent developments in science have not only confirmed this view but have gone beyond to assert the interdependence of the life. Microbial plant and animal, between themselves and with the physical environment of land, air, water and solar energy, this inter dependence embedded in the evaluation of life.¹

The environment as an important element instrumental in the effort to promote sports has always been acknowledged. However, neither there has been any literature nor major efforts to establish the inter-relationship between environment and sports. There have been practical works and analogy that sport talent has direct relationship on the locality in which the population is and the situation of the

population has an impact on the overall physical capabilities and characteristics of the human beings who are living there.

In India the effect of environment and ecology on sports need to be emphasised more and its needs to be taken care of because geographically India is a unique country where we have tropical and sub tropical rain/deciduous forests, arid and semi arid tropics, Alpine forest, Tundras and the desert. Of the total geographical area accounting for 19.44 percentage of the total area. Of this eastern hilly regions (eastern Himalayas) account for 70-90 percentage of actual forest cover followed by Madhya Pradesh, Haryana, Himachal Pradesh, Kerala, Orissa with 20-30 percentage forest cover. Other states including Gujarat (6.0 percentage) have bare minimum of forest cover (1.2 to 4.4 percentage). The forest survey of India estimates that out of a total forest cover only 50 percentage is of adequate density. The effective forest cover, therefore, is just 10 percentage of the geographical area of the country.

Broadly speaking special areas, for this purpose, include all the tribal areas, hills and coastal areas of the country. Thus it includes all the state in the north east India will district U.P., J & K, Himachal
Pradesh and all the Coastal/Tribal area of Madhya Pradesh, Gujarat, Rajasthan, Andra Pradesh, Tamil Nadu, Bihar, West Bengal etc. This scheme also extended to the areas where there is some, special talent in particular sports. For example a few districts of Kerala are major recruitment zones for all the circus companies of the country. In these areas also, the scheme is operated to tape the talent in gymnastics.²

Man in action is frequently exposed to environmental condition that might be classified as a typical, if not abnormal. The physiological concepts discussed until now have dealt with the body's response to normal exercise and training. But optimal condition do not always prevail the day may be excessively hot and humid and cold, the clothing or uniform may be inadequate or the individual may journey into unusual environmental circumstances such as high altitude or under water.³

In all such situation the organism must adjust to a self condition that tends to alter normal physiology in significant ways. The performer finds without acclimatization a period of adjustment to the

² Ibid., p. 41.
rigors of the environment - his performance may be impaired. The body has a remarkable ability to compensate either wholly or partially environmental condition if given the opportunity. This does not mean that complete success will always be experienced. While it might be argued scientifically that slight impairment may not be particularly significant, to the athlete in competition it might well be the difference between winning and losing a contest. Moreover there may be an addictive effect when the performer competes in extend running, swimming, cycling or the like a compared with shorter events. The potential length of the exposure is an important factor when considering the effect of adverse environmental conditions.⁴

Effect of high altitude on performance has been mentioned that performance may actually be improved at high altitude in certain type of activity that are of short duration because of the reduced air resistance. The reason for that sprint activities are powered largely by anabolic metabolism and hence are not greatly effected by the reduction in oxygen availability. Aerobic power (max oxygen uptake)

⁴ Ibid., p.219.
is on the other hand reduced at high altitude. This means that intensity of the work that can be performed in a steady state (such as distance running events) is re-metabolism at a lower level of exertion. In the Mexico city Olympics, there was either improvement or no impairment of performance in running events upto 400 meters. There was impairment about 3% in the 800 meter run and 10% in the 5000 and 10000 meter events. It is also observed that the time required for recovery after event was much greater in Mexico city that at sea level. Exercise of strength are like sprint activities powered largely by anaerobic metabolism and are therefore not appreciably affected by high altitude.\(^5\)

The capacity for working in dry heat depends not only on the environmental temperature but also on whether there is direct exposure to the sun. During the exercise in dry heat in the shade the body may gain heat by conduction and convection from the surrounding air. This heat gain is usually modest because of the low heat capacity and thermal conductivity of air, and is balanced by evaporate heat loss. If however the work is performed during direct

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exposure to the sun, additional heat is gained by radiation and evaporative heat loss must accordingly be increased. Performance under this condition is improved by the wearing light weight clothing.\textsuperscript{6}

High humidity has a marked influence on the ability to perform prolonged moderate work in the heat because of interference with the evaporation of sweat. In one experiment resting subject tolerated 60 mins. exposure to an environmental temperature of 145\textdegree F. When the relative humidity was 10 percentage by they could not tolerate an environmental temperature above 104\textdegree F when the relative humidity was 90 percentage. These differences are exaggerated if the subject are performing work.\textsuperscript{7}

Sea level residents ultimately adapt well to endurance competition at moderate altitude and there is some evidence that high altitude natives have a persistent advantage at a sea level venue, there has been considerable discussion of desirability of training endurance competitive of high altitude. Where this tactics has been adopted the

