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स्वामी दयानंद : भारतीय जागरण एवं धर्म सुधार के महान पुरोधा

## Editor-in-Chief: Prof. Jaiveer Singh Dhankhar

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## Editorial

A matter of pride to present the Vol.XII No.II October 2022 issue of Journal of People \& Society of Haryana. The present issue is the amalgamation of fourteen research papers both in English and Hindi connotating the historical writings to unveil the regional historical facts.

The editorial board is thankful to Prof. Surendra Kumar to accept our request to share an invited paper on thematic aspect of the concept of soul in Indian philosophical thought.

A wide variety of research papers included in the issue not only speaks about the culture of Haryana but also the every minute cultural aspects of the state of Haryana and its people.

Revealing the regional aspects of a geographical area and its demography, it widens those aspects of mankind which the world can know and the culture, society and people of Haryana can further be elevated. The art, culture and education of those areas which often earmarked can be known through the writings. A description about Mahendergarh district of Haryana in the issue is a bright example.

Wish you a happy reading.

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# The Concept of Soul in Nyaya-Vaisheshika Philosophy 

(Invited Paper)

Surendra Kumar*


#### Abstract

Nyaya and Vaisheshika philosophies (Nyayadwaya) have important place in Vedic systems of Indian philosophy. The purpose of Nyaya-Vaisheshika philosophy is to attain the supreme felicity with removal of all miseries by true understanding of reality through valid means of knowledge. It is therefore a detailed enquiry regarding provable realities has been carried out in the philosophy of Nyaya \& Vaisheshika. In this philosophy the Atman which refers to both, God (Parmatman) and Soul (Jivatman) is very important metaphysical reality.

According to Nyaya-Vaisheshika philosophy the Soul is not an empty idea but has a real existence; it is not a by-product of matter as mentioned in Charvaka philosophy, nor is it identical with the stream of conscious states as mentioned in Bauddha philosophy, nor, again, only one ultimate Supreme Self as mentioned in Monistic philosophies; but it is a distinct entity possessing distinct attributes and it is many in number. Ignorance or misapprehension is the cause of its bondage and by acquiring true knowledge it is liberated.


Key Words: Soul, Nyaya philosophy, Vaisheshika philosophy, Nyayasutra, Vaisheshikasutra, Gautama, Kanada.

## Introduction

The Systems of Indian Philosophy are mainly categorized as Vedic or Astika Darshana (orthodox systems of Indian Philosophy) and Non-Vedic or Nastika Darshana (Heterodox systems of Indian Philosophy) The orthodox systems of Indian Philosophy are popularly known as Sankhya - Yoga, Nayaya - Vaisheshika, Mimansa and Vedanta. Charvaka, Jaina and Bauddha are considered the heterodox systems of Indian Philosophy.

Due to affinity in doctrines and supplementary nature of subject matter the six Vedic systems of Indian philosophy are popularly placed in three pairs as Sankhya-Yoga, (Yagadwaya) Nayaya-Vaisheshika, (Nyayadwaya) Mimansa and Vedanta (Mimansadwaya). Nyaya and Vaisheshika philosophies (Nyayadwaya) have important place in Vedic systems of Indian philosophy. The oldest works of these philosophies are Nyayasutra and Vaisheshikasutra authored by Gautama and Kanada respectively.

According to Gautama, there are sixteen categories of Predicable (Padartha) and one can be free from all miseries by a correct and true understanding of these. (Nyayasutra 111) Out of these sixteen, the second category of Predicable is objects of true knowledge or reality to be known (Prameya). These

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objects are twelve in number and of these twelve; the first object or reality to be known is the Soul (Atman). (Nyayasutra 119) In Vaisheshika philosophy, Kanada has classified all existing Predicable (Padartha) in to six categories.(Vaisheshikasutra 114) Later on Negation (Abhava) the seventh Predicable was also included in the metaphysics of Vaisheshika philosophy. According to metaphysics of Vaisheshika philosophy the first Predicable is called Substance (Dravya) and that is nine in number. In these nine Substances, the eighth Substance is the Soul (Atman). Due to affinity in doctrine and similarity in subject matter and methodology the Soul has been discussed in both Nyaya and Vaishehika philosophies in a synergic manner.

In this present research paper, the existence, nature, attributes and liberation of the Soul have been discussed with special reference to Nyayasutra of Gauama and Vaisheshikasutra of Kanada.

According to Nyaya-Vaisheshika philosophy the Soul is not an empty idea but has a real existence; it is not a by-product of matter as mentioned in Charvaka philosophy, nor is it identical with the stream of conscious states as mentioned in Bauddha philosophy, nor, again, only one ultimate Supreme Self as mentioned in Monistic philosophies; but it is a distinct entity possessing distinct attributes and it is many in number.

The existence: Perception is the primary means of knowledge to prove existence of all perceivable objects. According to Nyaya-Vaisheshika philosophy the Soul is very subtle substance and is not an object of external perception. (Vaisheshikasutra 8.1.2) However it perceives itself with the union of mind internally. (Vaisheshikasutra 9.1.11) 'I am happy', 'I am sad,' 'I know' in these expressions ' $I$ ' is an object of internal perception and refers to the Soul, because happiness, sorrow and knowledge cannot be attributed to a non-conscious agent such as mind, sense- organs and body. But here an objection can be raised that in similar expressions such as 'I am strong', 'I am tall', 'I am blind', 'I am deaf' the term 'I' refers to either body, or a sense-organ so it is not true that ' $I$ ' only refers to the Soul. Kanada refutes this objection replying that this objection is based on the false identity of the body with the Soul. In reality the substratum of the term 'I' is Soul alone and this intuition has the individual soul as the object of perception. (Vaisheshikasutra 3.2.14)

Being a science of logic the Nyaya-Vaisheshika philosophy emphasizes mainly on inference for proving the existence of Soul. According to Nyayasutra of Gautama, Desire, Aversion, Effort, Pleasure, Pain and Cognition are the indicatives for the existence of Soul. (Nyayasutra 1.1.10) Desire arises from the remembrance of a previous perception and no such desire would be possible if there were not one and the same agent to cognize and recognize the thing. It is thus we infer that there is some unchangeable entity and that is the Soul. Similarly when one and the same agent perceives several things and on recollecting those previous perceptions, comes to have aversion to the things that caused him pain. When a certain kind of thing has been found to be the cause of pleasure, on subsequently seeing a thing of that kind, the individual makes an effort to obtain that thing; and this effort would not be possible if there were not one agent perceiving a number of things and recollecting his past perceptions. This explanation also applies to the effort that is put forth for the getting rid of what has been found to be a cause of pain. The experiences of Pleasure and Pain are also the indicatives of the Soul's existence. These experiences are possible only when the person getting by the thing in the present and
remembering the experiences of the past is the same who had had those experiences. Cognition is also an indicative of the presence of the unchangeable common agent who quests, ponders and cognizes the things and that is the Soul. Gautama further reasons that the excitement of one sense through the operation of another sense is also a mark to infer the existence of the Soul. The flow of saliva induced by strong desire of the particular taste in one's mouth after seeing a particular color or smelling a particular fragrance of an orange or a sweet, proves that there is an unchangeable common agent responsible for cognition and recognition of the taste, smell and sight and that is the Soul. (Nyayasutra 3.1.12) Kanada has also given an account of many indicatives or marks to infer the existence of the Soul including those of Gautama. (Vaisheshikasutra 3.2.4) According to him the motions of ascending and descending vital airs within the body are the mark of the existence of the Soul. With no presence of the Soul in a body we find no motion of vital airs. The closing and the opening of the eye-lids also infer a presiding agent in the organism. Similarly, life is also a mark to infer the Soul. The word life implies the effects of vitality, such as growth and sustainability of a body, the healing up of wounds, repairing of fractured bones, and these are the marks to infer the existence of the Soul. The movement of Mind is also a mark of the Soul. According to Vaisheshika philosophy, the Mind is indivisible single entity in each body and it is an instrument of pondering by the Soul. Its connection to a sense is dependent upon desire and attention. By that it is inferred that the Soul is the being whose desire and attention direct the Mind.

In the philosophy of Nyaya-Vaisheshika it has been discussed in detail that sense organs, body and mind are not substratum of the consciousness, thus these cannot be regarded as Soul. According to Gautama, apprehension of the same thing by sight and touch proves that the Soul is different from senses. (Nyayasutra 3.1.1) Previously I saw a jar and now I touch it:" such expressions will be meaningless if "I" is not different from eyes which cannot touch and from skin which cannot see it. In other words, the "I" or the soul is distinct from the senses, thus a sense is not soul because we can apprehend an object through both sight and touch.

The characteristics \& attributes: As far as characteristics of the Soul are concerned, according to Nyaya-Vaisheshika philosophy, the Soul is that which possesses the soulness (Atmatva). This soulness is that generality or class (Samanya) that differentiates the Soul from all other things. The Soul is an eternal substance, in other words it has no beginning and no end. Being eternal, it is infinite that is to say, all-pervading or greatest in magnitude. (Tarkabhasha p 145)

In Nyaya-Vaisheshika philosophy, the Soul is considered a substratum of certain attributes. These attributes are Cognition or Consciousness, Pleasure, Pain, Desire, Aversion, Effort, Merit, Demerit, Impression, Number, Dimension, Separateness, Conjunction and Disjunction. (Prashastapadabhashya p. 70) The attributes, such as Cognition or Consciousness, Pleasure, Pain, Desire, Aversion and Effort have already been discussed as the indicatives or marks to infer the Soul while discussing its existence in aforesaid paragraphs. However mentioning of some notable facts is very important and necessary here. According to Nyaya-Vaisheshika Cognition or Consciousness is not accepted as nature of the Soul, it is considered an attribute of the Soul. It is a product of the contact of the Soul and mind etc. (Nyayasutra 1.1.4) Hence the Cognition or Consciousness is none-eternal and it is an attribute of the

Soul but not nature. (Nyayamanjari p 275) Like Cognition, the other attributes such as Pleasure, Pain, Desire, Aversion and Effort are also not nature of the Soul. All these six attributes are perceptible by the Soul through the contact of mind. (Tarkabhasha p 211) Here we have to understand, though the attributes mentioned above are the incidental but are special qualities of the Soul only.
The attributes namely Merit (Dharma) and Demerit (Adharma) are special cause for pleasure and pain of the Soul. Though they are not perceptible like pleasure and pain but their existence is known through inference. The body of a person and the things to be enjoyed by him are produced by some special qualities of his soul, because they are the cause for his enjoyment, like any other object obtained by his efforts. Thus it is inferred that these special qualities of the Soul which produce body etc. are his Merit and Demerit because no other attribute is capable to produce these. (Tarkabhasha p 212) The Merit and Demerit are also produced in the Soul with the contact of Mind by the various thoughts of purity and impurity and actions accordingly. (Vaisheshikasutra 6.2.14)

In the series of attributes of the Soul, the ninth attribute is Impression (Sanskar). According to NyayaVaisheshika it is produced by experience and is the cause for recollection. Through this attribute the Soul becomes able to recognize all past experiences. Merit, Demerit and Impression are also special attributes of the Soul like other six mentioned above.

Number, Dimension, Separateness, Conjunction and Disjunction are the general attributes of the Soul, because these are common to other substances also. According to Nyaya-Vaisheshika philosophy the Soul is many in number. The proof for this assumption is the divergent status in the universe. (Vaisheshikasutra 3.2.20) Different status of births and deaths, happiness and unhappiness, bondage and liberation prove that the Soul is not single in number but plural. Had there been only one Soul, then this divergent status of beings would not have been seen in this universe.

According to Nyaya-Vaisheshika, the Soul is greatest in Dimension (Vaisheshikasutra 7.1.22) If it were not so, then action would not have been performed and its effect would not have been produced in the respective objects possessing limited dimension, because the performance of an action and production of its effect is a result of conjunction of the Soul carrying its destiny (adrsta) inasmuch as destiny being present in different substratum. This proximity of destiny producing action and effect all over proves that the Soul is present all over and hence, it is greatest in dimension.

The plurality of the Soul proves the Separateness between Souls. Connection and disconnection of the Soul with non-pre existing body etc as per its merit and demerit are Conjunction and Disjunction reactively. (Vaisheshikasutra 6.2.15) Besides these attributes in Nyaya-Vaisheshika the Soul is also accepted doer and enjoyer of actions and their fruits respectively.

The Liberation (Apavarga): According to Nyaya-Vaisheshika liberation is absolute release from all kinds of pain (Duhkha). (Nyayasutra 1.1.22) The cause of pain is birth (Janma), the cause of birth is merits and demerits earned through right or wrong activity, the cause of activity are the faults and finally the cause of faults is misapprehension. Gautama says, Pain, birth, activity, faults and misapprehension, on the successive annihilation of these in the reverse order there follows release from all kinds of pain. (Nyayasutra 1.1.2) A person, by true knowledge of the reality, is able to remove his misapprehensions. When this is done, his faults disappear. He is then no longer subject to any activity that earns merits and
demerits for him and this ends the transmigration, so no birth again. With no birth there are no body, mind and senses, and without them no experience, thus all miseries are ceased.

Keshava Mishra (Tarkabhasha p 232-33) explains this in detail. According to him in liberation all twenty one forms of suffering cease completely. These twenty one forms of suffering are the body, the six sense-organs, the six objects enjoyed through these six sense-organs, the six kinds of cognition from the six senses, pleasure, and pain. Pleasure is also considered suffering as it is always accompanied by pain.

The true knowledge is the ultimate cause of liberation. When a person understands the real nature of all things and cognizes the defects in the objects of enjoyment, he loses attachment to these and becomes desirous of release. After strong desire for release he takes the path to yoga and meditation. On attaining perfection in meditation he realizes the true nature of the Soul and after this realization he performs actions without any attachment to results, thus he ceases acquiring further merits and demerits. He also, by his yogic powers, comes to know his past merits and demerits which caused his present birth. He collects them together and ends them by enjoying their effects collectively.

By this he exhausts all his previous accumulation of good and evil acts and when the present body dies off, his soul has no new body to enter into and thus loses complete contact with the all twenty one forms of suffering. This release from all forms of suffering is called liberation according to Nyaya-Vaisheshika philosophy.

## Conclusion

From the facts presented in foregoing pages regarding the concept of Soul in Nayay-Vaisheshika philosophy, we understand that this philosophy has a realistic view regarding the Soul. In this philosophy the Soul is a distinct entity. It is a substance possessing certain special and general attributes and it is many in number. Ignorance or misapprehension is the cause of its bondage and by acquiring true knowledge it is liberated.

When we compare these ideas of Nyaya-Vaisheshika with other schools of Indian philosophy we find many similarities and dissimilarities. Though the Jain school of Indian philosophy is a none-Vedic school but it has many similarities to the ideas of Nyaya-Vaisheshika regarding the Soul. According to Jain philosophy the Soul is a substance and it has plurality. It possesses almost all attributes as mentioned in Nyaya-Vaisheshika. But in Jain philosophy consciousness is accepted as nature or essence of the Soul, though the degree of consciousness varies Soul to Soul. Jain view also differs in dimension (parimana) of the Soul. According to their view there is intermediate dimension of Soul in which it decreases and increases according to the size of body.

Vedic schools of Indian philosophy such as Sankhya-Yoga and Mimansa also have a realistic view about the Soul. Sankhya supports the reality and plurality and the dimension of the Soul as accepted in Nyaya-Vaisheshika but opposes about nature of the Soul. According to Sankhya the Soul is pure consciousness and does not possess any adventitious quality or attribute. The view of Mimansa, regarding the Soul is quite similar to that of Nyaya-Vaisheshika. In view of Mimansa the Soul is eternal infinite substance which possesses consciousness but this consciousness is not essence of the Soul, it is
an adventitious quality. The concept of Soul in Nyaya-Vaisheshika is quite different from the empirical view of Bauddha and idealistic view of Advaita Vedanta.

