Chapter-I

Introduction

"DNA Is the Micro Compact Hard Disc of Nature Which Reveals the Biological History, Chemical History and Inheritance of an Individual"

"Science" is a term which has something to do with inventions in various fields of human life which include observation, experiments conclusion; and application of science with various tools and techniques is known as "Technology".

Science and Technology has made the human life so comfortable, easy and dependent that we cannot imagine our survival without it. It is Science with Technology which differentiates human beings from other creatures on the earth.

Directly or indirectly in a way we are living the life of science without consciously knowing its actual concept and importance. There are infinite aspects related with science, one of which is "science of study of human cell". In scientific language it is known as "Deoxyribonucleic acid" and DNA fingerprinting is an indispensable part of the same.

'DNA fingerprinting' or DNA typing (profiling) as it is now known, was first described in 1985 by an English geneticist named Alec Jeffreys. Dr. Jeffrey found that certain regions of DNA contained DNA sequences that were repeated over and over again next to each other. He also discovered that the number of repeated sections present in a sample could differ from individual to individual. By developing a technique to examine the length variation of these DNA repeat sequences, Dr. Jeffrey created the ability to perform human identity tests.

Before that the identification of an individual was carried on through Fingerprints, which was considered as one of the most reliable physical evidence used in the determination of the identification of the person. But later it was found that even fingerprints can be altered by surgery. Also the problem with the fingerprints is that the two individuals can have the same fingerprints although the chances are very-very low.

After that the identification was begun to be determined through Blood Grouping test, but the limitation was they may exclude a certain individual as the possible father of the child but cannot possibly establish paternity. And at last DNA Technology was invented which has been proved a benediction for everlasting generations. The said subject has been chosen with a purpose to understand and convey its use and application with relation to society, science and focusing on Law.

DNA Technology is mainly used for identification and establishing blood relations with the use of legal evidence to resolve the legal issues of inheritance, maintenance, maternity and paternity, for criminal investigation to solve various crimes, Identify endangered and protected species, for medical use and biotechnological research purpose, to identify and cure diseases etc. The list is infinite.

DNA[1] or Deoxyribo Nucleic Acid is the fundamental Building block for an individual's entire genetic make-up. It is a component of virtually every cell in the human body, a person's DNA is the same in every cell. DNA profiling is a new technique to identify a person on the bases of his genes as no two persons have the same identical sub-genetic structure. It is also known as genetically fingerprinting and is not concerned with the conventional process of finger printing. This technique detects and displays a DNA pattern, which is unique to every person as simple tracks of bands like a bar code found on food packing. DNA is the powerful tool because each person's DNA is different from every other individual, except for identical twins, DNA fingerprinting works on the principle that every individual in this word can be differentiated and identified at molecular level on the basis of DNA the genetically material which inherits from his parents and which is identical in every cell.

The application of DNA profiling spreads far and wide across both civil and criminal process of operation. Over the years this technique has undergone rapid changes. There are many rapid scientific doubts regarding the veracity of this process, which requires a detailed scientific study, but it is too technical to be discussed.

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[1]See, Article "Advancing Justice through DNA Technology", Available at http://www.dna.gov/audiences/investigators/know/whatisdna (Last accessed on: 2nd Jan., 2007)

The DNA technology has been expanded to the horizons of various fields like genetic weapons, human expansion, patenting and inventions, bio-technology and genetic engineering, diseases; other than having its importance in the civil and criminal investigation; and still on the way of developments.

In this research work the efforts have been made to explain the various socio-legal dimensions of DNA Technology and its interface with Indian Legal System. For example; as compared to the other countries of the world, how far the Indian legislations, judiciary and society have been proved successful in using, applying and accepting the DNA technology. The question is; whether any efforts have been made to modify the existing laws to contribute in these directions? There are many more other questions which require reasonable, rational, analytical answers. Hence, this research work is prepared with the same purpose and object.

1.1 Understanding Genetic and Molecular Basis for DNA Testing:

Some principles of genetics and molecular biology are necessary to understand the two principal kinds of genetic systems used in forensic DNA typing. Efforts have been made to describe some basic concepts about DNA, chromosomes and genes

Each human body is composed of an enormous number of cells. Most of these cells contain a nucleus (or inner part), which in turn contains the person's genetic material (the *genome*). All the cells in every human body descend by successive divisions from a single fertilized egg[2].

1.2 What is DNA?

Chromosomal DNA is the chemical storehouse of genetic information. The DNA molecule itself resembles a twisted ladder or double helix. The molecule is composed of four chemical subunits called *bases*: Guanine (G), Adenine (A), Thymine (T) and Cytosine (C). These bases pair between strands: A on one strand with T on the other, and C with G. The sequences of base pairs in turn are arranged in long chains of

[2] Ibid 1

varying lengths that form the DNA double helix. Each person has about 3.3 billion base pairs[3].

1.3 DNA Resides in the Chromosomes:

Virtually the entire complement of a person's genetic material resides in the *chromosomes*. A chromosome is a very thin thread of DNA, surrounded by other materials, mainly protein. Chromosomes are located in the cell's nucleus.

Almost all cells in the human body contain 23 pairs of chromosomes (for a total of 46 chromosomes). The two members of a chromosome pair are said to be *homologous*. One member of each homologous pair is inherited from the mother (the egg) and one from the father (the sperm). Because of the way DNA in the original fertilized egg replicates itself, virtually every cell in the body has the same chromosomal make-up. An important exception is found in sperm and egg cells, which have only half as many chromosomes (a total of 23) as the rest of the body's cells. The full number, 46, is restored by fertilization[4].

1.4 Genes and Chromosomes:

Integral to the chromosomes is the genes. Structurally, a gene is "*a stretch of DNA, ranging from a few thousand to tens of thousands of base pairs, that produces a specific product, usually a protein.*[5]" Functionally, genes are the basic units of heredity. The gene's function is determined by the order of the four kinds of bases within it. The specific base sequence acts as an encoded message, each specifying an amino acid (a protein building block).