\textsuperscript{6} Ibid., p.217.
\textsuperscript{7} Ibid., p.208.
physiological objective has been the time to the return to the sea level. So that the altitude polycytheemia is preserved but body suffers have been restored to their sea level value. Red cell production is severely depressed immediately after return to sea level, and if the altitude exposure has been extreme the suppression of haemopoiesis can be such that a temporary Anemia develops (Health and William 1989) these remains a theoretical possibility gaining some advantage of oxygen transport four to twenty days following altitude exposure, but this must be against such practical advantages as the likely curtailment of training and the learning of incorrect pace while at altitude. If athletes are in peak condition before a mountain sojourn the net result of period at on altitude camp seems no change or even a small deterioration in max oxygen uptake and time for endurance competition most teams are no disillusioned about altitude training except where competition is planned at altitude and a long period of residence is possible at an agreeable training site. 8

Climates, season and weather exert such an influence on physical activities and sports that sub-area, bio-climatic of sports

8 Ibid., p.211.
appears justified with in the field of sports medicine. The physical, physiological and psychological reaction of man are very depended on environmental conditions. Temperature, atmospheric pressure, humidity, the composition and pollution of the air, solar radiation and other environmental factors may have a positive or negative influence on the human organism. As the general state of the health can be effected so will the efficiency and capacity of physical performance, and the susceptibility to fatigue vary with extreme change in environmental conditions. The season of the year are characterized by typical metrological and climatological phenomena that are directly related to physical performance, training and sports.\footnote{Wolf Gong Wolf, "Climate Seasons," Encyclopedia of Sports Science and Medicine: 851.}

Soccer is played in highly varied environmental circumstances. In some instances the climatic conditions are too hostile or are temporarily unsuitable for playing and their is a dull in the competitive programme. This applies in northern climates in winter and in tropical countries during the rainy season. In the former it becomes impossible to maintain playing pitches and the weather is too cold to play in comfort. At another extreme is the stress imposed by a
not environment and difficulty to coping with high heat and humidity. Usually the hottest part of the day is avoided and matches are timed for evening kick offs. In highly competitive international tournaments they do not compete in conditions to which they are unaccustomed.

Altitude constitutes another environmental variable that can make supra-normal demands on football teams. This has applied to those teams who have competed at the two world cup finals in Mexico in 1970 and 1986. Also it applied to teams playing friendly or international qualifying matches at moderate altitude. Additionally training camps for top teams are sometimes located at altitude resorts and this constitutes a particular novel challenge to sea level dwellers.

The human body has mechanisms that allow it to acclimatize to some extent to environmental challenges. In the course of history it has evolved to match the environmental changes associated with the solar day. Consequently many physiological functions wax and wane in harmony with cyclical changes in the environment every twenty four hours. The sleep wake cycle is dovetailed with alternation of darkness and light and majority of the body's activities are controlled by biological clocks. These are disrupted when the body is forced to
exercise at a time it is unused to, for example after crossing multiple
time zones to compete overseas. It is also disrupted if sleep is
disturbed.

The environment in which the soccer player trains and competes
has implication not just for performance but also for health and safety.
The quality of playing surface for example faces a choice of appropriate
footwear so the performance can be executed without increased risk.

Soccer is the sport of the world. It is game of constant action
and requires continuous adaptation to changing situation by the team
as a whole as well as by individual players. Although it is a team
game there is ample room for player to display their brilliance through
individual performance with the ball as well as team play involving
improvision and tactical knowledge. It is a game that sends people
from all over the world into frency, creates national heroes and
millionaires and has even sent countries to war.

Soccer has become a very popular game in the world. Almost all
the nations play the game both for enjoyment and competition. Modern
soccer is very fast by its nature. The spectators and the players enjoy
the game of soccer with great amount of merriment. It is a game of
constant action and requires continuous adaptation to changing situation by the team as a whole as well as by individual players. Although it is team game there is ample room for players to display there brilliance through individual performance with the ball as well as through team play involves improvisation and tactical knowledge.\textsuperscript{10}

The existing literature in the field of soccer shows that endurance, speed, agility, maximum leg strength, upper body strength, leg power, muscular endurance, flexibility, coordination and reaction time are important, pre requisites for efficient soccer performance where as excess body fat prove to be hindrance.\textsuperscript{11}

The coaches are responsible to teach their players soccer techniques and tactics to achieve optimum level of performance. Unfortunately there is no magic formulas for transforming limited skilled players into world class champion. However through implementation of a well planned training programme and coaching

that utilizes the principles of modern soccer coaches can provide the best possible opportunity for improvement.