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# Site Catchment Analysis of the Harappan Site Mitathal 

Sajjan Kumar*


#### Abstract

The Harappan settlement Mitathal was an important town situated in the Chautang basin, a tributary of Ghaggar in northwest Haryana. The main aim of the paper is to demarcate and analyse the catchment area of the site. In view of this, the author conducted village to village survey in 12 km radius of Mitathal site by applying the method of site catchment analysis. The analysis of the site incorporates the study of exploitation of resources by inhabitants of Mitathal. In Archaeology, site catchment analysis provides important information regarding the people of particular culture, their subsistence practices, economic and social organization. The evidence of subsistence practices is primarily recovered from archaeological sites in the form of artifacts (made or modified by human and moveable remains), features (made or modified by human and non-moveable remains) and ecofacts (not made by man produced by nature i.e. seed, bone, pollen etc.).


Keywords: site catchment, Harappan, subsistence practices, surveys, explorations, arable land, natural resources, exploitation, flora, fauna, soil, ecology and landscape.

## Introduction

The study of the protohistoric economy has now been recognized as an important aspect of Harappan archaeology particularly of Ghaggar basin in Haryana. There is no doubt that the Ghaggar basin and adjoining areas are one of the most important territories for origins, development and diffusion of the Harappan civilization. The river Ghaggar and its tributary (Chautang or Drisdwati) provided cultivated land and natural irrigation facilities for agricultural purposes, which was the main base of subsistence economy of the Harappans and the site of Mitathal falls in this region.

## The Concept and History of site Catchment Analysis

The territorial approach is known as site catchment analysis. This method was first introduced by Claudio Vita Finzi and Eric Higgs (1970:5-6) in their study of prehistoric economy in the Mount Carmel area of Palestine. Finzi and Higgs, two Cambridge based palaeo-economists, explicitly realized that human groups have procured resources from the regions immediately surrounding their settlements. This basic idea of understanding the catchment area that how humans exploited their environment and the extent of settlement territories which led to the formulation of this analytic method in the late 1960s. In proposing the term site catchment analysis, Vita Finzi and Higgs (1970:5) defined it as 'the study of relationship between technology and those natural resources lying within economic range of individual sites. The term catchment is taken from the literature of geomorphology where it is similar with drainage basin or watershed and denotes the area from which a stream draws its water. Similarly, the catchment

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of an archaeological site is that area from which the inhabitants of a site derived its resources (VitaFinzi, 1969:102-108).

In the Indian subcontinent, the concept and method of site catchment analysis has been employed by a number of scholars. R. S. Pappu (1988:107-120) introduced this concept of site catchment analysis at Chalcolithic site of Inamgaon, Harappan site of Kuntasi (Pappu, 1996:107-120) with M. K. Dhavalikar and another important site in Tapi basin in northern Maharashtra with Vasant Shinde (Pappu and Shinde, 1990:421-448). After two-three decades D. Dasgupta (2004 \& 2006: 70-74) and Astha Dibyopama (2010: 47-57) have worked at Gilund and Balthal sites in Rajasthan. The site catchment analysis on protohistoric settlements in Haryana is also in a primary stage of development. Very few case studies were done on site catchment analysis in Haryana. Amarendra Nath and Tejas Garge (Nath and Garge, 2014: 33-45) have done work on site catchment analysis at Harappan site Rakhigarhi. My approach in the present context of site catchment analysis is mainly based on the distribution of arable land and necessary resources around the Harappan settlement of Mitathal. Earlier this type of study has not been carried out by any scholar at Mitathal; hence, the present paper is the first attempt in this regard.

## The Study area and Methodology

There are several techniques and methods adopted to define the catchment analysis of the site which help in the reconstruction of the Harappan culture such as material culture, settlement pattern and subsistence economy. The research work is mainly based on the excavation reports of Mitathal, several research papers and articles published so far. In addition, the author was a member of excavation team at the site in 2007-08 and 2010-11 directed by Vasant Shinde (2008) and Manmohan Kumar (2011:16877). I have also carried out explorations at 11 other Harappan sites located in the catchment area of 12 km radius of Mitathal site. This surrounding area of Mitathal site is divided into three important concentric circles and covers about $452 \mathrm{~km}^{2}$ area. The first circle is 0 to 3 km , the second 3 to 6 km and the third one is 6 to 12 km (see Map 2). These all 11 settlements were probably feeders to the main site of Mitathal. The names of the explored sites in study area along with their details are given in Table -2, and in the description of the individual sites under the heading of Satellite Settlements in 12 km radius of Mitathal.

## Aims and Objectives

The Harappan site catchment analysis of Mitathal is to assess ecology of the site, exploitation of natural resources, availability of material resources, the nature of interaction with the sites located in the catchment area of 12 km radius of Mitathal. It focused on the role of ecology and landscape of catchment area, availability and exploitation of resources for various purposes and interaction with the landscape, settlement pattern and subsistence economy and observed transformation of cultural material of the period. The scope of the study involves analysis of landforms, drainage, flora, fauna, soil and other raw materials of the provenance area. The author has been visiting the site many times for more than the last two decades and participated in two important excavations conducted at Mitathal site in 2007 and 2010, which enabled me to know more about Mitathal site and surrounding areas. In this context, a detailed village to village survey was carried out by the author in the area of 12 km radius of Mitathal site.

## Location of site Mitathal and Previous Works

The modern village Mitathal is located at a distance of 12 km northeast of tehsil and district headquarters of Bhiwani, Haryana (India). The famous and important Harappan site Mitathal ( $28^{\circ} 53^{\prime}$ $31^{\prime \prime} \mathrm{N}, 76^{\circ} 10^{\prime} 08^{\prime \prime} \mathrm{E}$ ) is further located about 1.5 km northwest of the present village Mitathal (see Map1). The site is situated on the alluvial plain of the Chautang basin. The Chautang, a major tributary of the Ghaggar, was a seasonal stream in its upper course. The Ghaggar and its tributaries, though now dry, were both important during the Protohistoric times.

In 1960s, Suraj Bhan (1969: 1-15) explored the present area and first time reported the Harappan site Mitathal in 1968 and conducted also an excavation at the site (Bhan, 1975). Thereafter, time and again explorations were carried out by other scholars such as Silak Ram (1972), Surender (2002), Suresh Siwach (2010), Narender Pramar (2013) and some other agencies brought to light numerous material remains from the site. Time to time it was also subjected to excavation by archaeologists as has been earlier stated. G. L. Possehl (1992:237-44) has named it the "Eastern Domain" of the Indus or Harappan civilization.

## Chronology and Antiquities of Mitathal

Mitathal site occupies an area about 40 acres consisting of two mounds at the time of Bhan's excavation. Mound-1 occupies an area approximately $150 \times 130 \mathrm{~m}$. and rises to a height of 5 m ., and Mound-2 occupies approximately $300 \times 175 \mathrm{~m}$. and is approximately 4 m . in height (Bhan, 1975). But Manmohan Kumar has reported three separate mounds at Mitathal, namely- MTL-1 (Citadel Complex), MTL-2 (Lower Town) and MTL-3 (Industrial Complex). MTL-1 and MTL-2 are separated by 20 m . gap running from north-east to south-west, while MTL-2 and MTL-3 are separated by a 10 m . gap running northwest to southeast (Kumar et al. 2011:169). The excavations conducted so far at Mitathal site have brought to light three-fold cultural sequence i.e. Period-I (Late Siswal Culture), Period-II A (Harappan Culture) and Period-II B (Late Harappan Culture) (Bhan, 1975; Kumar et al. 2011:169)(Table-1).

Table 1: The Cultural-sequence of Mitathal (after Suraj Bhan)

| Period | Date in BCE | Contemporary |
| :--- | :--- | :--- |
| Mitathal Period- I | c. $2000-1900$ | Late Siswal |
| Mitathal Period- II A | c. $1900-1700$ | Mature Harappan |
| Mitathal Period- II B | c. $1700-1500$ | Late Harappan |

In 1968, when Suraj Bhan excavated Mitathal site, more than half part of the site was intact. But in last two or three decades a large chunk of the mound has been removed with the help of heavy JCB machinery for agricultural purposes. About 3 hectares part of the site to each side towards the east and south has been leveled. Thus, maximum part of the site has been removed. Now only a small part of the original mound is left. Under these circumstances, the remaining part of the site is under threat and thus leading to permanent loss of archaeological heritage.

## Environmental Changes

The relationship between the environment and humans has played an important role in cultural development. The ecological system is becoming more important in interpretation of human behaviour,
cultural changes and continuity, people's diffusion, social relations and practices, production of materials and growth of population. It also emphasized how people in a particular landscape prepared to live from natural resources. The archaeological evidence has clearly indicated the importance of the topographical features, variety of soils, mineral resources, climatic conditions, rivers, rain, flora and fauna for past cultures and civilizations. The catchment area falls in the north and northeastern part of tehsil and district headquarters Bhiwani. This area is mostly alluvial plain but some sandy parts are also recognized here. The good amount of sea salt is also responsible for the content of the alluvium forming the plain (Duggal, 1970:3).

The majority of soils of this area have been formed by fluvial processes. The main physiographic units in this area are Chautang flood plains. There are hills in the close vicinity of the area from where the water gets accumulated in this plain. Topographically, today the Chautang basin is flat and monotonous upland plain. In adjoining of this area (around $25-30 \mathrm{~km}$ in radius), Aravalli foothills are also present at nearby Devsar, Kaliana, Tosham, Khanak, Nigana Kalan and Riwasa villages. The rock of Tosham ring complex is composed of metasomatic granite, quartz, quartzite, mica schist, alkali, feldspars, plagioclase and biotite (Grover \& Kumar, 1980: 119-236). The Aravalli hills have good resources of different kinds of minerals particularly in the regions of Tosham and Kaliana ring complexes. Copper ore has been recovered both from Tosham and Kaliana ring complexes (Kochhar, 1982:50-51). Mostly the loam soil is found in the region but few sand dunes are also present in the catchment area. The areas having this soil are considered to be very good for cultivation activities. This area was suitable for sustaining the village settlements as well during the fourth or third millennium BCE which attracted early people who established their settlements here.


Map 1: Location of Mitathal site showing its catchment area

Table 2: Explored Harappan sites in catchment area of Mitathal

| Sr. No. | Harappan Site | Coordinates | Cultural Sequence | Area of Site in acre | Present Condition of the site |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1. | Mitathal | $\begin{aligned} & 28^{\circ} 53^{\prime} 31^{\prime \prime} \mathrm{N}, \\ & 76^{\circ} 10^{\prime} 08^{\prime \prime} \mathrm{E} \end{aligned}$ | Early, Mature \& Late Harappan | 20 | Maximum part of the site leveled |
| 2. | Chang-1 | $\begin{gathered} 28^{\circ} 53^{\prime} 14^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 13^{\prime} 19^{\prime \prime} \mathrm{E} \end{gathered}$ | Early, Mature \& Late Harappan | 50 | Maximum part Leveled for Agriculture |
| 3. | Chang-2 | $\begin{gathered} 28^{\circ} 51^{\prime} 44^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 15^{\prime} 40^{\prime \prime} \mathrm{E} \end{gathered}$ | Early, Mature \& Late Harappan | 10 | Entirely Leveled for Agriculture |
| 4. | Chang-3 | $\begin{gathered} 28^{\circ} 51^{\prime} 48^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 12^{\prime} 500^{\prime \prime} \mathrm{E} \end{gathered}$ | Early, Mature \& Late Harappan | 25 | Entirely Leveled for Agriculture |
| 5. | Dhanana | $\begin{gathered} \hline 28^{\circ} 54^{\prime} 25^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 09^{\prime} 11^{\prime \prime} \mathrm{E} \end{gathered}$ | Mature \& Late Harappan | 6 | Entirely Leveled for Agriculture |
| 6. | Mandhana | $\begin{gathered} \hline 28^{\circ} 54^{\prime} 00^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 07^{\prime} 49^{\prime \prime} \mathrm{E} \end{gathered}$ | Early, Mature \& Late Harappan | 3 | Almost leveled for Agriculture |
| 7. | Tigrana-1 | $\begin{gathered} 28^{\circ} 53^{\prime} 25^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 08^{\prime} 08^{\prime \prime} \mathrm{E} \end{gathered}$ | Early, Mature \& Late Harappan | 10 | Site Intact |
| 8. | Tigrana-2 | $\begin{gathered} 28^{\circ} 54^{\prime} 25^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 09^{\prime} 20^{\prime \prime} \mathrm{E} \end{gathered}$ | Early, Mature \& Late Harappan | 7 | Entirely Leveled for Agriculture |
| 9. | Sui | $\begin{gathered} 28^{\circ} 52^{\prime} 16^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 04^{\prime} 13^{\prime \prime} \mathrm{E} \end{gathered}$ | Harappan | 5 | More than 50\% site leveled |
| 10. | Pur-1 | $\begin{gathered} 28^{\circ} 58^{\prime} 10^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 04^{\prime} 33^{\prime \prime} \mathrm{E} \end{gathered}$ | Late Harappan | 5 | More than 50\% site leveled |
| 11. | Pur-2 | $\begin{gathered} 28^{\circ} 56^{\prime} 28^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 06^{\prime} 28^{\prime \prime} \mathrm{E} \end{gathered}$ | Late Harappan | 7 | More than $50 \%$ site leveled |
| 12. | Talu | $\begin{gathered} 28^{\circ} 59^{\prime} 39^{\prime \prime} \mathrm{N}, \\ 76^{\circ} 10^{\prime} 12^{\prime \prime} \mathrm{E} \end{gathered}$ | Late Harappan | 3 | Entirely Leveled for Agriculture |

## Satellite Settlement in $\mathbf{1 2} \mathbf{~ k m}$ radius of Mitathal

The author has also explored 11 earlier reported Harappan sites in 12 km radius of Mitathal site. The details are given below:

The Chang village is located about 15 km to northeast of the tehsil and district headquarters Bhiwani and 12 km southwest of tehsil Meham on state highway (16A) Bhiwani-Meham; and 6 km east of Mitathal site. Three Harappan sites are located in the territory of village Chang.

Chang-1: ( $28^{\circ} 53^{\prime} 14^{\prime \prime} \mathrm{N}, 76^{\circ} 13^{\prime} 19^{\prime \prime} \mathrm{E}$ ) The site Chang-1 is situated about 1.7 km west of the present village and about 4.5 km east of Mitathal mound on the Chang-Mitathal and Chang-Badesara link roads. Locally it is known as Patte wale Khet. It measures approximately 50 acres and is about 4 m . in height. But maximum part of it has been leveled for agricultural activities (Table-2). It contains the ceramic assemblage of the Early Harappan and Mature Harappan but Late Harappan phase is very doubtful on the site. During field survey the author collected potsherds, fragments of terracotta and faience bangles from the site (Bhan, 1975:125).

Chang-2: ( $28^{\circ} 51^{\prime} 44^{\prime \prime} \mathrm{N}, 76^{\circ} 15^{\prime} 40^{\prime \prime} \mathrm{E}$ ) The site Chang-2 is located about 2.5 km southeast of the village Chang and 8.5 km east of Mitathal on the Chang-Riwari village link road, locally known as Khera. The whole site has been leveled to the ground and it is used for cultivation. The pottery is scattered in an area about 10 acres (Table-2). The ceramic assemblages from Early to Late Harappan cultures were found during explorations. Some fragments of terracotta and faience bangles were recovered from the site (Kumar et al. 2021:46-57).