Genes are interspersed among the rest of the DNA and actually compose only a small fraction of the total DNA. Genes differ from the rest of the DNA on the chromosome only in having a specific sequence of bases, which enable them to encode a specific protein. Most of the rest of the DNA has no known function.

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[3] Ibid 1

[4] See, article on Human Genome Project, available at http://www.answers.com/topic/human-genome-project (Last accessed on: 2nd Jan., 2007)

[5] Ibid 1

The position that the gene occupies along the chromosome (or DNA thread) is its *locus*. Each chromosome contains many different loci, arranged in a specific linear order. The order is the same for every human. For example, the locus for the gene responsible for cystic fibrosis is on chromosome. Everyone has this gene at the same position on chromosome, although only some people have the alteration in the gene that causes it to be defective and produce cystic fibrosis.

Genes are passed on from parents to their offspring via egg and sperm cells. During *meiosis*, the process that results in the development of sperm or egg cells, two partner chromosomes in a chromosome pair line up side-by-side and randomly exchange parts. The result is that genes formerly located on the same chromosome can move to the *homologous chromosome*, and genes formerly located on homologous chromosomes can move to the same chromosome. Genes that are very close to one another on the same chromosome might remain associated for many generations before they are separated. Genes on the same chromosome are said to be *linked*; that is, they tend to be inherited together. Genes residing on *no homologous* chromosomes are inherited independently, as are genes far apart on the same chromosome.

1.5 Most Genes Are the Same for All Humans:

Most loci contain the same gene in every human being, while some (like the cystic fibrosis example) can vary among individuals. It is thought that about 3 million of the total 3.3 billion base pairs differ between any two individuals. In other words, most of our genetic material is the same. This fact is not surprising when we think of how many characteristics all humans share: one head, two eyes, two legs, etc.

1.6 Some Genes Differ Among Individuals:

At each genetic locus reside two genes, one inherited from the mother and one from the father. The form of the gene inherited from the mother can differ from the one inherited from the father. An *allele* is an alternative form of a gene (for example, those producing normal and sickle cell haemoglobin). If the mother and father have different alleles, then their child will inherit one allele from the father and one from the mother. In other words, while only two genes reside at each locus, multiple different alleles are possible at each locus.

An example is the gene responsible for determining blood type. Three possible variants or alleles exist for this gene: A, B, and O. which combination of the three a person has depends on which she inherited from her parents. So if the father passed on the A allele and the mother passed on the B allele, the child is blood type AB. Someone who got the O *allele* from one parent and the O from the other would be type O. In a more generic example, if there are two possible alleles at a locus, A and a, then there are three *genotypes:* AA, Aa, and aa. The word *genotype* refers generally to the genetic makeup of an organism; however, it also can be used to describe the genetic makeup at a number of loci, from one to the total number[6].

DNA testing concerns itself with those loci at which genes can differ among individuals. Obviously, it would do no good to test one of the loci for which no genetic variation is possible, because the test would show a complete match for every human being. Forensic DNA tests also typically examine alleles from four or five different loci. The tests compare DNA sequences at these loci between different individuals.

1.7 Description of Forensic DNA Testing:

As of 1995 or so, most DNA testing involved one of two basic techniques: analysis of *variable-number tandem repeats* (VNTR), and polymerase chain reaction-based (PCR) methods. PCR is the newer of the two technologies.

Use of the DNA testing:

i. Identification of Parentage, paternity, maternity can be identified; to identify, decide and establish the blood relation between two persons, whether they are real brother or sisters and about their ancestors.

ii. Acceptance of parentage: Once identified can't be denied the parentage-paternity/maternity, conclusively solve the question of maternity in case where no one is ready to accept the child as their biological child.

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[6]See Article on DNA Technology Available at http://www.ornl.gov/sci/techresources/Human_Genome/elsi/forensics.html (Last (accessed on: 2nd Jan., 2007)

iii. Succession right: biological parents cannot lie to their child, to court, to law then they are not parents of the infant or child to get the succession right.

iv. For criminal investigation of murder where deceased is unidentified and body is very much mutilated- for identification of person and determination of the sex of the deceased.

v. Used against suspects in solving various crimes. (E.g.or Forensic Identification)

vi. Identify potential suspects whose DNA may match evidence left at crime scenes

vii. Exonerate persons wrongly accused of crimes

viii. Identify crime and catastrophe victims

ix. Identify endangered and protected species as an aid to wildlife officials (could be used for prosecuting poachers)

x. Detect bacteria and other organisms that may pollute air, water, soil, and food

xi. Match organ donors with recipients in transplant programs

xii. Determine pedigree for seed or livestock breeds

xiii. Authenticate consumables such as caviar and wine

The list is not exhaustive.

We can say that no area of human life has been left untouched by use and application of DNA Technology. It has become indispensable Part of our life. And hence the in-depth study of the same is required by taking into consideration the social, scientific, moral-ethical perspective of DNA technology by studying it's relation with law.[7]

[7] Interpretation and analysis are discussed further in chapter 2 of the Research work.

Explanation of the Title of the Doctrinal Work with the Help the Charts:

(a) Multi-Dimensional Features of DNA Technology –Chart-1

DNA Technology carries the multidimensional features though contains very small portion of the animate inanimate things. DNA Technology has expanded it's horizons to various areas such as health and diseases, human genome project, genetic engineering, intellectual property, bio-ethics human enhancement, forensic science and what not. And still has scope of further expansion on the bases of scientific and technological applications covering various aspects of the human life.

But at one side DNA Technology has facilitated the human life, and on the other side it is subjected to criticisms and required a thorough discussion and analysis and created a number of problems for the spheres related with human concerns such as –

1. Society;
2. Science;
3. Law;
4. Ethics;
5. Religion;
6. Jurisprudence Etc.

There is a specific nexus between DNA Technology and all above mentioned aspects of life.