The ball does not run smoothly on sticky, muddy patches, thus on muddy pitches the ball will have to be kicked with more force than is necessary on a dry pitch, in order to cover the same distance. Also besides kicking with more forces and determination experience has shown that the longer pass is more effective than the shorter pass partially because the longer pass requires a greater impetus and is less likely to stick in the mud. But mainly because of muddy pitch offend slippery. Slippery pitches provide difficult to defender beaten by a ball because the sloppiness impedes his training speed pools of water on the pitch will cause the same difficulties as muddy patches and can be tackled in a similar fashion, snow covered patches possess some of the characteristics of the muddy pitch but provide less difficult because they tend to be slips rather than sticky snow does however lows the ball down thus it is necessary kick harder than normal. Hard pitches can cause problems for players because of each bump becomes
accentuated and can therefore alter the path of the ball drastically. On such pitches it is advisable to play the ball along the surface.\textsuperscript{12}

The environmental factors and field conditions effect the game of soccer to a large degree and the team that best adopts to them will increase its chance of winning. Bumpy fields can adversely effect the playing quality of a soccer games particularly for teams with inferior ball handling. Their lack of skill will be exposed on bumpy field. Soggy and muddy fields will slow the ball down. A wet slippery field will assist ball kicks along the ground. Penalty takers must be aware of existing field condition and watch them carefully before taking their kicks. A kick in the air on a muddy field is better advised them a kick along the ground.\textsuperscript{13}

The natural environment is a fundamental factor in the development of living being and influence, the normal function of their body. Similarly the environment temperature is an important factor in


which training and competition takes place. The human efficiency and working capacity mainly depends up on the thermal environment of his surrounding. When a person is suddenly exposed from cold to hot climate or vice versa, he is effected not only physically but also physiologically, similarly when a soccer player is exposed to variety of climatic condition during his participation. It will have considerable effect on his performance depending on the severity of the climate. Hence it is very vital to consider environmental aspect of competition in training and also its effect on various physiological responses.\textsuperscript{14}

Very less studies have been conducted regarding the influence of geographical conditions an physical qualities, anthropometric variables, physiological aspects and playing ability as a whole. Of course it is new area of exploration which will provide scientific knowledge about the players who brought up from various geographical conditions.

Statement of the Problem

The purpose of the study was to comparatively investigate the effect of different geographical conditions on selected physical, physiological, anthropometric characteristics and playing ability of soccer players.

Sub Problem

The purpose of the study was also to assess the relationship between physical, physiological and anthropometric characteristics with playing ability of soccer players.

Delimitations

1. The study was delimited to the inter-university male football players.

2. The study was delimited to the coastal area, non coastal area and hill area.

3. The study was further delimited to selected physical, physiological, anthropometric variables and playing ability.
**Limitation**

Certain factors like diet, daily routine habits, facilities, training etc. which may have effects on the result on the study that was considered as a limitation for the study.

**Hypotheses**

On the basis of different literature the following hypothesis were drawn:

It was hypothesised that different geographical conditions will have significant effect on physical, physiological and anthropometrical variables of soccer players.

It was also hypothesised that different geographical conditions may not have significant influence on playing ability of soccer players.

It was again hypothesised that physical, physiological and anthropometric variables will have significant relationship with playing ability of soccer players.
Definition and Explanation of Terms

Soccer

Soccer is a football game played by the teams of eleven players in each side and using round ball. The designation soccer is derived from association football is distinguished from American football, Canadian football, Rugby and Several, Other sports in Federation De International Football Association. It is popularly known in India as football.\textsuperscript{16}

Geography

The science of earth, which deals with the composition of the earth's surface and distribution of its feature.\textsuperscript{16}

Hill Area

An elevation of the earth's surface that typically has rounded top and is not as a high as a mountain.\textsuperscript{17}

\textsuperscript{16} Ralph Hickok, "Soccer," \textit{New Encyclopedia of Sports S.V.}
\textsuperscript{17} Ibid.
Coastal Area

The area which is located near the sea. The main feature of this area is consist of sand.

Speed

Speed may be defined as the capacity of the individual to perform successive movements of the same pattern at fast rate.\textsuperscript{18}

Strength

Mathews\textsuperscript{19} has defined muscular strength as a force that a muscle or group of muscles can exert against a resistance in one maximum effort.

Endurance (Cardiovascular)

Cardiovascular endurance is the ability to continue or persist in the strenuous task involving large muscle groups for long period of


time. Cardio respiratory endurance is the maximal amount of work than an individual can perform over a period of time.  

Vital Capacity

Vital capacity is defined at the largest volume air that can be exhaled after deepest possible inhalation.  

Cureton defined vital capacity as a maximum volume that can be expired after taking full inspiration.

Heart Rate

Heart rate is the frequency of pressure waves per minutes propagated along the peripheral radial arteries.

Blood Pressure

Blood pressure is the lateral pressure exerted by the blood on the vessel walls while following through it.

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21 Clarke, Exercise Physiology, p.151.
Respiratory Rate

Number of breaths taken in a minute or number of inspiration/expiration in a minute.\textsuperscript{25}

Significance of the Study

The result of the present study is to be worth while in the following ways:

1. The present study will highlight the importance of each geographical condition on the variables which contributes to a better performance in football.

2. The study will also help the coaches, physical educators and other people in preparing the effective training schedule while giving importance to different geographical condition to improve performance in football.

3. The result of the study may help the coaches, physical education teachers and concerned person to give importance of different geographical conditions while selecting the players.

4. The study is also will be useful to select appropriate geographical condition to conduct training programmes.