Chang-3: ( $28^{\circ} 51^{\prime} 48^{\prime \prime} \mathrm{N}, 76^{\circ} 12^{\prime} 50^{\prime \prime} \mathrm{E}$ ) The Harappan site Chang- 3 is located about 2.5 km southwest of the village Chang and 8 km southeast of Mitathal. It measures approximately 25 acres (Table-2). The whole site has been leveled to the ground and is used for cultivation but few intact parts are visible. The ceramic assemblages of the Early to Late Harappan cultures were collected during the explorations. The fragments of terracotta and faience bangles, terracotta wheel, one fragment of copper bangle and one unidentified copper piece are recovered from the site (Kumar et al. 2021:46-57).

Dhanana: ( $28^{\circ} 54^{\prime} 25^{\prime \prime} \mathrm{N}, 76^{\circ} 09^{\prime} 11^{\prime \prime} \mathrm{E}$ ) The Dhanana village is situated about 16 km to the north of district headquarter Bhiwani on the Bhiwani-Jind road. There is one Harappan site in the village territory which is situated about 3 km south of village Dhanana and 3.5 km north of Mitathal mound. Locally it is called Kale ka Tiba. It covers approximately 6 acres area (Table-2). The whole site has been leveled for agricultural purposes. It has yielded the ceramics of the Mature Harappan and Late Harappan cultures. During field survey the fragments of bangles of faience and terracotta, and terracotta figurines were found from the site. Manmohan has reported some mud brick walls visible on surface of the site (Kumaret al. 2011: 169).

Mandhana: ( $28^{\circ} 54^{\prime} 00^{\prime \prime} \mathrm{N}, 76^{\circ} 07^{\prime} 49^{\prime \prime} \mathrm{E}$ ) The Mandhana village is situated about 17 km to north of the district headquarter Bhiwani on the Bhiwani-Bawani Khera road and about 6 km to the northwest of the Mitathal site. The site is located about 2.5 km southeast of the modern village. The mound measures 3 acres and almost reduced to the ground. It has yielded the remains of Early to Late Harappan cultures. Beads and bangles of terracotta and faience were also recovered from the site (Parmar, 2013:52-53)(Table-2).

The Tigrana village is situated about 8.5 km to north of the district headquarter of Bhiwani on BhiwaniJind road. There are two Harappan sites in the territory of Tigrana village.

Tigrana-1: ( $\left.28^{\circ} 53^{\prime} 25^{\prime \prime} \mathrm{N}, 76^{\circ} 08^{\prime} 08^{\prime \prime} \mathrm{E}\right)$ The Tigrana-1 site is located about 3 km north of the present village and 5 km west of Mitathal mound. The villagers call it Rukhi wala Khera. More than half part of the site is intact. The potsherds are found approximately in 10 acres area. The height of the site is about 2 m . It has yielded the pottery of Early to Late Harappan cultures. The ceramic assemblage includes vases, basin, perforated jar, goblets, storage jar, dish-on-stand with dropping rim etc. One etched carnelian bead, steatite beads, faience beads, terracotta beads, a complete terracotta bangle and a terracotta solid bull figurine were the important finds from this site (Parmar, 2013:59-60).

Tigrana-2: ( $28^{\circ} 54^{\prime} 25^{\prime \prime} \mathrm{N}, 76^{\circ} 09^{\prime} 20^{\prime \prime} \mathrm{E}$ ) The site Tigrana-2 is situated about 3 km south of the village Tigrana and 8 km southwest of Mitathal mound. Locally it is known as Purana Khera. The entire site has been leveled for agricultural purposes. The pottery is scattered in an area about 7 acres (Table-2). It has yielded the potsherds of the Early to Late Harappan cultures. Steatite beads and fragments of faience and terracotta bangles were found during the explorations. Earlier studies reported Late Siswal and Mature Harappan remains at the site (Bhan, 1975:125).

Sui: ( $28^{\circ} 52^{\prime} 16^{\prime \prime} \mathrm{N}, 76^{\circ} 04^{\prime} 13^{\prime \prime} \mathrm{E}$ ) The village Sui is situated 10 km northwest of Bhiwani and 10 km south of Bawani Khera block headquarters and about 10 km southwest of Mitathal mound. The site is located about 1 km east of the present village. The total area of the site is approximately 5 acres and is about 2 m . high (Table-2). The pottery collected from the site belongs to the late Harappan culture.
The Pur village is situated about 20 km to the north of district headquarter Bhiwani and about 10 km to northwest of the Mitathal site. There are two Harappan sites located in the village territory.

Pur-1: ( $28^{\circ} 58^{\prime} 10^{\prime \prime} \mathrm{N}, 76^{\circ} 04^{\prime} 33^{\prime \prime} \mathrm{E}$ ) The site is located about 2 km northwest of the present village. The potsherds were noticed in an area about 5 acres (Table-2). The local people call it Baba wali Johadi. During the exploration we found ceramic of the Late Harappan culture.

Pur-2: ( $28^{\circ} 56^{\prime} 28^{\prime \prime} \mathrm{N}, 76^{\circ} 06^{\prime} 28^{\prime \prime} \mathrm{E}$ ) The mound is located about 3 km east of the village on PurDhanana link road. The ceramic assemblage of late Harappan culture is scattered in an area about 7 acres and the mound is about 1.5 m . high (Table-2). Few fragments of faience bangles were found during explorations.

Talu: ( $28^{\circ} 59^{\prime} 39^{\prime \prime} \mathrm{N}, 76^{\circ} 10^{\prime} 12^{\prime \prime} \mathrm{E}$ ) The Talu village is situated about 24 km to north of the district headquarter Bhiwani and about 10 km to northwest of Mitathal site. The ancient site is located about 2.5 km northeast of the present village on the Bhiwani-Jind road. The site is spread over an area about 3 acres and has been totally leveled for agricultural purposes (Table-2). During the explorations very small potsherds were recovered from the site. Parmar has identified the ceramic industry of the site as Late Harappan culture (Parmar, 2013:59).

## Site catchment analysis of Mitathal

The Harappan site Mitathal was selected for the site catchment analysis because three important excavations were carried out by different scholars at the site from 1960s to 2010s and Possehl says that
the region or the Mitathal site was 'Eastern Domain' of the Indus or Harappan civilization. The author has also explored 11 other Harappan sites in 12 km radius of Mitathal site. The surrounding area of 12 km around the site was divided into three important concentric circles, the first circle is $0-3 \mathrm{~km}$, the second $3-6 \mathrm{~km}$ and the third one is $6-12 \mathrm{~km}$ (Map 2). In the radius of 12 km around Mitathal, it is divided into different lands such as arable land, pasture land and barren land. In calculative prediction it goes like: 1 to 1.5 hours radius $=$ Sedentary economy $=$ Agriculturalists $=$ Inhabitants of Protohistoric time. 1.5 to 2.5 hours radius $=$ Mobile economy $=$ Hunter gatherer/Fishing $=$ Inhabitants of Protohistoric period. Circle wise description is given below:

## The Settlement ( $0-3 \mathrm{~km}$ in radius)

Within the radius of 3 km , the total area covered is $28.27 \mathrm{~km}^{2}$. In this radius, an important site Dhanana is situated northwest of Mitathal (Map 1\&2). The modern land use pattern of this area has shown availability of number of resources required for the basic subsistence practices for the inhabitants.

The soil is sandy loam (a few parts), loamy and clay loam. Clay loam is used for making pottery, terracotta objects, bricks, mud mortar and house building materials. The areas having this soil are considered to be very good for cultivation activities and produce very good harvest every year. The tract is generally smooth, deep, well-drained, fertile and covered by the Yamuna canal system. There are two main seasons for the cropping pattern known as Rabi and Kharif. The major Rabi crops are wheat, mustard, barley and oil seeds while jawar, pearl millet, cotton, sugarcane, maize and rice are the main Kharif crops. The important trees in this region include Kikar, Shisham, Neem, Bakain, Beri, Peepal and Poplar.


Map 2: Territories showing core sites in catchment

## 3-6 km Radius

The area, lying in the second concentric circle, was exploited by ancient habitants of Mitathal. It covers $84.83 \mathrm{~km}^{2}$. Five Harappan sites are situated in this area such as Chang-1, Chang-3, Tigrana-1, Tigrana-2 and Mandhana (see Map 2). The majority of soils of this area is formed by fluvial processes and is considered to be very good for cultivation activities and produce very good harvest every year. In 2011, excavation at Mitathal led by Manmohan, noticed 10 kiln-walls at MTL-3. Burnt and charred animal bone fragments and charcoal were found near the bottom in all the kilns, indicating that animal bones were also used in some means for firing the artifacts (Kumar et al., 2011: 174). Sharada and Joglekar described in their work (Sharada et al. 2012: 31-41) that pastoralists played an important role in the economy of Mitathal from early to late periods. Good quantity of pasture land was available in 6 km radius of Mitathal. All the five settlements may be of pastoral nature in the catchment area. The wild and domestic animal bones were found in the excavations indicate that both types of animals contributed to the subsistence practices of Mitathal (Sharada et al. 2012: 31-41).

## 6-12 km Radius

The total area covered by the $6-12 \mathrm{~km}$ radius is $338.69 \mathrm{~km}^{2}$. Most probably the land was very suitable for pastoral use and the other use may have served as hunting ground for the inhabitants. Five settlements were found located in 6-12 km radius such as Chang-2, Sui, Pur-1, Pur-2 and Talu (Map 2). The alluvial land was available in close vicinity of Mitathal.

The animal bones, shells and teeth have been collected during Mitathal excavation in 2007 and were studied by C. V. Sharada and P. P. Joglekar (Sharada et al. 2012: 31-41). The domestic animals identified at Mitathal include cattle, buffalo, sheep, goat, pig and dog. Several wild mammal bones have also been recovered from the site including wild pig, spotted deer, barking deer, blackbuck and porcupine. Two other mammalian species (rats and hare) were later intrusions. The inhabitants of Late Mitathal have used a few aquatic animal species (reptiles, fish and molluscs). Cattle/buffalo bones were the major share of the total bones at Mitathal. The second important food species have clearly identified as sheep/goats (Sharada et al. 2012: 35-41). During the Late Harappan phase, a few species of wild mammals were exploited through occasional hunting to supplement the diet. The relative proportion of the wild mammals was small as compared to the domestic mammals used for food (Sharada et al. 2012: 37). The total land in this radius may have been used for pastoral use and hunting for the inhabitants. Most probably some of the craft products manufactured at Mitathal would have been traded within the catchment area in exchange of food grains and some other raw materials which were not available around Mitathal but present in the vicinity of this area (Sharada et al. 2012: 37).

## Conclusions

In the radius of 12 km , there are total 12 Harappan settlements. These sites have been identified on the basis of ceramic assemblage and associated material remains. The site catchment analysis of Mitathal has helped to understand the way resources were exploited, to assess the economic potential of the ancient people of Mitathal and the nature of interaction with the sites located in 12 km radius. Mitathal appears close to the source of raw material required to produce faïence as the evidence of its
manufacture (Shinde et al. 2008 and Kumar, et al. 2011). The acquisition of raw material for grinding stones from the Kaliana Hills and steatite from the Alwar region of northern Rajasthan likely put inhabitants of Mitathal in contact with, probably indirectly, people of the Ganeshwar-Jodhpura cultural phase (Prabhakar et al. 2010: 59). Catchment analysis is a methodology that relates an archaeological site to the surrounding physiography and simultaneously defines the "Limits of influence" of an archaeological site. Generally, site catchment analysis delimits an arbitrary territory or set of concentric territories surrounding a site and assesses the resource potential contained within that area. The territory assessed is postulated to be the area from which the greatest quantity of resource was derived. The catchment area is defined by drawing a circle around the site, the radius has often been set at $5-6 \mathrm{~km}$ (that is an hour walk) for agro-pastoral sites and $10-12 \mathrm{~km}$ (that is 2 hours walk) for hunting-gathering or fishing purposes. Within the catchment area the proportions of such resources as arable or pastoral land are calculated and from these figures conclusions can be drawn concerning the nature and the function of the site. The people of Mitathal practiced a mixed-economy based on agriculture, animal husbandry and non-agricultural activities.

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# A Review on the Impact of Farm Bills during Covid-19 

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#### Abstract

Present paper is a review paper of by nature that based on different studies on farm bills from different aspects. In the amidst of extreme cold of December 2021, thousands of farmers were assembled on the boarder of Delhi, UP and Haryana in order to protest against farms bills. After the yearlong violent and consistent protest against bill they were withdrawn from implementation by the central government. It is noted that after a long period of time, a government attempted to make changes in the structure of agriculture system. Consequently, and unsatisfied from the provision of the bills, the farmers protested. The protested community of farmers and the government have had conflict due to opinion in difference. Farmers which organised the protest were unable to comprehend the functioning as well as the provision of farm bill. The government was unable to understand the concern of farmers and farmers were not able to suggest changes in the bill. In the paper, almost fifty studies have taken into consideration in order to study the different prospective, hence, prepare a conclusion.


Keywords: Farm Bills, Farmer Protection, Agriculture Market
Limitation of Study- Due to the importance of subject, many research were conducted by scholars in last three years. Out of these studies only 50 studies were shortlist, given the fact that it was not possible to access every research on present topic. So, the conclusion of the present work was based only on these studies.

## Abbreviations-

## APMC- Agricultural Product Market Committee

MSP- Minimum Support Price

## GOI- Government of India

Agriculture provide employment to more than 50 crore Indians and food securities to all country. Due to creation inherent weakness such as small landholdings size, large proportion of small and marginal farmers, agriculture has remained Achilles heel of Indian economy since independence. There are many positive aspects, such as increase in production, area under cultivation, productivity per hectare and remarkable increase in institutional finance. These achievements are worthy but not sufficient. Lack of quality infrastructure, declining land holding size due to population explosion have created more thorny problems such as debt trap of small farmers, food waste etc. MSP is still a tussle between government and farmers. To tackle with these issues government announced highly ambitious programme of doubling farmers income by 2022. Government started various schemes such as PM- KISSAN, PMSAMPADA etc. to achieve these targets. Agricultural bills were another legislative reform in this

[^2]direction. Agriculture Bills 2020 could have broken the monopoly of middleman as well as enhance the agricultural marketing infrastructure. This ambitious target of modernizing agriculture was opposed by the farmers groups due to communication gap between government and farmers. It leads to farmers movement in north part of India and government had to back track on issue of bills.

Were bills aimed for reforms? Why farmers were protested some parts challenges for farmers? there has been debate on these questions. One thing is sure that situation of farmers has remained identical before and after the introduction of the bills. This demand action on past of government and farmers groups. But pertinent question is - have they taken any step after roll back the bill? it is the responsibility of the government and farmer groups to change the situation as required for the agriculture development. An attempt has been made in present research paper to analyse the studies those have been conducted to examine the Bills with different approaches, so that multifarious overview can be presented.

## Nature and Objective of Present review paper-

## Review Paper- A review paper is based on results of different studies those conducted earlier about a topic of particular field.

Purpose of present review paper- the present review paper elaborate the deep study regarding the topic " Farm Bill-2020". It provides almost complete understanding to the readers about the selected topic. The outcome of this study is completely based the fact and findings of earlier studies those were used as literature for review in present paper.

## Research Questions-

## The study was started by following research questions-

I) What was the common reason of protesting against "Farm Bills -2020" among farmers?
II) Is there any gap of understanding regarding the nature of Bills among farmers and Mechanism of government agencies ?
To find out the answer of above explained questions, author has used the previous literature of research those conducted on this area inspite of conducting new research analysis.