Chart-1: Multi-Dimensional Features of DNA Technology

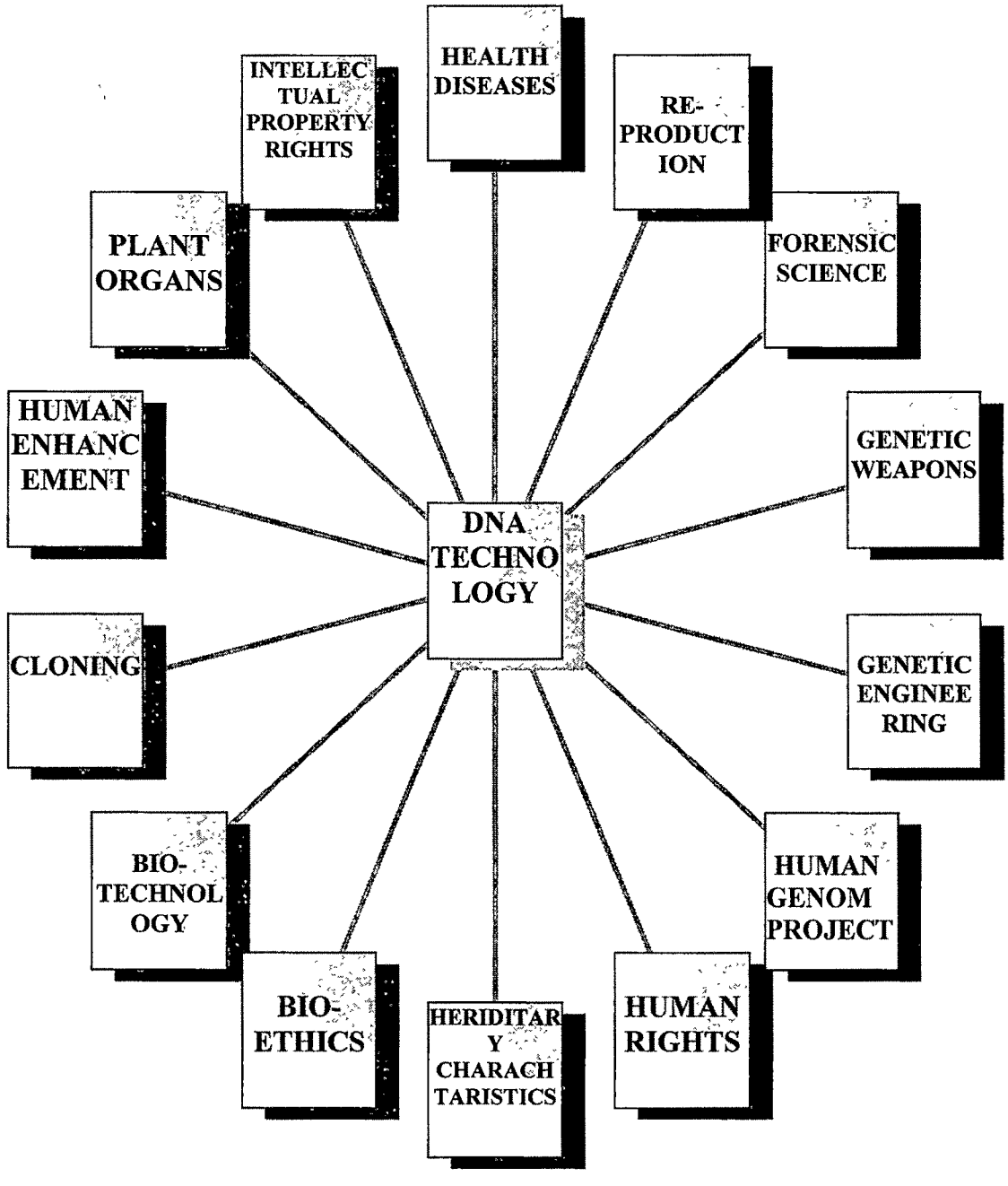


Chart-2

(b) Interdependence-Interrelationship of Various Social, Legal and Scientific Aspects/ Dimensions with DNA Technology. This can be explained with the help of Chart -2.

Relation between Science and Society:

In this Van-Diagram of the DNA Technology the over-lapping field of science and society indicate the area of ethics, morals and religion. There has always been a war between the science and religious ideology, morals and ethics in society.

Relation between Law and Society:

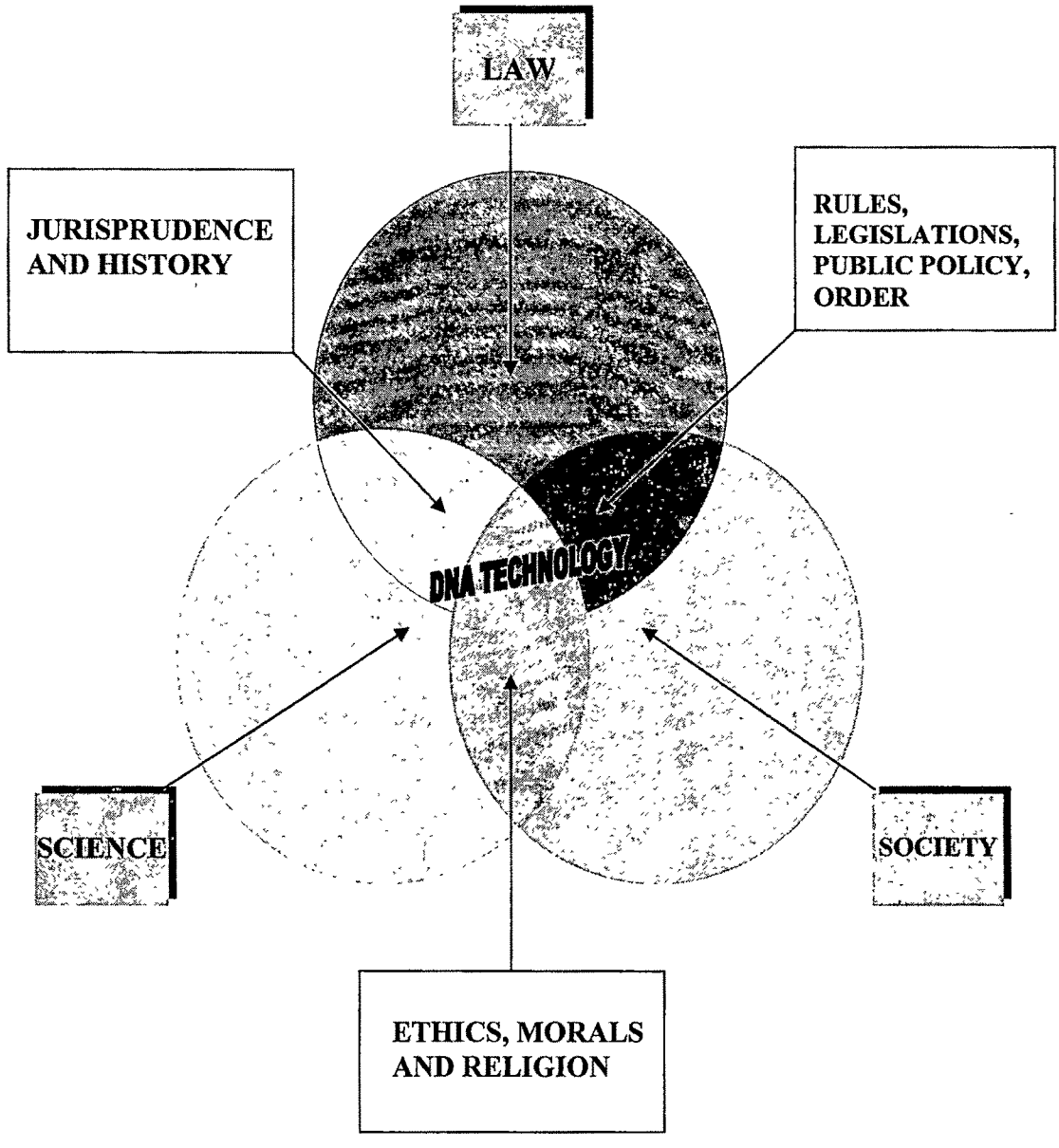
The overlapping fields are of law and society indicated the rules, regulations, public policy, law and order etc. As per the 'Social Engineering' theory of Roscoe Pond law is the creation of society. It is managed, controlled by Law in society only. No society means no law in Existence.

Relation between Science and Law:

Again in case of overlapping of science and law there has always been a conflict between these both on issues as explained in the chart. That means the Jurisprudence which is considered as philosophy of law also includes science in it which is explained in various theories under Jurisprudence. Among all these three areas the DNA Technology can be seen falling in centre as it has relation with all three aspects viz. Law, Science and Society.

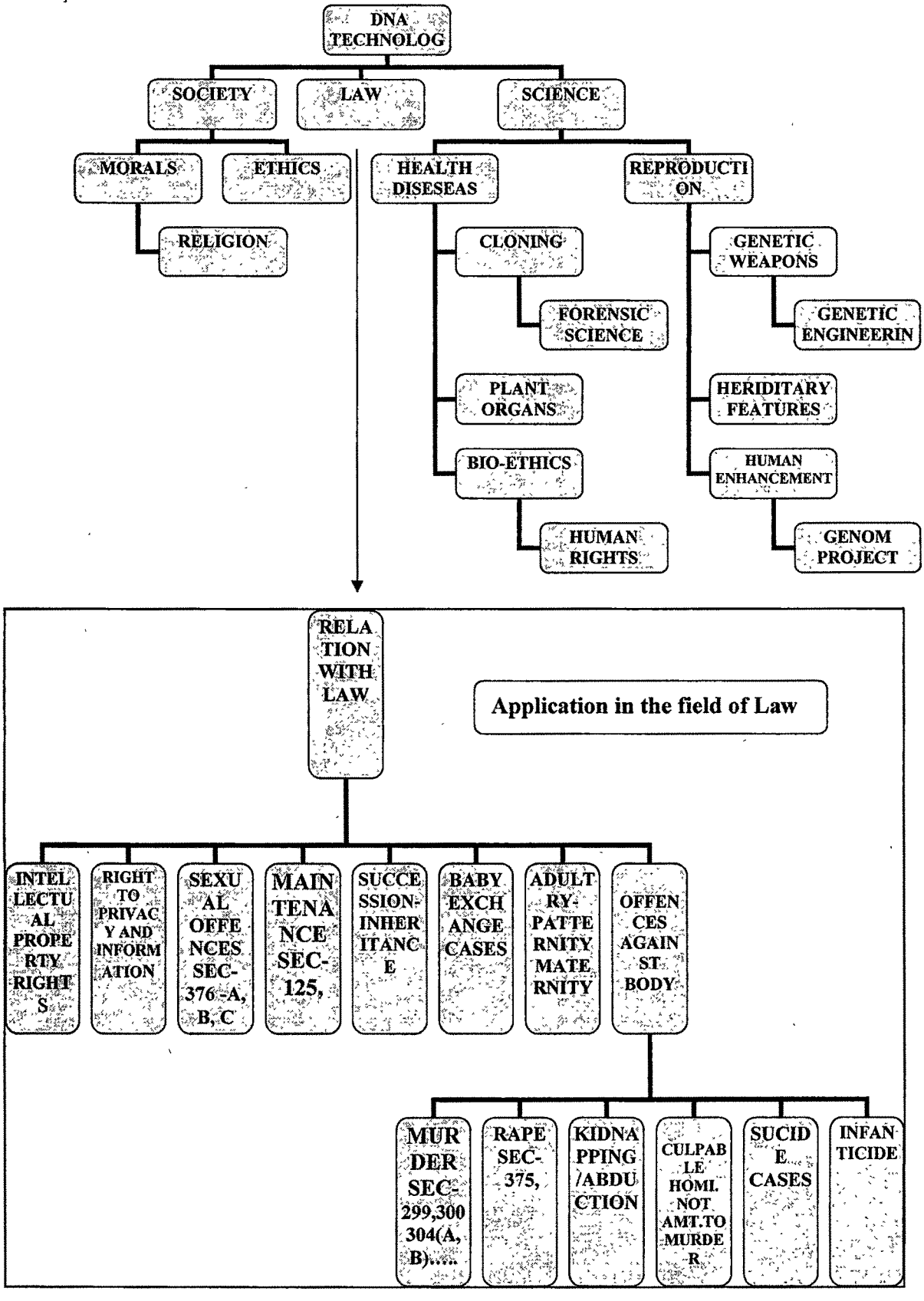
Thus, the vary title of the Research can be explained with the help of the explanation of inter-dependence and interrelation of DNA Technology with various social, legal and scientific aspects or dimensions.