Method of Finding of Literature and process of review- The study reviewed almost 50 research regarding the farm's bills. Research paper were found out via key word finding technique (as adopted by Prasenjit Barik (2021). Key words like Farm Bills, Farmers protect, Land reforms bill and Farm Act 2020 were searched out from many online and off line resource. The filter regarding required information for objectives were applied. By this method, 22 studying were briefed to understand the bills and their effects deeply.

Study Discussion- AmarShankar (2021) in his research paper presented the depth analysis of farm laws and trying to attempt the depth study of these laws. He explained that the three acts are based on idea that these laws will be helpful for investors for investing in agriculture and food chain. The main point of debate was MSP, mainly protested in Haryana and Punjab where MSP is more prevalent as per officials record, given the fact that the government could never have afforded to buy all farm produced at MSP. So, it is necessary to came up with a different solution Indian Farm Acts, 2020 are likely to
establish an exposed market inter and intra state agriculture trade and also intra state farming marketing though facilitated remunerative price by competitive trade channel. Finally, author expected that through farm laws 2020, the farmers will able to double their income by 2022. Antarpreet Singh Beniwal (2020) presented a paper under the title "India's New farm act 2020: farmers point of view". The Author explained the farm bills with the perception of its negative impact on farmers. This Study explained that the government made a commitment that it would double the farmers income by 2022, after involving the corporate sector. These laws treated farmers as traders despite the fact that Indian farmers were never into trading before. This trading enhances price rise, where major portion of profit will be taken by traders. On the same trade platform, traders share less portion of profit with farmers, consequently, will remain at the same level of margin as they were before the enactment. Future more, this study highlighted the negative impact of contract farming, in contract provision famers will have to work as labour on their own land. Results also highlighted concern about Swami Nathan report over MSP. Study was totally based on expectations and factual data was completely ignored in present research work.

Anjani et al. (2021) in their research paper highlighted the farmers awareness and perception regarding new farm bills. The paper was based on a large survey of house hold carried out during 2020, across five eastern states. Prohibit and multinominal regression model were used to examine the socioeconomic factors which influence the farmers and helps to establishes their perception regarding the farm bills. The Study concluded that the level of awareness regarding the new farm laws were not encouraged. Even it was reported that some households knew about the laws which possessed little specific knowledge. The awareness regarding laws were highly with regard to land holdings, level of education and awareness regarding government schemes etc. Finally, the study suggested that the centre should be given the autonomy to the state regarding the amendment in laws and various schemes. The state needs to be proactive in generating awareness among farmers about new schemes. Proper awareness and understanding are the only way to make the laws meaningful. Aastha Tiwari et al. (2020) the paper highlighted the policy implication and political parameters of farm bills. Paper started with a bunch of questions about the bills and its insecurities concern of MSP etc. in the first part of the paper the author highlighted the process of bill implication which in turn was challenged. There are many factors which were ignored while presenting the bill. The farmers were in dilemma due to the political nature of the policies. Finally, the study suggests that instead of demolishing the whole system, the government need to analyse the shortcomings that are infiltrating the entire structure. Amit M., et al. (2021) The study emphasizes the role of the agriculture produce market committee (APMC) and the procedure of setting up APMC mandies with in the state and the role these mandies would be performing. The author asserts that the APMC model, briefly, indent to promote farming under pre agreed contracts and therefore promote competition according to the availability of multiple marketing channels. The author attempted to make the study qualitative by resighting the provision of the APMC acts and its implications on the market. The author concludes that the APMC act fails to mentioned the sufficient information regarding minimum support price (MSP) for the farmers sale hence creating confusion with in the farmers community. Brajabandhu Swain (2020) in his paper attempts to scrutinize the implication of contract farming. The study analyses qualitative as well as quantitative research that highlights how contract farming unfold the future of agro-industry in relation to farm bill. The data is collected via primary survey. Study concludes that the back bone of Indian agriculture relies on small house hold who have
less than 2-3 hectare of land. He put emphasis upon a model that would work for Indian agriculture. Finally, the study suggests that there is a need to focus on corporate led contract farming which in the long terms have its own implication. Moreover, practice of inclusive development, process of structuring contracts and safe guarding the interests of farmers should also be taken into account. The approach of the authors led to the digging the solution with in the raised questions.Ambadas B. Ponde (2021) in their paper highlighted major problems of Agriculture sector related to improper and inefficient use of natural resource and effect of new farm bills. Study concludes that the efficiency of these law will bring price stability and higher income of agriculture. Farmers will get an opportunity to sell their product in open market where they will get more price. The law also provides an effective disputes resolution mechanism with clear time line for redresser. Now farmers could themselves fix the price of their products with mutual understanding with corporates, on other hand there was an apprehension to the farmers that free hand has been given to private corporate house. In case of essential commodity act products like pulses, oil seeds, eatable oils were removed from the list of essential products. Hence, this amendment will deregulate the production, movement, storage and distribution of these food commodities. Prime facie it seems that though there are some issues in these laws, but there is scope of improvement in these laws and if some amendments are made then farmers will be benefited and will be able to connect easily with the global market.

Biswajit Mondel at el. (2021) explains the farm laws by lens of paddy marketing. Paddy generally takes place in the output market between the farmers to whole sale trader or farmers to government agencies. While the marketing of rice takes place among processors, traders and consumers. And finally, processor to consumers and government to PDS channels etc. however, trading is the main component of paddy and rice marketing. Authors connected the laws with trade and explained that this law would provide freedom of choice to farmers and widen the origin of the market. On the other hand, paper also highlighted the other shade of law i.e. the recent marketing system were also not effective and selling and purchasing methods were also questionable. The margin of profit was high for traders and the middle men in the case of perishable goods. Due to the dominance of few traders, APMC markets sometimes behave like monopsony markets. With the failure of APMC authors prospected these new bills as a hope for agriculture marketing. More over the author concluded that if the Government will not regulate the price in contract farming, then the market would not be controlled by selected traders. Jyoti P. Sahoo, et al. (2020) in their research paper highlighted the expected impact of farm bills. Bills were protested by group of farmers, those were motivated and supported by middleman or group of aarthis. Aarthi's were in a shadow of fear that the bill will snatch away their commission. Due to the mandi tax loss some state governments were also in terror. Main issue raised by the protestor were the end of minimum support price [MSP] regime and losing land rights and under the contract farming rule. Researcher clear by that farmers were misguided and mislead by some parties or groups regarding contract farming. On another hand purchasing agencies and contract unit will have a strong incentive to provide the best new technologies and farming practice to farmers, The study added some facts regarding govt. support price in the concluding section of the paper. Study suggest that support should also provide to tenants and other labours that associated with farming.Gummadi Sridevi and Dontha Prashanth (2021) in their paper attempts to analyse the possible impact of the farm bills by the given
fact that financial dependency of non-constitutional resource for small and marginal farmers. The author establishes some facts based on primary as well as secondary data that the local moneylenders and fertiliser vendors act as middlemen outside the arena of market yards. They provide advance loans on the interest of $8-10 \%$ to the farmers and later on buy their products on much lesser price than fixed by MSP. This paper explained the role of middlemen in regulated Market operations and sometime they helped purchasing agencies by adopting faculty methods of sales purchase. This study also explained that maximum farmers were not aware of Minimum support price. In order to avoid the hassle (exploitation of regulated market) farmers are ready to sell outside the yard at lower price. Almost $34 \%$ famers sold their surplus outside the centre at $11 \%$ lower price than MSP. The author concludes that the dependency of small and marginal farmers on large farmers and other agencies will considerably increase. To avoid this, it is necessary to consider the financial dependency and financial security of farmers before formulating any other laws.

Karan R. et al. (2021) study concluded that no law is perfect in every aspect, it matters on case to case and depend upon time period. Farmers were reported only the fact that they had not been consulted regarding their demands for the bills. The protest was a resulted of lack of faith of farmers in government. Authors, also highlighted the fact that proper procedure was not followed by the government while passing the bills. If Government were able to get proper supports of farmers than these acts would have been beneficial. These laws have potential to increase farmers income and will giving them freedom of choice. There is an urgent requirement of a decent sitting between government and farmers rendering the fears which are thriving among farmers.Mohammad Waseem, etal. (2022) In their research article presented farmers opinion regarding farms bill. Study was based on primary data collected via questionnaire taken from online mode. Study concluded that farmers were in fear regarding MSP as government can't give guarantee safety act in market price. The outrage and the protest were happened in those state, those were highly benefitted by MSP over the period of time. Further, Authors explained about the failure of entire system that involved in bill presentation and their applications. Situation could be better if GOI could have been more considerate of farmers condition and the bill could have discussed properly with the farmers before its enactment.

Nanitakaur et al. (2021)in her study examined the covid 19 impact on farm bills. The bills were introduced during covid phase. Study based on secondary data such as report and news headlines mainly focused on the impact of three agriculture reforms bills in the time of pandemic where economy of the country was stagnant and labour class were suffering most. Farmers were vulnerable as the central government gave an edge to corporate agri-business companies. In that case state were suffering by losing their revenue. Covid-19 made situation worse as it caused serious threat of financial resource. In our country farmers were not enough aware to understand the depth of policies itself. Farmers were scared about MSP as bills indicates hand on controls by corporates. More over farmers had a distress that the ownership of the land will be transferred to big treaders.

Pareek V. D. (2021) analysed the constitutional and the impact of new farm laws on farmers. The study was based on reports and secondary data from published source regarding the bills. The author has thrown lights on various issue that arose due to implementation of laws. Study mainly focused on exploitation of farmers through contract farming, agriculture in hands of corporates and removal of
pulses, cereals, onion, potatoes and oilseeds from the essential commodities list resulting in huge scale of hoardings. Finally, study concluded that these bills were disadvantageous to farmers and it also violates Article 369 of Indian Constitution which gives temporary powers to centre government. According to the study this law also violated article 100 and 107 of Indian Constitution. The laws were completely against farmers interest and formulation of some new laws has been suggested by considering so that farmers can avail their benefits.Prasenjit Barik (2021) in his review paper elaborated the potential benefits and loopholes of the farm bills 2020. The study was based on earlier research which was done by key word finding methods Selected studies were filtrated on the basics of critical evaluation of farm laws. Study concluded that contract farming will promote crop diversification and productivity. This practice was not new in India, but before the introduction of these laws this practice was performed without legal protection for farmers. The act supported farmers in legal frame for contract farming. Many studies those supported contract farming used word "MAY" instead of word "SHALL", means their study was based on expectation instead of facts. The study suggested that there should be a provision of higher price benefits for farmers in contract farming to protect the sole right of farmers.Radha R. Ashrit (2021) in his research work highlighted the farm laws and their way ahead. The author also highlighted the questionable procedure of bill presentation in Rajy-sabha. Study also put some past examples regarding the change in APMC structure in Bihar 2006. Where farmers were suffered and forced to sale the produce due to malfunctioning APMC. In case of essential commodity Act study highlighted the fears of farmers regarding black marketing and price instability. Finally, author offered some suggestion as centre must avail revenue compensation to state due to their loss of market fee revenue. There should be a free legal provision for small farmers in contract farming. Rukaya Rashid (2021) author described three laws in details with special reference of economical and constitutional frame work. This study was based on reports and published news regarding the bills. The author has used qualitative and descriptive approach while establishing the fact. Bills explained the terms of contract, supply, grade, and price etc. Agreement also provided that the terms shall be extended with mutual consent among farmers and GOI. Legal authorities at sub division level will empower the farmers regarding the contract agreements. Moreover, author highlighted the doubt of the farmers regarding the one nation one market. Farmers were worried about the involvement of private players in trade of agriculture commodity that leads them to exploited by price instability. Finally, author suggested some key point for the safe guard of farmers interest in contract farming.

Saham Shah et al. (2021) in their paper briefing the procedure of bill enactment along with the expected their positive impact on agriculture. Bills were criticised by a group of farmers only on the basis of imaginary ground. Study showed that how the agriculture reforms were required. Farmers were facing challenges on all aspects of farm production. They were exploited by group of middlemen. Many studies those were conducted before the acts justified author's point. Machinery and marketing pattern of regulated marketing were required to reframe with a view of modern marketing system. Central government took initiative and decided to develop market infrastructure and a transparent market environment with the help of private players. By introducing of contract farming and essential commodity acts govt. has tried to eliminate the unhealthy and exploitative rules and procedures. By which APMC will not only remain functional but also strengthened. The environment of marketing will
be more competitive due to the increasing the competition among buyers. Finally, this study supported the bills and suggested to the implication as soon as possible. Satish Y. Deodhar (2021) in his research work discussed the Institutional structure of Indian Farm markets. The author explained that APMC was constituted for assuring the remunerative price to farmers. But to the monopsony nature and the practice of selling-purchasing in APMC market yard, APMC was doing just the opposite of what they were instituted for. In the case of MSP and FCI, author highlighted that the government fixed MSP for some crops only. it is imperative that it has to be higher than the market clearing equilibrium price. If the MSP is lower than the market clearing price many traders will arbitrary with MSP. The finance and storge capacity were not sufficient to buy all excess supply at announced price. However, government enacted few laws for the improvement in the present condition of APMC. The Acts faced a huge objection by protesters. Finally, author put some examples of successful contract farming and other case transfer schemes. The Study remarked that option of selling the produce anywhere would increase the bargaining power of farmers. Interest of private players may bring high investment in marketing and storage infrastructure. The condition of small size farmers may be improved by investment in vertical farming. It may be concluded that present study explained the farms bills as a positive and required step by central government. SeedriUjwala Rani (2021) in her research paper highlighted some opportunities and challenges for new farm bill. The study predicts few points as liberalising the trade will empower traders in future. There might be a chance of delay in payment and other benefits due to shifting of crop patterns in contract farming. In case of essential commodity act authors express his worry about bulk storage of essential commodity would create price crises. And the benefits of increase price will enjoy by traders only. On another hand authors also presented some strength of bills. Free market trading could be beneficial for the farmers as it increases the competition in buyers. Entry of private players in agriculture trade will strength the infrastructure of the market. Privatization of agriculture market should be avoided as there is lack of literacy among farmers which makes them unable to understand the concept of privatization. Sukmeen Kaur (2022) in her research paper examined farms laws with both angles i.e positive and negative. Author also highlighted the process of passing the bill which was challenged by the protesters. The proponent claimed that this change will extend market and Act will provide safe zone for farmers in contract farming. On another hand, opponents were worried about MSP and farmers rights. Authors also discussed the repelling process of bill. In concluding remarks, it can be said that author presented just simple summary of news which going during the introduction of bill, farmers protection, governments point of favouring the act and finally repealing of laws.

## Summery of Findings-

From the above discussion we can conclude that farmers were having the fear of privatization of agricultural market(Antarpreet Singh (2020), Mohammad W. et al (2022).The protested community of farmers and the government have had conflict due to opinion in difference. Farmers which organised the protest were unable to comprehend the functioning as well as the provision of farm bill. The government was unable to understand the concern of farmers and farmers were not able to suggest changes in the bill.Therefore, they were unable to comprehend the implication of farm bill. Many researchers mentioned that lack of constitutional frame work of bill implication in parliament (Pareek
V. D. (2021), Prasenjit Barik (2021) Aastha Tiwari et al. (2020) Nanitakaur et al (2022). The biggest concern of farmers was doubting regarding minimum support price as reported by majority of researchers. (Amar Shankar (2021), Sukmeen Kaur (2022). It is stated in the above report that APMC mandis were malfunctioned and farmers were not aware of the provision of the bill (Anjani et al (2021), Satish Y. Deo Dhar (2021), Radha R. Ashrit (2021), B. Mondal (2021) Saham Shah (2021). The stereo type regarding contract farming were persistent in the mind of farmers. It concludes that government mechanism was failed to provide any grievance redressal mechanism for convey the benefits of bills to farmers and their repetitive. (Mohammad W. et al (2022) Anjani et al (2021) Amit M. et al (2021) Karan R., et al (2021)

## Results Discussion-

I) What was the common reason of protesting against "Farm Bills -2020" among farmers? In case of first question (mention above) it may be concluded that almost 60 percent of studies indicated that farmers were having the fear of privatization of agricultural market. This was the most common fear explained by authors. The fear of privatization was associated with finance issue, timely payment, MSP and contract farming.

## Suggested solution regarding Question -I

Most of the authors were suggested that their should be a way where famers will ready to accept the bills as a reform rather than a fear. In addition almost 80 percent studies were in favour of fair and clear conversation among farmers and government officials.
II) Is there any gap of understanding regarding the nature of Bills among farmers and Mechanism of government agencies?
There were a sense of misguiding among farmers were indicated by 15 studies out of 22 . It shows that there a gap of understanding between farmers and Central Government of India. On this basis we can conclude the failure of Government mechanism to discuss the positive and realistic side of the bills. As a result farmers were confused about contract farming, legal procedure of dispute settlement mechanism and future of MSP as reported by different authors.

Finally it may be concluded from above literature that there was strong gap of communication between farmers and Authorities of different level. That leads a wave of misunderstanding regarding the nature of bills among farmers. Middleman was find a stronger tools of information regarding the bills, hence they were providing the information for shake of their interest to farmers. Technical part of the bills i.e contract farming, MSP and Legal help was a matter of confusion among farmers, that need to be discussed carefully and frequently authorities.

Suggesting Remarks- Neutralised opinion regarding agriculture market were required whilst formulating the policy it is suggested that the government should not have dived right into the announcement of farm bills but rather have taken the time and analysed the bill by implementing them in a smaller rural area in order to observed the consequence and functionality of bills. Only after understanding the implications of bills they have publicly announced.

Table 1

| Sr. No | Author Name | Concluding Remarks |
| :---: | :---: | :---: |
| 1. | Antarpreet Singh (2020) | Contract farming is not good for farmers |
| 2 | Pareek V. D. (2021) | Legal frame work of contract farming |
| 3 | Prasenjit Barik (2021) | Highlight the legal frame work of farm bills |
| 4 | Amar Shankar (2021) | Worried about MSP and open market discussion |
| 5 | Karan R., et al (2021) | Farmers should support the bills |
| 6 | Saham Shah (2021) | Bills were required to resolve the existing problems of market System |
| 7 | B. Mondal (2021) | Bills would be beneficials for Paddy Marketing |
| 8 | Satish Y. Deo Dhar (2021) | Farm bills will improve infrastructure and investment in agriculture |
| 9 | Anjani et al (2021) | Lack of awareness among farmers regarding farm bills 2020 |
| 10 | Aastha (2020) | The process of bills implication was questionable |
| 11 | BrajaBandhu Swain(2021) | Some practice is required on contract farming before its implication |
| 12 | Ambadas B. Ponde (2021) | Bills would be provided open market and effective dispute resolution mechanism |
| 13 | Jyoti P. Sahoo et al (2020) | Farmers were led by Arthis on farm bills |
| 14 | Gummadi S. et al (2021) | Financial strengthening was required for farmers |
| 15 | Nanitakaur et al (2022) | Presenting the bills in covid phase was itself a challenge |
| 16 | Seedri U. Rani (2021) | In long run contract farming would be beneficials |
| 17 | Mohammad W. et al(2022) | Farmers should be council properly by the GOI |
| 18 | Sukmeen Kaur (2022) | There should be legal provision for assured MSP |
| 19 | Rukaya Rashid (2021) | Terms and conditions for contract farming |
| 20 | Radha R. Ashrit (2021) | APMC strengthening |
| 21 | Amit M. et al (2021) | Lack of Information Regarding bills among farmers |

Source- Research paper of Authors


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News papers and special issues on Farm bills -2020
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# Status of Education Loan Disbursement in India 

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#### Abstract

Education is a flavoring agent which adds flavor to the intellectual life of a human being and gives exposure to the proper way of living life. Also, it plays a key role in making a person adaptable to the modern living culture of today's society. Education is getting costly day by day. Not every person is able to get education from a reputed institution, especially from a private institution because their fees are too high. And still there are hikes in their fees every year. In light of this, parents who want to give their kids a high education should put their money into long-term investments like mutual funds, fixed deposits, unit-linked insurance policies, and other assets. An education loan fills the gap between the shortfall and the necessary amount in this situation, which is crucial. The focus of this paper is to identify education loan disbursement's status in India with special attention to public sector banks from the year 2017-2022. The descriptive study relied on secondary data obtained from the Indian Banks Association, the University Grants Commission, the Ministry of Finance's Annual Reports, and bank annual reports. The census method was used for the research. The study included all twenty-seven public sector banks. The relationship between student enrollment and education loans was measured using correlation. The findings in this study show that there was a high amount of outstanding education loans in banks, and there is a high correlation between students' enrolment rate and education loan accounts.


Keywords: Education, Education Loan Disbursement, Public Sector Banks, Correlation

## Introduction

Education has become a necessary ingredient for a person to survive in the modern world. One who is not educated gets no recognition in today's social system, since there are no reputed jobs for uneducated people. After all, all human beings want recognition, so they want education. Since reputed posts are limited in India, and getting a reputed job after competing with so many people is not easy. People who passed out from good educational institutions only are considered for jobs. Keeping this thing in mind, private institutions with good reputation increase their fees every year, making education very costly. If a person wants to take admission in such private institutions, taking an education loan from banks is a better option.

Education loan disbursement is the term used to describe the transfer of loan funds to a borrower, who is a student. Students are notified in writing of loan disbursements by schools and loan servicers, including the loan amount and expected date of disbursement. Then, frequently twice or more during the school year, they make payments on their private and federal student loans. Tuition costs are credited to the

[^3]student's account, and the remaining amount is paid via a check, direct deposit, or another method that has been agreed upon.

Most education institutions worldwide, including India, are charging increased tuition prices in their quest for financial sustainability, for typical middle-class students to enroll in technical training programmes without getting a bank loan. Deserving middle-class and lower-class students have historically received Indian education loans, and the product was developed in accordance with the model of the Indian Banks Association's education loan programme (IBA). In accordance with this plan, interest accrues throughout a course's duration and is capitalized, with payback beginning one year after course completion. Students from the economically underprivileged parts of society receive financial aid under the Government of India's Central Sector Interest Subsidy (CSIS) programme.

Most employee credit processing in the public sector banks are either reluctant to authorize the loan or grant it without giving enough thought to risk because loans for education are a top priority because they are oblivious to the market potential of the loan they are making. The government launched the Education Loan Credit Guarantee Fund Scheme to cover unjustified defaults, but its effects are still being felt. A structure akin to that of European nations cannot be followed by developing nations like India, which have big populations and lower per capita incomes and lack both the resources to finance funding and any administrative or regulatory mechanisms.

Both in India and overseas, the range of education has expanded to include new courses in a variety of fields. Government expenditure on education has been diversified and the private sector is now more involved as a result of privatization and new economic reforms. Hence, borrowing money for college is another option for paying for higher education. The government is also conscious that every deserving student needs to have access to bank financing in order for the nation to benefit from its demographic dividend. The federal and state governments routinely issue directives and instructions to public sector banks encouraging them to take an active role in financing higher education. According to RBI standards, priority sectors including agriculture, small-scale industries, etc. receive $40 \%$ of the overall advances made by commercial banks. While the importance of higher education has increased globally in the digital age and during these times of globalisation, educational loans are also included in these priority sector advances of public sector banks.

## Review of Literature

Garg et al. (2015) examined if the educational loans provided by the commercial banks in Kerala were sufficient or not. Find out if beneficiaries' opinions regarding the sufficiency of loans differ significantly, if at all. Data was collected through primary sources by using questionnaire methods. The adequacy of education loans was found to be inadequate, on the basis of the analysis of beneficiaries perspective on education loans. For efficient disbursement of money, a few more efforts should come on part of the bank. Little amount of distraction of funds by beneficiaries have also been found in the amounts of educational loan disbursed, as they utilize only $73.2 \%$ of the loan disbursed on an average.

Raviselam \& Mahesrwari (2015) examined students' awareness of getting educational loans. The objective of this study was to find what factor induces them to get an educational loan. Data from both primary as well as secondary sources were gathered. Primary data collection was done with the help of a
questionnaire. Secondary data was collected with the help of the annual reports of the banks, manual of guidelines on loans and advances, books, articles and research papers and internet. This research study concluded that most of the students are not aware of getting educational loans from banks, the commercial bank conducts some student awareness programs for the rural and urban students. It can help to improve higher education in India.

Hillman et al. (2015) examined variations in the proportion of government financial aid awarded to universities with "low," "medium," and "high" default rates on student loans over time and across industries. Data was collected through secondary sources. This study found that federal student's share aid curving through colleges with medium and high student loan default rates went up substantially from 2007-08 to 2012-13 but went down in 2013-14 as the national job market improved. It also revealed that institutional behavior also affects student loan defaults.

Arora \& Kaur (2016) considered the development of the loan for education and investigated the relation between the higher education and the loan for education and studied the trends in growth of higher education. Data was based on secondary sources. The percentage of education loans is growing, as found in this study, since both the number of higher education institutions and their student enrollments have increased. Government has launched education loan schemes to fulfill the needs of students and amendments have been done in those schemes from time to time, in order to ensure an affordable higher education to all.

Menges \& Leonhard (2016) conducted surveys at three Midwest community colleges to learn more about how acculturation, temporal perception, and the financial literacy affect the college students' propensity of the community to take out student loans. Data was collected through primary sources. According to this study, in terms of their acculturation, financial literacy and orientation to time, college students of the community are similar . Furthermore, decisions of the college students of the community to take out student loans may vary depending on their unique characteristics rather than being influenced by temporal perspective, acculturation, or financial literacy.

Inge (2017) looks at characteristics at the individual and institutional levels that are connected to defaulting on federal student loans for students who attended public two-year colleges that were a part of a statewide network of technical and community colleges. Data was collected through secondary sources. A total of five federal student loan borrowers who attend the public two-year universities default on those loans within three years of receiving repayment, according to the poll. The Pell grant eligibility, male gender, financial independence status, need for a developmental math skill level of medium or higher, and the strongest indicators of default on student loans were found to be the requirement for a developmental reading course.

Luna-Torres et al. (2018) considered a vast network of urban community colleges in Texas and studied a sample of college students of that community. Secondary sources were used for data collection. This study engaged descriptive statistics and regression techniques. Results indicated that The Metropolitan Community College's debt-laden students are primarily Black females over the age of 20, with low incomes and weak academic preparation. Even though they had no bearing on the total amount of debt,
race and ethnicity affected both loan beneficiaries and non-loan recipients' chances of completion or transfer.

Tilak \& Varghese (1991) examined how higher education is now funded in India and talked about the acceptance and viability of potential alternative funding strategies. Data was collected through secondary sources. This study revealed that provided equity considerations and resource constraints, long-term goals should be considered before deciding whether to fund higher education primarily through general tax income. The government must continue to be responsible for paying for higher education despite the socioeconomic and political realities that exist. Efforts must be made to create a financial strategy that utilises a variety of funding choices rather than only relying on one type of money.

Shen \& Ziderman (2009) looked into how much of each student's original loan must be repaid as well as what proportion of the entire cost of loan programmes the lending institution can expect to recover through repayments. The information was gathered through secondary sources. This analysis shows that the amount of the payback and recovery ratios amongst programmes varies significantly. Overall loan recovery is considerably lower. The study also revealed that the interest rate and repayment period of loans affect repayment ratios.

Gross et al. (2009) reviewed factors affecting student's loan defaults or what matters in student loan defaults. Secondary sources were used for data collection. California students who attended publicly traded institutions were less likely to be found as defaulters than students attending other vocational schools, as found in a descriptive analysis of default rates and institutional characteristics.

Bandyopadhyay (2016) investigated the risks associated with Indian student loans' borrowers. Four of India's biggest public sector banks provided an assortment of information from 5000 borrowers. According to the report, the borrower margin, repayment schedules, and security all have a significant impact on student loan defaults. Defaults on student loans are also significantly influenced by the socioeconomic makeup of the borrowers and their geographic areas.

Jackson \& Reynolds (2013) studied racial or ethnic disparities in student loan debt while also evaluating the dangers and potential rewards associated with dependence on loans in a sample of black and white first-year college students. The data was compiled using both primary and secondary sources. According to this study, borrowing money increases enrollment rates and the likelihood that a student would complete college, particularly for black students. Nonetheless, black students have a greater default rate than white students and accrue more student loan debt overall.

Research Methodology: The study in hand is of a descriptive type based on secondary type of data obtained from public sector banks in India as they extend loans up-to ninety one percent of education expenses.. In this paper, 5 years of data on education loans disbursed by public sector banks will be selected through census sampling. 14 years of overall data on education loan and students' enrollment in higher education will also be selected through census sampling.

## Data collection

Secondary data was collected for this study. Following were the major sources of data for this study:

- Annual reports of the ministry of finance, various issues.
- Annual reports of university grant commission, various issues.


## Sampling techniques and statistical tools

Census sampling technique is adopted for this study. A total of twenty-seven public sector banks are considered for the study. The correlation coefficient is used to assess the connection between student enrolment and loan borrowing.

## Objectives of the study

- To evaluate the expansion and effectiveness of public sector banks' issuance of student loans in India.
- To analyze the growth of student's enrollment in the higher education in India.
- To measure the relationship between enrollment in the higher education and the education loans.


## Results and Discussion

Objective-1: To analyze the growth and performance of the education loan disbursement of the public sector banks in India.

Table-1: Bankwise Distribution of Education Loan Amount Outstanding (In Crores)

| Name of Banks | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 |  | Mean of Disbursed Amount | Mean Rank of Disbursed Amount |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Amount <br> Disbursed | Amount <br> Disbursed | Amount <br> Disbursed | Amount <br> Disbursed | Amount <br> Disbursed | Total <br> Amount <br> Disbursed |  |  |
| Allahabad Bank | 268.40 | 282.67 | 313.90 | - | - | 864.97 | - | - |
| Andhra Bank | 610.80 | 614.97 | 601.86 | - | - | 1827.63 | - | - |
| Bank of Baroda | 534.96 | 554.79 | 668.84 | 794.33 | 887.49 | 3440.41 | 688.082 | 5 |
| Bank of India | 474.13 | 424.01 | 397.70 | 372.19 | 102.79 | 1770.82 | 354.164 | 9 |
| Bank of Maharashtra | 8.02 | 201.63 | 220.30 | 152.54 | 167.51 | 750 | 150 | 11 |
| Canara Bank | 1951.97 | 2329.35 | 2521.01 | 2975.89 | 3113.93 | 12892.15 | 2578.43 | 2 |
| Central Bank of India | 676.21 | 654.87 | 754.12 | 668.74 | 809.93 | 3563.87 | 712.774 | 4 |
| Corporation Bank | 527.49 | 783.60 | 648.95 | - | - | 1960.04 | - | - |
| Dena Bank | 14.23 | 9.51 | - | - | - | 23.74 | - | - |


| IDBI Bank <br> Limited. | 260.48 | 315.85 | - | - | - | 576.33 | - | - |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Indian Bank | 530.12 | 583.73 | 662.70 | 745.84 | 816.34 | 3338.73 | 667.746 | 6 |
| Indian <br> Overseas <br> Bank | 430.64 | 323.81 | 311.88 | 464.06 | 309.18 | 1839.57 | 367.914 | 8 |
| Oriental <br> Bank of <br> Commerce | 214.98 | 215.72 | 359.79 | - | - | 790.49 | - | - |
| Punjab and <br> Sind Bank | 106.76 | 129.27 | 142.91 | 152.26 | 165.60 | 696.8 | 139.36 | -12 |
| Punjab <br> National Bank | 1227.18 | 1407.12 | 1629.62 | 1854.18 | 2065.58 | 8183.68 | 1636.736 | - |
| State Bank <br> of India | 4146.57 | 3928.53 | 5569.31 | 4481.34 | 6767.63 | 24893.38 | 4978.676 |  |
| Syndicate |  |  |  |  |  |  |  |  |
| Bank |  |  |  |  |  |  |  |  |

## Interpretation

In absolute terms, Table 1 displays the total amount of disbursed loans made available by the major public sector banks in India for the years 2017 through 2022. Thus, the average value and average rank of each public sector bank during a five-year period were determined. The table reveals that among all public sector banks, State Bank of India disbursed the most loans, with a mean value of Rs. 4978.676 crores, and it was followed by Canara Bank with a mean value of Rs. 2578.43 crores. In terms of the total amount of education loans disbursed over a period of five years, Punjab National Bank, Central Bank of India, and Bank of Baroda placed third, fourth, and fifth, respectively. The lowest mean value of the outstanding Punjab and Sind Bank student loan balance of Rs. 139.36 crores.All other Public Banks given in the table are either merged or abolished in due course of action.