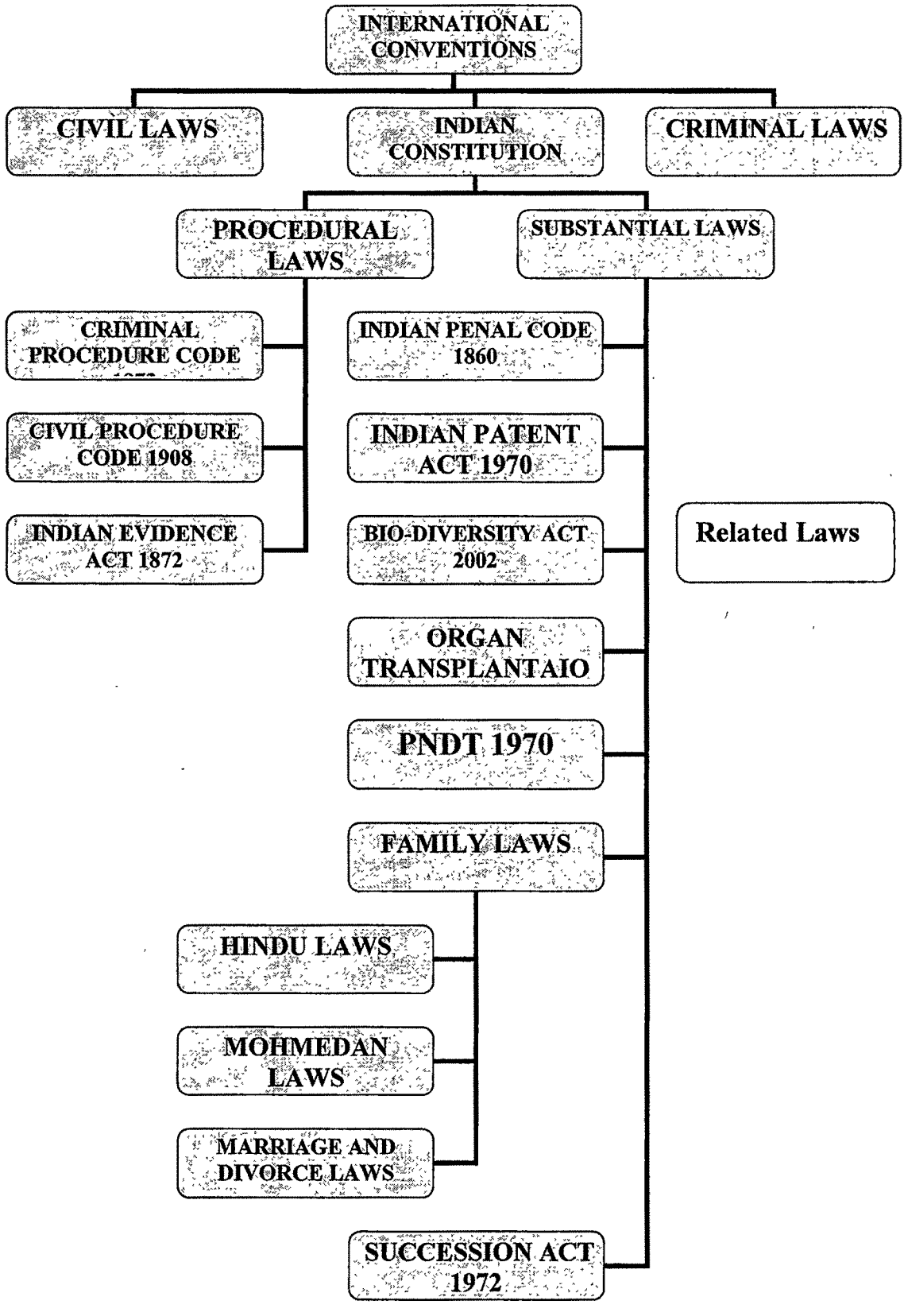
Chart-2



Interdependence-Interrelationship of Various Social, Legal and Scientific Aspects/ Dimensions with DNA Technology

Chart-3: Socio-Legal Dimensions of DNA Technology:




INTERNATIONAL CONVENTIONS
CIVIL LAWS
INDIAN CONSTITUTION
CRIMINAL LAWS
PROCEDURAL LAWS
SUBSTANTIAL LAWS
CRIMINAL PROCEDURE CODE
CIVIL PROCEDURE CODE 1908
INDIAN EVIDENCE ACT 1872
INDIAN PENAL CODE 1860
INDIAN PATENT ACT 1970
BIO-DIVERSITY ACT 2002
Related Laws
ORGAN TRANSPLANTAIO
PNDT 1970
FAMILY LAWS
HINDU LAWS
MOHMEDAN LAWS
MARRIAGE AND DIVORCE LAWS
SUCCESSION ACT 1972

(d) Chart- 3 and 4

The Central Idea of the research work and the Title of the research work i.e. *"The* Socio-Legal Dimensions of DNA Technology: Its Interface with Indian Legal System*"* can be explained with the help of Chart-3 and 4.

Thus this chapter gives the brief idea and explanation of the topic of the research work. This has been discussed in next chapters in detail.