Objective-2: To analyze the growth of student's enrollment in the higher education in India.
Table-2: Growth in Higher Education Enrollment

| Year | Total enrollment (in crore) | \% Increase |
| :---: | :---: | :---: |
| 2007-08 | 10201981 |  |
| 2008-09 | 11038543 | 8.19 |
| 2009-10 | 12043050 | 9.1 |
| 2010-11 | 13163054 | 9.3 |
| 2011-12 | 14400381 | 9.4 |
| 2012-13 | 15768417 | 9.5 |
| 2013-14 | 17243352 | 9.4 |
| 2014-15 | 18670050 | 8.3 |
| 2015-16 | 20327478 | 8.9 |
| 2016-17 | 22302938 | 9.7 |
| 2017-18 | 23764960 | 6.6 |
| 2018-19 | 26585437 | 11.87 |
| 2019-20 | 28484746 | 7.14 |
| 2020-21 | 29427158 | 3.31 |
| CAGR (14 years) | 0.078603191 |  |

Interpretation: 14 year CAGR (Compound Annual Growth Rate) of student's enrollment is 0.078603191 . Annual growth of student's enrolment was highest with 11.87 percent in 2018-19 followed by 2016-17 with 9.7 percent. Least growth of higher education enrolment was 3.31 percent in 2020-21. The Indian Government has set up the target of $30 \%$ Gross Enrollment Ratio (GER) to achieve till the end of (2025). This target can definitely be gained if every eligible student gets enrolled into the
higher education, and this is possible only when higher education is reasonably feasible to each level of income.

Objective-3: To measure the relationship between enrollment in higher education and the education loans.

Hypothesis:- H0: There is not any significant relation between higher education enrollment and education loan.

## Graph 1: Relationship between students' enrollment and education loan



Graph 1 signifies that there exists a positive correlation between students' enrollment and the education loan. Number of accounts of education loans is increasing with an increase in enrollment of students for higher education.

Table: 3: Pearson Correlation

## Correlations

|  |  | enrollment | accounts |
| :--- | :--- | ---: | ---: |
| enrollment | Pearson Correlation | 1 | $.906^{* *}$ |
|  | Sig. (2-tailed) |  | .000 |
|  | N | 14 | 14 |
| accounts | Pearson Correlation | $.906^{* *}$ | 1 |
|  | Sig. (2-tailed) | .000 |  |
|  | N | 14 | 14 |

**. Correlation is significant at 0.01 level (2-tailed).
Table 3 "A Pearson's correlation was run to find out the relation between 14 years enrollment of students and no. of account of education loan values. A very strong, positive correlation was found to exist
between the enrollment and the account $(\mathrm{r}=.906, \mathrm{~N}=14, \mathrm{p}<.001)$. So it is clearly analyzed that Pearson's correlation coefficient value of 0.906 confirms a positive correlation between two variables (enrollment and accounts of loan). If the p value is more than 0.05 , the hypothesis is accepted and if the $p$ value is less than 0.05 , then the hypothesis is rejected. In the above table the $p$ value is less than 0.05 , so the hypothesis is rejected. So we can conclude that there is a significant relation between students' enrollment and the number of accounts of the education loans.

## Conclusion

In the year-wise data of each Public sector bank, State Bank of India has provided the maximum amount of educational loans in all six years (2017-2022) viz. rs. 4146.57 cr., 3928.53, 5569.31, 4481.34, 6767.63 respectively with highest mean value 4978.676 and Canara Bank has the second highest maximum amount of educational loans for all six years with second highest mean value 2578.43. The least mean value is Rs. 139.36 crores of education loan outstanding from Punjab and Sind Bank. All other Public Banks given in the table are either merged or abolished in due course of action. Thus, the maximum amount of education loan is observed in State Bank of India and in Canara Bank also. Total enrollment of 14 years is analyzed from 2007-08 to 2020-21. Total enrollment of students in 2020-21 is 29427158. 14 year Compound Annual Growth Rate of student's enrollment is 0.078603191 . From 200708 to 2020-21 data of education loan number of accounts and amount outstanding indicates wide fluctuation in terms of the annual growth. The annual growth was found to be negative in 2017-18, 2019-20 and 2020-21 and positive in other years. Overall education loan number of accounts and amount outstanding in the year 2020-21 is $24,84,349$ and 78,823 crore. There is a highly positive relationship between students' enrollment and the number of accounts of education loans. Number of accounts of education loans is increasing with an increase in enrollment of students for higher education. A Pearson's correlation was applied to find the relationship between 14 years enrollment of students and no. of account of education loan values. A very strong positive correlation was found between the enrollment and the account ( $\mathrm{r}=0.906, \mathrm{~N}=14, \mathrm{p}<0.001$ ).

## Suggestions

With the execution of following suggestions, the public sector banks should be able to play a more important role in supporting higher education through education loans:

1. Due to the fact that education is a national priority, it is imperative to address the program's flaws and shortcomings, and all public sector banks should make an effort to increase their lending of education loans.
2. Borrowers must be educated about the various educational loan schemes through effective knowledge campaigns. The banks should route all publicity measures to create awareness among the public to expand this sector further.
3. In order to increase the response of the students to take education loans in large numbers banks must provide educational loans at low interest rates to enhance the advances from this sector.
4. In order to increase early repayment of loans, attractive incentives/concessions need to be offered to create a center of attention of students to approach banks for loans.

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# A Study on the Development of Future \& Option Segments in the Indian Derivative Market 

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#### Abstract

Futures and Options are two types of derivative contracts that can be traded between two parties. F\&O contracts are expanding rapidly, encouraging traders and investors to trade and earn easy money by hedging their positions. In India, $\mathrm{F} \& \mathrm{O}$ contracts are growing and expanding faster than other derivatives. As per NSE data, the turnover rate of F\&O markets has increased dramatically over time. The turnover in the year 2000-01 was Rs.2,365.00 crore, but it has increased to Rs 2579357760.40 crore in the year 2022-23. In just twenty-three years, the cash market in India has overtaken the futures and options (F\&O) trading market in both the number and volume of contracts traded.The study covers F\&O sector concepts, definitions, types of underlying assets, participants, uses \& applications, classification, milestone history, regulatory framework, and growth \& development of the derivative market in India.


Key Words: Futures, Options, NSE, BSE, Risk Management, Development

## Introduction

Futures and options are types of financial instruments that are traded on the capital market. The price of F\&O contracts are derived from underlying assets, which may include stocks, rate of interest, commodity markets, and currencies, amongst other items. Futures and options (F\&O) are one such tool that facilitates risk management and hedging. It may be used to speculate or hedge against the risk that is involved in business and finance. These items are classified as derivatives and are exchanged using demat accounts via an exchange in a standardized way. Traders and investors make money by hedging on how the market will move in a certain period. With the underlying asset's volatility, the Futures and Options (F\&O) market is the fastest method to earn a significant amount of money fast. Regarding the indexes, time frame expiration will be structured on a weekly and monthly basis for only the underlying stock. The trader has effectively reduced their exposure to risk by hedging many contracts and limiting their losses to their highest probability. $\mathrm{F} \& \mathrm{O}$ is the most active and traded instrument from the equity market (cash market) and has expanded into multi-trillion dollar markets because of these differences and advantages.

Table-1 shows that North America has the largest open interest and daily average turnover in futures and options since it is one of the most developed countries. However, in comparison to North America, India is not yet at the developed stage. Consequently, we expect that as India develops, Indian derivative markets would expand as well. India is the second-most populous country and has the greatest

[^4]potential for future development. In the following table, Table 2, it is shown that a total of 191 underlying assets and the Nifty Index are made accessible for trading in F\&O, and these figures are continually increasing. Therefore, it is essential to understand the current development, potential, and difficulties of India's financial derivatives markets.

Table 1: Location of exchange-traded futures and options
Notional principal (in billions of US \$)

$\left.$| Instruments, <br> exchange's location/ <br> market risk <br> category/ maturity | Open interest <br> Dec <br> $\mathbf{2 0 2 1}$ |  |  |  | Jun <br> $\mathbf{2 0 2 2}$ | Sep <br> $\mathbf{2 0 2 2}$ | $\mathbf{2 0 2 0}$ | $\mathbf{2 0 2 1}$ | May <br> $\mathbf{2 0 2 2}$ | Jun <br> $\mathbf{2 0 2 2}$ | Jul <br> $\mathbf{2 0 2 2}$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Aug |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{2 0 2 2}$ |  |  |  |  |  |  |  |  |  |  |  | | Sep |
| :--- |
| $\mathbf{2 0 2 2}$ | \right\rvert\,

Source: BIS Statistics Explorer (http://stats.bis.org/statx/)
Table 2: Total Underlying Assets on NSE\& BSE

| S. No. | Type | Total |
| :---: | :--- | :--- |
| 1. | Nifty Index | 04 |
| 2. | Large Capitalization | 83 |
| 3. | Mid Capitalization | 81 |
| 4. | Small Capitalization | 27 |

Source: Compiled from NSE \& BSE website

## Literature Review

Mishra et al. (2022) found that a study with the title "A Study on the Evolution and Growth of Indian Derivatives Market" demonstrated that Derivative instruments have developed into an essential part of the contemporary world's economy after almost thirty years since their inception. Despite this, the market for derivatives in India is nowhere like as well developed as the markets in other nations. As a result, it is essential to have an understanding of the present degree of expansion and development that is
taking place in the Indian financial derivative instruments. In addition, it found that certain markets may have insufficient trading because of a lack of market liquidity. In the same way, credit derivatives, which are part of the market that is growing the fastest around the world, are not present in India and need help from regulators if they are to grow.
Shalini \& Raveendra (2014) studied providing price promises for future dates to give protection against unfavorable price changes to limit the number of financial risks.According to "A Study of Derivatives Market in India and its Current Position in Global Financial Derivatives Markets," financial derivatives are becoming more popular and widely employed in the world of finance, and the equity derivatives market plays a significant role in determining price discovery. The growth of financial derivatives around the world, including in India, has been driven by things like volatility in the prices of financial products, globalization of the economy's various financial markets, modern methods of risk analysis, the emergence of innovative financial techniques, different methods for managing risks.

Gautam \& Kavidayal (2014) makes the effort to comprehend how the Indian financial sector has developed over time and investigates historical trade data of a variety of financial products.According to "Derivatives Market in India: Evolution, Trading Statistics, and Future Prospects," the market is growing rapidly due to the variety of goods it offers, but it also faces several challenges. Reduced costeffectiveness due to insufficient scale, barriers posed by taxes and regulations, increasing vulnerability of Indian banks to activities that are not shown on their balance sheets, the necessity of a free and impartial regulatory, etc. are a few of the challenges that need to be resolved right now.
Bhagwat et al. (2012) presented the findings of research entitled "Development of Financial Derivatives Market in India and its Position in Global Financial Crisis," which discovered that as a direct outcome of the worldwide recession that started in 2008, the structure of the financial derivatives market in India changed in a big way. In India, index options are currently more popular than single stock futures as a preferred derivative instrument. Before the financial crisis, single stock futures had been the most popular kind of derivative instrument due to the large amount of speculation involved. Financial derivatives have grown so rapidly worldwide that it has been called the derivatives revolution in finance.

Vashishtha \& Kumar (2010) conducted research on the topic "Development of Financial Derivatives Market in India- A Case Study," which traced the history of derivatives trading, policy and regulatory changes, growth and development, future prospects and limitations of India's financial derivatives instruments. Additionally, it has focused on the condition of the international derivatives markets in comparison to the Indian financial derivatives instruments. On NSE, the turnover of equity financial derivative has exceeded that of the equity market, and this has had a significant impact on how price discovery is carried out.

Sarkar (2006) noted in his paper titled "Indian Derivatives Markets" that as Indian financial derivatives grow increasingly complex, higher shareholders expertise would be required. National Stock Exchange runs educational and training programmes for market professionals such as brokers, dealers, and traders. The research focused on Indian derivatives traders and discovered that stock futures or index futures account for about $90 \%$ of activity, while options trading is confined to a few equities.

Sahoo (1997) showed a study called "Development of Financial Derivatives Market in India: A Case Study," which said that "Derivatives products first appeared as ways to protect against changes in commodity prices, and for many years, commodity-linked derivatives were the only type of derivatives."

## Objectives

Following are some of the objectives of the study:

- To understand the importance of the F\&O Segment.
- To explore the development of the Indian derivatives markets.
- To analyze the current situation in the Indian financial derivatives segment of the market.


## Explanation of Derivatives Concept

The word "derivatives" is used to describe a large category of the financial instruments, the most common of which are options and futures. The value of these instruments is based on the underlying asset's price and other factors. These instruments' worth is determined by market conditions, including the price of the underlying asset. They have no value of their own and instead derive their worth from the fact that they provide their owners the opportunity to claim possession of those other capital assets or instruments. Butter, a milk-derived product, serves as a simple illustration of a derivative. Butter prices are determined by the market supply and demand for milk, which in turn affects the price of milk. The word "derivatives" comes from the phrase "to derive," which implies "to get something from another source." A derivative's underlying asset might be a commodity or a financial asset. Financial instruments whose value is derived from the value of another asset are known as derivatives. The price of gold delivered two months from now will rely on various factors, including its current and predicted price.

## $>$ Definition of Financial Derivatives

One definition of a derivative describes an instrument as having a value that is "derived" from the value of another security or economic variable. A derivative is a fantastic tool for transferring and managing risk since the derivative's worth is contingent upon external variables or pricing.

As per (Hull, 2007), "A derivative can be defined as a financial instrument whose value depends on (or derives from) the values of other, more basic underlying variables."

Accordingly, (McDonald, 2016) "A derivative is simply a financial instrument (or even more simply an agreement between two people) which has a value determined by the price of something else."
D.G. Gardener defined derivatives as "A derivative is a financial product which has been derived from the market for another product."
(The International Monetary fund, 2001) defines "the derivative is financial instruments that are linked to a specific financial instrument or indicator or commodity and through which specific risks can be traded in financial markets in their own right. The value of a financial derivative derives from the price of an underlying item, such as an asset or index. Unlike debt securities, no principal is advanced to be repaid and no investment income accrues."

Derivative is defined as follows under Section 2(ac) of the Securities Contract Regulation Act (SCRA)
of 1956 :
i. "A security derived from a debt instrument, share, loan whether secured or unsecured, risk instrument or contract for differences or any other form of security";
ii. "Acontract which derives its value from the prices, or index of prices, of underlying securities".