2. Objectives of the Study:

The Constitution of India, by Article 51A (h) and (j), declares that, it shall be the duty of every citizen of India "to develop the scientific temper, humanism and the spirit of inquiry and reform"; and "to strive towards excellence in all spheres of individual and collective activity so that the Nation constantly rises to higher levels of Endeavour and achievement." The Parliament is legislatively competent to make laws with respect to the Union agencies and institutions for professional, vocational or technical training, promotion of special studies or research, or scientific or technical assistance in the investigation or detection of crime and with respect to coordination and determination of standards in institutions for higher education or research and scientific and technical institutions[8]. The constitutional provisions take care of the scientific developments that may take place and may be put to use for the benefit of the people. The Constitution provides efficient scales for balancing between public and private interests and the Courts have put to use its provisions for an effective social engineering to protect both the cherished human rights recognized by the Constitution and the paramount public interest in a welfare State.

The study on "Socio-legal dimensions of DNA technology and its reflection on Indian legal system" has been carried out by taking into consideration the following objectives.

i. To understand the meaning, nature, scope and concept of the various terminologies relating to DNA Technology.

ii. To find out the application of DNA technology in Indian legal system i.e. both civil and criminal judicial system. To establish the relationship between the law and science-modern technology.

iii. To discover the effect, success and failure of use/application of DNA Technology in Indian context. I.e. How far the Indian judiciary has been proved successful in dealing with the cases where the DNA technology has been used directly or indirectly.

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[8] J.N. Pandey : *The Constitution Law of India*, 44th Edition, 2006 ,65 and 66 of the Union List in the Constitution of India

iv. To understand and analyze various social-scientific-legal dimensions/aspects, their impact, effect, causes, reasons for/of the use and application of the DNA technology as far as the law, society, science, ethics and jurisprudence are concerned.

v. To establish the relation between the mythological history and use of science of DNA technology in modern era.

vi. To decide the legal position and carry a comparative study of the Indian legal system from international point of view as far as DNA legislations are concerned, to provide suggestions in this the laws and legislations relating to DNA technology, to study use and application of the same. To justify the study by analyzing facts from Social-Judicial-Legislative Perspective.

vii. To analyze and decide the advantages and disadvantages, reliability, limitations of DNA technology in Indian legislative and judicial system and to bring suggestions for the modification of prevailing procedural and substantial laws.

3. Nature and Scope of the Study:

We are living in 21st century- a century of science and technology. The changes occurring in science bring changes in society, and through which changes in the various laws of the country become possible, or we can say that they are bound to be changed. Scientific developments resulting from advancement in molecular genetics provides the scope for diagnostic, predictive and unfolding inherently locked –in biological secrets of life and behavioural patterns. The genetic profile generated by molecular genetics and biotechnology coupled with information technology has great potential for revolutionizing applications in all paradigms of life and living style. Along with developmental applications they are creped in contra indications having legal bearings peculiar of Genetic Information System. Nonetheless, the justice administration system needs to assimilate the scientific advancement of genetic profiling and develop the procedural techniques of harnessing the emerging judicial challenges.

Thus, the scope of the study has extended not only to the scientific inventions but also has created direct and indirect impact on society and on law and is still on the way of development.

The nature of the study is very basic and explanatory based on theoretical, experimental work in the field of law and science as well as society. The pure nature of the present study is of exploring the possible impact of the adaptation of DNA Technology in the socio-legal dimensions in the Indian Legal System.

4. Rationale of the Study:

For the solution of a problem there is a need to know the actual problem and to find out the material facts/reasons/root of problem to come to conclusion and to bring the effective solution.

Circular motion of the DNA Technology and its relationship with the various fields of human concern. This can be explained with the help of chart-5

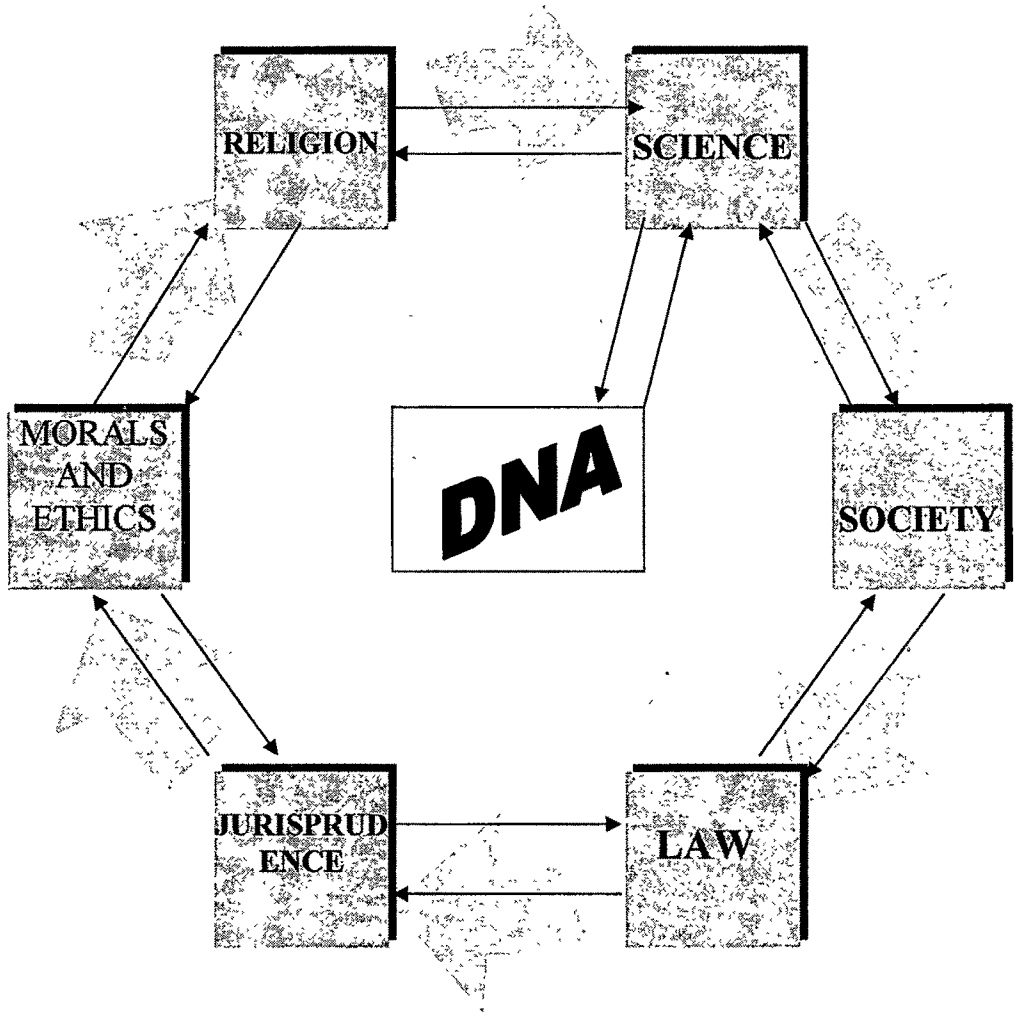
(1) DNA Technology is the scientific invention.

(2) Scientific inventions are carried out by the human beings in the society.

(3) The conduct of human beings is regulated by the laws, enactments and legislations etc. (The social engineering theory of roscoe pound)

(4) When law comes Jurisprudence comes which explains the philosophical bases relating to law with legal, social, philosophical, historical, sociological analytical and natural schools of law.

Chart-5: Circular Motion of DNA Technology-Interdependence of Various Aspects



Jurisprudence explains how the morals and ethics create an everlasting effect on religion. I.e. every religion is based on morals and rules of ethics and vice-versa. And when we go for the scientific inventions it also requires the consideration for religious values and morals, and morals take into consideration the ethics.

This shows the clockwise motion of the DNA Technology. The Anti-clockwise motion of the DNA technology can be explained as under.

Ethics have been given a valuable place in Jurisprudence. -When Jurisprudence comes again comes law-again the law is the created by and in society, where the human beings by experiments try to invent something under he name of science to facilities the human life as DNA technology.

Thus this clock wise and anti-clockwise circular motion or direction of DNA Technology show or indicates the interrelationship of various socio-legal fields /aspects of life. The DNA Technology falls in the centre of all.

Thus the vary title of the research work can be explained with the help of the explanation of inter-dependence and interrelation of DNA Technology with various social, legal and scientific aspects or dimensions.

"Nova Constitio Futuris Forman Imponere Debet, Non Proteritis", which means; new Laws Are Prospective Not Retrospective and therefore there is a need of new laws and legislation providing directions for the use of the DNA Technology.

Law of a country is bound to change due to revolutionary changes in science and technology. The modern invention of science has the serious impact on the law and the administration of the justice system. For example the introduction of the Information Technology Act 2000 has also influenced the Indian Evidence Act 1872 and IPC, 1860. These Acts have also been amended.

The advent of DNA technology has the serious impact on the administration of justice. Investigation in criminal cases has been much easier with the advent of DNA Technology. A circumstantial evidence is much stronger than the eyewitness oriented criminal administration of justice system. DNA Technology has made a drastic change improvement proving different types of disputes both civil and

criminal. But the traditional procedural laws and Evidence Act have not been amended. These Acts should be amended by keeping pace with new scientific inventions. The rigidity of proving the case with the help of the eyewitness should be replaced by scientific evidence. In all the developed countries scientific evidence has been prominent and administration of justice has been enriched with wide application of Forensic Technology.

i. The dangers of the eyewitness-oriented system are as under.

ii. Administration of justice system in India depends heavily on eyewitness, particularly on the administration of the criminal justice.

iii. Courts access the entire evidence of the cases on the performance of eyewitness. But this system of justice has some disadvantages. Because in all situations the eyewitnesses are not available.

iv. If available due to ear of cross-examination they do not attend court.

v. In many situations these eyewitnesses are purchased by the influential opposite party by money.

vi. In many cases, eye witness become hostile they become reluctant to say anything on behalf of prosecution.

vii. If eyewitnesses are available, there is no protection for him.

viii. In many situations eyewitness are harassed.

ix. No, sufficient diet money is given to them. They are afraid of attending the courts

x. Due to long pending of the cases the eyewitnesses go somewhere. Their Whereabouts Become Unknown To Prosecution.

In the same way there are other social areas where there is the need to take in account the use, applicability advantages and disadvantages of DNA technology to modify the laws, both substantial and procedural, of country. i.e. making favorable changes in legislations as and when there is the introduction of new inventions in science such as DNA technology.

5. Hypothesis of the Study:

The hypothesis of the study is as under.

i. DNA Technology has direct and indirect relation with law, society and science.

ii. In Indian Legal System it is necessary to understand when to use and when not to use DNA Technology.

iii. The study of the socio-legal dimensions of DNA technology is indispensable in Indian Legal System.

iv. The role and responsibilities of various agencies using DNA Technology are important factors to understand the relativity in Indian Legal System.

v. The Social, legal, religious and moral areas always get affected directly or indirectly by DNA technology, in Indian context.

6. Utility of the study:

In the light of the developments taking place in the field of DNA Technology, this doctrinal research is useful to number of agencies:

In the absence of any concrete legislation on the use of the DNA Technology in India, the investigating agencies- the police force and the central and state laboratories will be the primary groups and classes of people who are having first hand on the DNA Technology. The forensic experts will be benefited by the current study to gauge their role in the providing the evidences in the court of law and in the process of administration of justice. The governmental agencies like CBI, RAW, IB and other intelligence wings will get a vital outlook towards the use of DNA Technology from the investigation and legal point of view from the present study.

Through the present study the scholars of evidence law, lawyers, and judges, students of law, the press media, the government agencies and the entire society will be getting the vital inputs regarding how the existing laws of the country and the regulatory framework will operate in India if the DNA Technology is accepted in our legal system.

7. Research Methodology:

This study on DNA Technology has been carried on the bases of primary and secondary data prepared by various authors, researchers scholars, relevant material collected from the books, articles, journals websites, news papers and efforts have been made to interpret, analyze, and to conclude the same by giving the rational and reasonable suggestions.

And thus, the research is purely Doctrinal in nature.