## > Underlying asset in the context of a derivatives contract

Previous discussions have shown that the valuation of the derivatives contract is tied to an underlying asset. The following are some examples of the underlying assets types:
i. A wide variety of different kinds of commodities, including wheat, beverages, and oil;
ii. Valuable metallic element like silver \& gold
iii. The exchange's rates or the currency of other nations;
iv. Financial instruments issued by governments, corporations, and other entities that are issued with a maturity of three years or more like bonds;
v. The stocks and warrants on shares of firms that are traded on established stock markets and the Stock Index;
vi. Financial instruments that mature quickly, like Treasury-bills;
vii. OTC Cash Market Products, including Deposit \& Loan.

## $>$ Market Participants in the financial Derivatives Segment

i. Hedgers: Hedgers are traders who utilize derivatives to hedge against market variable changes and asset price fluctuations. This group comprises the vast majority of the people that participate in the derivatives market.
ii. Speculators: Traders who acquire and sell assets to resell or purchase them at a higher price in the future are known as speculators. They are looking to take calculated risks and earn quickly by using derivatives to speculate on the movement of asset prices in the future. By using derivatives in a speculative venture, one may raise both the possible profits and the potential losses that might occur.
iii. Arbitrageurs: Arbitrageurs attempt to profit from unreasonably different prices by buying and selling the same products at the same period. They simultaneously participate in transactions in two or more markets to maximize their potential earnings while minimizing their exposure to potential losses. They search for chances to profit without taking on extra risk by taking advantage of spreads between current and future prices, as well as between different futures prices.

## > Financial Derivatives and Their Various Applications

The purpose of financial derivatives is to offer investors with a variety of different services, and some of their uses and applications are described below:
i. Management of risk: Derivatives help control, avoid, transfer, and economically manage risk via tactics including hedging, arbitraging, and spreading. To better manage their portfolio's risk, holders
might use derivatives to make adjustments. These are especially effective under turbulent financial situations including irregular trading, extremely variable interest rates, fluctuating currency rates, and monetary pandemonium.
ii. Measurement of Market: Derivatives are price barometers that provide fresh spot and future market values. They assist society find the right market equilibrium price by distributing knowledge about future commodity and security markets. This means they are valuable in society since they help distribute resources more efficiently and effectively.
iii. Trading with Efficiency: Trading with no risk is made possible by financial derivatives, which increases market efficiency. Traders may substitute a position in one or more financial derivatives for a position in the underlying instruments by holding a position in one or more financial derivatives. Financial derivatives are often seen by traders as more attractive than the underlying securities. This is due to derivatives' higher liquidity and cheaper transaction costs relative to cash market trading of the underlying instrument.
iv. Speculation: Derivatives in the financial market are seen as high-risk investments. These may cause a firm to go bankrupt if not utilized appropriately, as occurred to Barings Plc. However, competent traders may use these tools to take calculated and well-understood risks to make a profit.
v. Price Discovery: Price discovery is another major use for derivatives, which simply refers to the process of disclosing information about future cash market values via the use of the futures market. Derivatives markets allow various and separated perspectives on the future to be compiled into one easily observable figure, forming a consensus of smart thinking.
vi. Hedging: Enter financial derivative contracts whose price swings oppositely to its underlying position to hedge risk. Additionally, hedging occurs when a person or organization purchases a product and then utilizes a futures contract to sell the product. This is done in order to reduce the risk associated with the initial purchase. They can use the asset for a certain period and then sell it at a predetermined price in the future, as per the terms of the futures contract.
vii. Role of Price Stability: The financial market serves to keep market prices stable by absorbing part of the short-timeframe volatility, which helps to retain the market's impact. Further, derivatives have the effect of reducing the amount of price movements in the cash market for the underlying asset, which leads to a more stable price level.
viii. Gearing of Value: Gearing or Leverage in the study of financial derivatives means that even a very minor variation in the price of the particular underlying stock may have substantial impact on the derivative's price.
ix. Complete Market Development: Derivatives trading has seen as a key factor in the evolution of markets towards "complete markets." The term "complete market" is used to describe a market where no one investor stands to gain more than any other, where the current securities cover the whole range of possible returns, and where no new securities may be introduced.
x. Encourage Competition: Trading in derivatives gives rise to competitive trading, as well as a variety of risk-taking preferences among market operators such as speculator, arbitragers, brokers,
hedgers, and so on. Furthermore, it boosts the amount of trading that takes place inside the nation. They also work as attractions for the next generation of business leaders and financial specialists.
xi. Reduced Transaction Costs while Maintaining Liquidity: Since margin trading is the basis for the vast majority of derivatives contracts, it is clear that no immediate payment in full is necessary. Because of this, there are many different types of market participants, including traders, speculators, and arbitrageurs. Consequently, the markets for underlying assets benefit from increased liquidity and lower transaction costs due to derivatives trading.
xii. Other Uses: It is clear from the trading of derivatives in the market that derivatives are also used to eliminate market surpluses and shortages, as well as to stabilize price levels by narrowing the gap between similar assets, and to integrate the pricing structure of various assets at different times. Traders, speculators, and operators of large asset pools may use derivatives to develop new approaches to maximizing the performance of their holdings.

## Classification of Derivatives

Financial derivatives and commodity-based derivatives are two main categories of derivatives that may be seen in Figure 1. Commodities such as grain, precious metals, and gold are common underlying assets for commodity derivatives. On the other hand, when it comes to financial derivatives, the underlying asset may include a variety of equities, currency markets, securities, or any number of other assets that carry interest rates, amongst other things. In light of the fact that the subject matter of this case study is limited to derivative contracts, we shall concentrate our efforts only on these types of products.

Figure 1: Classification of Derivatives


## > Forward Contracts

A forward contract is a kind of customized contract that may be made between two participants to buy \& sell the commodities or financial product at a specified future period for a certain price. This type of contract can be used to hedge against price fluctuations. If two parties enter into a forward contract, the amount of money that will change hands between them in the future is determined at the time of the contract's signing. It's the most common kind of derivative contract in everyday life since it's easy to understand and enter into. The holder of a forward contract, whether long or short, has the right but not the obligation to purchase or sell of the underlying stock at a specified future date and prices. In a forward contract, the buyer (or seller) is the one who:
i. Acquires the requisite legal right to buy or sell an asset (known as the underlying asset)
ii. On a specified day in the future (the expiration date)
iii. At a price that is set today (the forward price).

## > Futures Contract

Futures are standardized forward contracts that provide investors the opportunity to buy or sell an investment product at a certain value and predetermined time on a fixed exchange. The term "forward contract" is also often used to refer to these agreements. Futures contracts are facilitated by exchanges that function as both buyer and seller for the counter party. Quality, quantity, price quotation, timeframe, and delivery location are all factors that the Exchange is responsible for standardizing (only for commodities assests). The following are important kinds of contracts for the futures contract i.e., Futures on stocks, indices, currencies, and interest-bearing securities like bonds and T-bills are all included.

## $>$ Options Contract

An option is a contract that provides the option right, but not the obligation to the investors, to make a future buying or selling at a specific value and on a fixed date. In finance, an option is a simple contract that gives the buyer (holder) the right but not the obligation to buy or sell an underlying asset on an exchange at a specified price and time. There are two different kinds of option contracts:
i. Call Options: A person who owns a call option has the right, but not the obligation, to buy specified amount of company's shares at a specified price on a predetermined date. If someone buys a call option, they are taking a long position and are referred to be an option holder.
ii. Put Options: Put options provide the buyer the option (but not the obligation) to sell a specified amount of shares of a specified company on a predetermined date at a specified price. In contrast to the call option, which imposes the sale on the holder, the put option essentially gives the right to execute the transaction.

## $>$ Swaps Contract

A transaction known as a swap may also be referred to as a trade or an exchange. A swap is a kind of derivative-based transaction in which two parties exchange cash flows and obligations arising from two separate financial instruments. Counterparty is a participant in a swap who has agreed to the transaction.

The following are the two kinds of swaps that are most often used:
i. Interest rate swaps: which include the parties exchanging solely the cash flows associated with interest between them in the similar currencies;
ii. Currency swaps: The two parties engage in a two-way exchange of principle and interest, with each party using a different currency for their respective incoming and outgoing financial flows.

## History of Derivatives Markets in India

In India, derivatives markets have existed in some capacity for a very long period. Derivatives have their roots in farmers' need for protection against changes in the price of their crops. Uncertainty over the crop's price would plague farmers from the moment it was grown until the moment it was ready to be harvested. The farmer was able to shift some or all of his price risk by locking in asset prices via the use of simple derivative products. This reduced the amount of uncertainty that they faced. These straight forward agreements, which were made to serve farmers' requirements, essentially served as a way to lower risk.

In 1875, the Bombay Cotton Trade Association opened as the world's first regulated futures market for commodities. Following this pattern, the Bombay Cotton Exchange Ltd., the Gujarat VyapariMandall, and the Calcutta Hesstan Exchange Ltd. launched futures markets in 1893, 1900, and 1919, respectively. There was a remarkable reversal in the derivative market once independence was achieved, from the outlawing of all derivative trading to their more recent legalization. When the Indian government banned cash settlement and options trading in 1952, it was a huge step towards establishing a more stable economy. The trading of derivatives moved to more unregulated marketplaces known as forwards. There has been a change in government policy to place more emphasis on market-based pricing and less on speculative derivatives trading. In 1995, India's government passed the Securities Laws (Amendment) Ordinance, which opened the way for the country to begin trading financial derivatives. Options in securities were allowed again when the law was changed. Many commodities' futures trading were deregulated in the early 2000s. Around the same time, the first electronic commodity exchanges at the national level established.

The formal launch of derivatives trading in India took place in June of 2000. In May 2001, the Securities and Exchange Board of India (SEBI) gave its final approval based on a committee chaired by L. C. Gupta. NSE and BSE, two Indian stock exchanges, and their associated clearing house and company, were recently given authorization by SEBI to commence trading in approved derivatives contracts and settlement contracts. At first, the Securities and Exchange Board of India (SEBI) issued its license for the trading of index futures contracts based on a variety of different stock market indices. These indexes included the S\&P CNX, Nifty, and Sensex. As a direct consequence of this, index-based trading became an alternative for trading options in addition to trading individual stocks. Furthermore,

Table 3 below discusses the historical important milestones in the growth of the Indian derivative market.

Table 3: Historical chronology milestones in the development of the Indian derivative market

| Period | Growth of Financial Derivatives |
| :---: | :---: |
| 1875 | The formation of "Native Share \& Stock Broker's Association" |
| 1921 | Establishment of "Clearing House started by the Bank of India" |
| 1952 | Enactment of the most popular forward contracts (Regulation) Act. |
| 1953 | Proper setup of the forward market commission in India |
| 1956 | Enactment of Indian Securities Contract Regulation Act 1956 |
| 1957 | Permanent recognition under the Securities Contracts (Regulation) Act (SCRA) by BSE |
| 1969 | Section 16 of SCRA bans any forward trading. |
| 1972 | Trading in carry forwards between settlement cycles started informally on BSE. |
| 1980 | According to the Khuso Committee, futures trading should be reinstated for the vast majority of commodities. |
| 1983 | The government has changed the regulations for trading on the stock exchanges in Bombay, Calcutta, and Ahmedabad to allow for carry forward trading of certain stocks. |
| 1986 | The first stock market index in the nation was the S\&P BSE SENSEX |
| 1987 | Introduction of the "Investor's Protection Fund (IPF)" |
| 1989 | Launch of the "BSE Training Institute (BTI)" |
| 1990 | The S\&P BSE SENSEX finished the day higher above 1000 |
| 1992 | The S\&P BSE SENSEX finished the day higher above 2000 |
|  | The S\&P BSE SENSEX finished the day higher above 4000 |
|  | The Initiation of the "Securities and Exchange Board of India" Act |
|  | The "Capital Issues (Control) Act" is no longer in effect |
|  | The "Securities Appeal Tribunal (SAT)" was created |
| 1993 | SEBI forbids transactions from being carried forward |
| 1994 | Nine commodities have been recommended for futures trading by the Kabra Committee |
| 1995 | Revisions to the carry forward mechanism are advised by the G.S. Patel Committee |
| 1995 | Index futures trading was requested by NSE from SEBI |
|  | Introduced "BSE Online Trading (BOLT)" system |
| 1996 | BSE has resumed the system after the upgrade |
|  | The first significant overhaul of the S\&P BSE SENSEX |
|  | SEBI formed the LC Gupta committee to create an index futures framework |


| 1997 | Established "Trade Guarantee Fund (TGF)" |
| :---: | :---: |
|  | Established "Brokers Contingency Fund (BCF)" |
|  | Expansion of the "BSE On-Line Trading (BOLT)" system throughout the country |
| 1998 | LC Gupta committee submitted a report |
| 1999 | Establishment of Central Depository Services Ltd. (CDSL) in collaboration with other banking organizations |
|  | BSE allows forward rate agreements/interest rate swaps |
|  | Initiation of Operations at CDSL |
|  | Financial regulator RBI approved over-the-counter interest rate swaps and forward rate agreements |
|  | The S\&P BSE SENSEX finished the day higher above 5000 |
| 2000-01 | Nifty was selected by SIMEX as the underlying index for futures and options trading on the Indian stock market |
|  | NSE and BSE were granted permission by SEBI to trade index futures |
|  | The BSE has begun trading equity derivatives |
|  | NSE has started trading derivatives, namely index futures |
|  | Futures and options on the Nifty index will now be traded on the SIMEX |
| 2001-02 | Index option was introduced by the BSE |
|  | Option trading on stock indices at the NSE |
|  | Equity options exchanged on the NSE |
|  | The BSE has introduced the 109 Equities option |
|  | Start of trading for options on individual equities |
|  | Stock future was introduced at the BSE |
|  | Futures trading on individual securities begins |
|  | BSE introduced 109 new stocks future |
| 2003-04 | Futures contracts on interest rates traded on the NSE |
|  | The CNX IT index has launched futures and options |
| 2004-05 | Optional trading of BSE on a weekly basis |
| 2005-06 | Introduction of futures and options contracts for the Bank Nifty index |
| 2006-07 | Awarded by Asia Risk magazine as "Derivative Exchange of the Year" |
| 2007-08 | NSE has introduced derivatives for Nifty Junior and CNX 100 |
|  | Derivatives on "Nifty Midcap-50" are introduced by NSE |
|  | Trading involving the Chhota (Mini) Sensex on the BSE |
| 2008-09 | NSE is a trading platform for futures and options on mini-indices |
|  | Futures contracts on currencies traded on the NSE and BSE |
|  | Option contracts with a long-term expiration date based on the "S\&P CNX Nifty |