7. Review of Literature

1. "*DNA Test in Criminal Investigation, Trial and Paternity Disputes*" , Yashpal Singh and Mohammad Zaidi ,Alia Law Agency, Allahabad, 2006

This book deals with the almost all aspects of DNA Technology. Initially it discusses about various legal and scientific terms. It also provides for the information of historical development of DNA technology. The DNA related important issues like Right to privacy and Right to information, DNA Test in paternity disputes, Expert Evidence and criminal Investigation are some of the important topics which have been discussed thoroughly in this book.Various Legislative aspects and judicial pronouncement is the important feature of this book.

The major reason for adopting this book for review is that this book contains the analysis of the DNA technology legislations of most of the developed and developing countries including that of USA, UK, Newzealand, Canada, China, and Australia.

2. "*An International DNA Database: Balancing Hope, Privacy, and Scientific Error,*" Allison Puri, Allahabad Law Agency, 2003

This is another important book discussing the international aspects of DNA Data base. Emphases have been given on administration, moral ethical aspects, right to privacy and other related issues of DNA Data Bank.

By studying this book wee can make out how can the administration and legislations relating to DNA Data bank can be introduced, adopted and improved in India.

This book is relied upon by the researcher for the purpose of understanding the difference in existing legislation in different countries relating to DNA Data Bank.

Apart from the above mentioned books, the researcher can refer to many other primary and secondary resources like Indian constitution, Indian evidence Act, DNA and patent issues, Medico-Legal Jurisprudence and other such books which cover various legislative aspects of DNA Technology in India.

The other resources have been mentioned in the footnotes and bibliography. Articles from various journals and resources based on websites have been added separately in the bibliography.

9. Limitation of the Study:

The study has been kept limited to Indian society and Indian legal system taking into consideration the international development in various countries as far as the Socio-legal dimensions of DNA Technology are concerned.

For the purpose of understanding the impact of DNA Technology, the comparative approach is adopted by the researcher by comparing the existing legal system in India with that of UK, USA, Canada, Australia, China and New Zealand. But this comparison is consequential in nature and not a complete comparison.

The other limitation of the present study is that there are day to day innovations and developments in the field of DNA Technology. All the technological changes and developments during the span of researcher have not been totally included in the present study as this research is purely based on the legal aspects.

10. Scheme of the Study

Chapter-I deals with the Methodology of research work carried out for the study of the subject. It includes the Introduction part which is the narrow introduction of the term DNA Technology, its legal and scientific explanations, and the Title of research work is explained with the help of the charts. The general objective/purpose for undertaking this study has been described in Objectives of the study. The nature and Scope of explains to whom and how and what are the areas /spheres where the DNA technology is applicable.

Rationale of study justifies the research work by quoting actual problems and their solution by giving the tentative testable statements for presumed questions of research in its Hypothesis.

Utility of the Study provides to whom, when and how this research be useful and in what manner. Thus, Research Methodology is purely Doctrinal and also includes the Limitations of the study.

The Scheme of the Study is the main part of the Doctrinal work describing various chapters as under:

Chapter-II deals with the Concept, Nature and the Scope of the DNA Technology. The areas covered under this chapter are scientific terms, DNA Technology application in judicial system in India, Use and application of DNA Data Banking and Evidential aspects.

Chapter-III deals with Historical Development and Evolution of DNA Technology In both India as well as in foreign countries like U.S.A. and also focuses on religious and ethical perspectives of DNA technology including Hindu Philosophy, Jainism, Catholic ideology, Islam, Jew's views regarding cloning and DNA Technology.

Chapter–IV is the heart of the Doctrinal work dealing with various Socio-Legal Dimensions and Aspects of DNA Technology such as, Criminal Investigation and DNA technology, Admissibility and Role of Expert and the admissibility of expert evidence and many more issues relating to the same. Use of DNA Technology in Post Conviction DNA testing; Paternity-Maternity Disputes Inheritance and Succession,

some issues relating to Right to Privacy v/s and Right to Information and DNA are some of the are other important points of discussion in this chapter.

The main focus area in this chapter is DNA Data Banking, Human Genome Project and DNA Patenting which discusses the impact of the same on law, society science, religion and ethics and morality.

Chapter-V explains the Legislative Approach of different countries towards DNA Technology. This chapter deals with the various legislations covering all or some of its sections, directly or indirectly having relation with it and takes into consideration the use of the DNA Technology, both in foreign and Indian legislations. Especially this chapter evaluates and discusses the relevant articles of India Constitution, The Indian Evidence Act, the procedural laws such as Criminal Procedure Code, Civil Procedure Cod., the substantial laws such as The Indian Patent Act 1970, succession laws, family laws Transplantation of human Organ's Act etc. At the same time the comparative study of the foreign legislations of various country such as U.S.A., U.K., Canada, Australia, New Zealand have been carried out as far as the DNA Technology is concerned. A detailed discussion on universal Declaration on Human Genome Project has been included in the same chapter.

Chapter-VI focuses on the DNA Technology and Judicial Response in India. This chapter focuses on the stand and role of Indian Judiciary and discusses the efforts made by the Indian Judiciary to give directions, guidelines as to the admissibility of the DNA evidence, paternity[9] and maternity[10] disputes, Divorce proceedings[11], maintenance, succession, adultery and other cases relating to both the civil and criminal proceedings[12]. And also focuses on how far the Indian judiciary has been proved successful to accept- apply this DNA Technology in administration of civil and criminal justice.

[9] Goutam Kundu v. State of West Bengal[9] AIR 1993 SC 2295
[10] Kamti Devi v. Poshi Ram AIR 2001 SC 2266
[11] Sharad v. Dharmapal, Ms. X v. Mr. Z and others AIR 2003 SC 3450
[12] Kamalnath and others v. St. Of Tamilnadu2005 (2) SCC (cri.) 1121

Chapter-VII provides for Conclusion and Suggestions

Efforts have been made to analyse the advantages, disadvantages, utility and limitation, use and application of DNA Technology, by giving the rational and reasonable suggestions as to the duties, role, and responsibilities, of the judges, investigation agencies, forensic expert and the society as a whole and other related agencies which have direct or indirect relationship with the application of DNA Technology.