|  | index" |
| :---: | :---: |
|  | Trading in Options and futures on sectorial indexes on BSE |
|  | Futures contracts on currencies traded on the NSE |
|  | The beginning of trading in futures contracts for interest rates |
|  | Introduced at the BSE were currency derivatives |
|  | Option and futures trading on the S\&P CNX Nifty index at the NSE |
| 2009-10 | "Interest rate futures" are introduced at the NSE |
|  | BSE and USE have formed an association with the goal of developing the currency and interest rate derivative markets |
|  | The new derivatives rate introduced by the BSE will actually reduce transaction costs for everyone |
| 2010-11 | Introduction of currency futures on new currency pairings at the NSE |
|  | NSE was given Asian Banker's award for best financial derivatives exchange |
|  | "S\&P CNX Nifty futures" are now being traded on the CME platform at the NSE |
|  | Futures and options on major indexes including the "S\&P 500" and the "Dow Jones Industrial Average have begun trading |
|  | NSE has introduced stock options in the European form |
|  | The NSE has introduced products currency options based on the USD/INR exchange rate |
| 2011-12 | Futures trading on the 91-day Government of India Bill will start on the NSE |
|  | "Index futures and options contracts" based on the FTSE 100 index have started trading |
|  | NSE has begun trading derivatives based on worldwide indexes |
|  | NSE introduces derivative products based on "CNX PSE" and "CNX infrastructure" indexes |
|  | EMERGE, "a platform for listing and trading shares of SMEs", has been established |
|  | Financial derivatives based on the BRICSMART indexes are now being traded on the BSE |
| 2012-13 | BSE introduced a new derivative market for currency exchange |
|  | "New Debt Segment (NDS)" has been Introduced |
| 2013-14 | NMF-II, "a new platform for mutual funds", has been released |
|  | NBF II, "a new category for interest rate futures", has been introduced |
|  | Futures trading for the India Volatility (VIX) index was initiated |
|  | The "Osaka Exchange" started for trading of the NIFTY 50 (CNX NIFTY) |
| 2014-15 | a memorandum of agreement was signed to improve communication with the London Stock Exchange Group |


|  | Changed the name of the CNX NIFTY to the NIFTY 50 |
| :---: | :---: |
| 2015-16 | Trading of futures contracts based on the NIFTY 50 index was started on TAIFEX |
|  | Establishment of a platform for the issuing of "sovereign gold bonds" |
|  | Introduced a framework for developing electronic books for the "private placement of debt securities" |
| 2016-17 | NSE IFSC, the International Stock Exchange, was promoted in GIFT City Gandhinagar, which is India's first Special Economic Zone that is designated as an IFSC |
| 2017-18 | Developed Currency Derivative Products for Non-FCYINR Pairs |
|  | "72 fixed income and 03 hybrid indexes" were introduced with the NIFTY SME EMERGE Index. |
|  | A Memorandum of Understanding (MOU) was established with "the Colombo Stock Exchange (CSE)" |
| 2018-19 | Commodity Derivatives was a new category that was introduced along with the "go Bid Mobile app for govt. securities" and "the Tri-Party Repo of Corporate Debt Securities" |
|  | The introduction of the weekly expiry option for the NIFTY 50 was announced |
|  | Electronic voting for corporations and organizations |
|  | Traders from the United States are now able to use NSE derivatives |
|  | "A Strategic Partnership and Post-Trade Technology Agreement" has been reached with Nasdaq |
|  | A Memorandum of Agreement with the "London Stock Exchange Group" |
| 2019-20 | NSE has released a new emblem for the NIFTY indexes |
|  | The regulatory approvals for the "NSE IFSC-SGX" Link were announced |
|  | The 200th SME listing has been made on the NSE EMERGE |
|  | The CBDT has acknowledged the efforts of the "NSE Commodities Segment" |
|  | "Center for Behavioral Science" at IIMA is originally inaugurated by NSE |
|  | Bonds issued by the Indian govt. now provide interest-rate options |
|  | NSE Indexes has begun publishing the "Nifty BHARAT Bond Index Series" |
|  | WFE has named NSE the biggest derivatives exchange globally for 2019 |
|  | "The Request for Quotation (RFQ)" System for Debt Securities was introduced by the NSE |
| 2020-21 | NSE Data Room (NDR), "a new cloud-based research resource, is launched by the NSE" |
|  | Introduced by NSE Indices is the "Nifty Midcap Select Index" |
|  | NSE now allows for weekly futures trading in the USD/INR currency pair. |
|  | The number of people who have accounts with the NSE has surpassed 5 crore |
|  | NSE Indexes is pleased to announce the introduction of the "Nifty India Digital |


|  | Index" |
| :--- | :--- |
|  | NIFTY 50 Index and its 20th anniversary are both celebrated in India |
|  |  |
|  | NSE IFSC physically settles American equities for the first time at IFSC |
|  | NSE Indexes is pleased to announce the introduction of the "Nifty SDL Plus <br> AAA PSU Bond Dec 2027 60:40 Index" |
|  | The "Nifty SDL Jun 2027 Index" was released by NSE Indexes |
|  | "Domestic Bullion Spot Exchange" to be Established by Joint Effort of NSE and <br> IBJA |
|  | Introduction of the "Fixed Income Analytics Platform" by NSE Data (Fixed In)The Honorable Prime Minister of India was Present at the Opening of the "NSE <br> IFSC-SGX Connect" |

Source: Compiled from BSE and NSE

## Regulatory Framework for Derivatives in India

L.C. Gupta Committee and J.R. Varma Committee recommendations served as the basis for India's regulatory structure. Many of its rules come straight from the International Organization of Securities Commission (IUSCO). The L.C. Gupta Committee Report provides one group's perspective on how the Securities and Exchange Board of India (SEBI) should divide up its regulatory duties. According to the report, SEBI's involvement should be restricted to reviewing the proposed derivatives contracts and the derivatives exchange's rules, bylaws, and regulations before trading can commence. It places a strong emphasis on the consulting and supervisory roles that SEBI performs. In addition to this, it recommends the formation of a separate clearing corporation. The framework's objective is to ensure that derivatives trading is conducted safely and honestly and that investors have access to methods to have their complaints addressed. The regulatory structure that is in place for derivatives might vary widely from nation to nation. The derivatives regulatory framework in India is established by the following laws:
i. Act of 1934, relating to the Reserve Bank of India
ii. Act of 1952, relating to the Regulation of Forward Contracts
iii. Act of 1956, relating to the Regulation of Securities Contracts
iv. Regulations on Foreign Exchange Management (Foreign Exchange Derivative Contracts), 2000

## Growth of Derivatives Market in India: estimate

The Indian derivatives market has seen tremendous expansion, and analysts predict that this development will continue to expand in the coming years. The Indian market for financial derivatives has had phenomenal growth ever since it was first established in the year 2000, in terms of both the number of contracts that have been traded and the overall number of contracts. The National Stock Exchange (NSE) handles 99 percent of all derivatives trading that occurs in the Indian markets, as shown by the data that are provided below. Participants in the stock market have welcomed the
introduction of derivatives. Immediately after its inception, derivatives trading quickly became widely practiced. After some time had passed, the turnover of the NSE futures market increased to a point where it was higher than the turnover of the cash market on the NSE. If we take 2022 as an example, we see that whereas the NSE futures markets were valued at Rs. 1695233134.00 Cr., the NSE cash markets were only valued at Rs. 16566257.00 Cr (Exhibit Table 5). When comparing BSE and NSE trading data, we see that BSE has been less successful across the field in terms of overall product turnover (Exhibit Figure 8). After studying the data, industry analysts believe the derivatives market has not yet reached its full growth and trading potential. Tables $4,5,6$, and $7 \&$ figures $2,3,4,5,6,7$, and 8 show NSE \& BSE's derivatives and cash divisions' growth and development. Analysts have noted that the NSE and BSE's equity derivative markets are seriously limited, and provide a modest selection of equities for individual stock futures and options, as well as index futures and options.

Figure 2: Derivatives and Cash Business Growth at NSE 2000-2022


Source: Author's computation using NSE data

Table 4: Turnover of the NSE's Derivatives and Cash Segment (Rs. in Cr.)

| Year | Derivatives Segment |  | Cash Segment |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Total Turnover | Average Daily Turnover | Total Turnover | Average Daily Turnover |
| 2022-23 | 2592169211.00 | 13500881.30 | 10250869.00 | 494381.00 |
| 2021-22 | 1695233134.00 | 6835617.48 | 16566257.00 | 803707.00 |
| 2020-21 | 643618108.30 | 2584811.68 | 15397908.00 | 61839.00 |
| 2019-20 | 345391355.50 | 1398345.57 | 8998811.00 | 36432.00 |
| 2018-19 | 237590973.70 | 958028.12 | 7949004.00 | 32052.00 |
| 2017-18 | 164984859.10 | 670670.16 | 7234826.00 | 29410.00 |
| 2016-17 | 94370301.61 | 380525.41 | 5055913.00 | 20387.00 |
| 2015-16 | 64825834.30 | 262452.77 | 4236983.00 | 17154.00 |
| 2014-15 | 55606453.39 | 228833.14 | 4329655.00 | 17818.00 |
| 2013-14 | 38211408.05 | 152236.69 | 2808488.00 | 11189.00 |
| 2012-13 | 31533003.96 | 126638.57 | 2708279.00 | 10833.00 |
| 2011-12 | 31349731.74 | 125902.54 | 2810893.00 | 11289.00 |
| 2010-11 | 29248221.09 | 115150.48 | 3577412.00 | 14048.00 |
| 2009-10 | 17663664.57 | 72392.07 | 4138024.00 | 16959.00 |
| 2008-09 | 11010482.20 | 45310.63 | 2752023.00 | 11325.00 |
| 2007-08 | 13090477.75 | 52153.30 | 3551038.00 | 14148.00 |
| 2006-07 | 7356242.00 | 29543.00 | 1945285.00 | 7812.00 |
| 2005-06 | 4824174.00 | 19220.00 | 1569556.00 | 6253.00 |
| 2004-05 | 2546982.00 | 10107.00 | 1140071.00 | 4506.00 |
| 2003-04 | 2130610 | 8388.00 | 1099535.00 | 4328.00 |
| 2002-03 | 439862 | 1752.00 | 617989.00 | 2462.00 |
| 2001-02 | 101926 | 410.00 | 513167.00 | 2078.00 |
| 2000-01 | 2365 | 11.00 | 1339510.00 | 5337.00 |

Source: Compiled from the BSE website

Figure 3: Turnover of F\&O by Product at NSE from 2000 to 2022


Source: Author's computation using NSE data
Figure 4: Graph of F\&O Turnover by Product at NSE from 2000 to 2022


Source: Author's computation based on NSE data.

Table 5: Turnover on the NSE's Derivatives Segment (Rs. Cr.)

| Year | Index <br> Futures | Stock <br> Futures | Index <br> Options | Stock <br> Options | Total |
| :--- | ---: | :--- | :--- | ---: | ---: |
| $2022-23$ | 7249837.47 | 14772788.00 | 2524442481.00 | 45740867.39 | 2592169211.00 |
| $2021-22$ | 8429378.27 | 21038937.56 | 1609497197.00 | 56267621.33 | 1695233134.00 |
| $2020-21$ | 9047645.65 | 18098365.39 | 590099062.80 | 26373034.47 | 643618108.30 |
| $2019-20$ | 6701072.45 | 14919550.78 | 311447325.40 | 12323406.79 | 345391355.50 |
| $2018-19$ | 5568914.47 | 16147010.86 | 203302404.90 | 12582374.84 | 237590973.70 |
| $2017-18$ | 4810454.34 | 15597519.71 | 134921876.50 | 9655008.56 | 164984859.10 |
| $2016-17$ | 4335940.78 | 11129587.14 | 72797287.69 | 6107485.87 | 94370301.61 |
| $2015-16$ | 4557113.64 | 7828606.00 | 48951930.60 | 3488173.75 | 64825834.30 |
| $2014-15$ | 4107215.20 | 8291766.27 | 39922663.48 | 3282552.18 | 55606453.39 |
| $2013-14$ | 3083103.23 | 4949281.72 | 27767341.25 | 2409488.61 | 38211408.05 |
| $2012-13$ | 2527130.76 | 4223872.02 | 22781574.14 | 2000427.29 | 31533003.96 |
| $2011-12$ | 3577998.41 | 4074670.73 | 22720031.64 | 977031.13 | 31349731.74 |
| $2010-11$ | 4356754.53 | 5495756.70 | 18365365.76 | 1030344.21 | 29248221.09 |
| $2009-10$ | 3934388.67 | 5195246.64 | 8027964.20 | 506065.18 | 17663664.57 |
| $2008-09$ | 3570111.40 | 3479642.12 | 3731501.84 | 229226.81 | 11010482.20 |
| $2007-08$ | 3820667.27 | 7548563.23 | 1362110.88 | 359136.55 | 13090477.75 |
| $2006-07$ | 2539574.00 | 3830967.00 | 791906.00 | 193795.00 | 7356242.00 |
| $2005-06$ | 1513755.00 | 2791697.00 | 338469.00 | 180253.00 | 4824174.00 |
| $2004-05$ | 772147.00 | 1484056.00 | 121943.00 | 168836.00 | 2546982.00 |
| $2003-04$ | 554446.00 | 1305939.00 | 52816.00 | 217207.00 | 2130610.00 |
| $2002-03$ | 43952.00 | 286533.00 | 9246.00 | 100131.00 | 439862.00 |
| $2001-02$ | 21483.00 | 51515.00 | 3765.00 | 25163.00 | 101926.00 |
| $2000-01$ | 2365.00 |  | - |  |  |
| 2 |  | - | 2365.00 |  |  |

Source: Collected from the NSE website
Figure 5: Business Development of Derivatives \& Cash at BSE from 2001-2023


Source: Author's computation using BSE data

Table 6: Turnover for the BSE Cash \& Derivatives Segment (Rs. in Cr.)

| Year | Derivatives Segment | Cash Segment |
| :---: | ---: | :---: |
| $2022-23$ | 33933819.17 | $8,28,539.17$ |
| $2021-22$ | 66078327.85 | $13,38,225.31$ |
| $2020-21$ | 35060169.07 | $10,45,089.56$ |
| $2019-20$ | 262268.62 | $6,60,896.03$ |
| $2018-19$ | 2250.11 | $7,75,590.08$ |
| $2017-18$ | 3262.66 | $10,82,968.21$ |
| $2016-17$ | 6939.29 | $9,98,260.58$ |
| $2015-16$ | 4475008.32 | $7,40,088.59$ |
| $2014-15$ | 20362741.42 | $8,54,844.29$ |
| $2013-14$ | 9219434.32 | $5,21,664.20$ |
| $2012-13$ | 7163576.66 | $5,48,774.44$ |
| $2011-12$ | 808475.99 | $6,67,497.58$ |
| $2010-11$ | 154.33 | $11,05,026.89$ |
| $2009-10$ | 234.06 | $13,78,809.32$ |
| $2008-09$ | 11774.83 | $11,00,073.77$ |
| $2007-08$ | 242308.41 | $15,78,855.41$ |
| $2006-07$ | 59006.62 | $9,56,189.11$ |
| $2005-06$ | 8.78 | $8,16,084.70$ |
| $2004-05$ | 16112.32 | $5,18,715.65$ |
| $2003-04$ | 12452.00 | $5,02,618.38$ |
| $2002-03$ | 2478.00 | $3,14,073.13$ |
| $2001-02$ | 1922.00 | $3,07,297.77$ |
| $2000-01$ | 1673.00 | $10,00,032.62$ |

Source: Collected from the BSE website
Figure 6: Turnover of F\&O at BSE by Product from 2004 to 2022


Source: Author's computation using BSE data

Figure 7: Graph of F\&O at BSE Product-wise Turnover from 2004-2022


Source: Author's computation, based on BSE data.

Table 7: Turnover for the BSE Derivatives Segment

| Year | Index <br> Futures | Stock <br> Futures | Index <br> Options | Stock <br> Options | Total <br> Daily <br> Turnover |  |
| :--- | ---: | ---: | :--- | ---: | ---: | ---: |
| $2022-23$ | 47.06 | 0.00 | 33933772 | 0.05 | 33933819.11 | 176738.64 |
| $2021-22$ | 493.52 | 0.00 | 66077834 | 0.00 | 66078327.52 | 266444.87 |
| $2020-21$ | 5010.27 | 0.00 | 35055158 | 0.00 | 35060168.27 | 141371.65 |
| $2019-20$ | 14933.69 | 163.00 | 245962.6 | 1209.36 | 262268.64 | 1061.82 |
| $2018-19$ | 39.13 | 17.77 | 2193.13 | 0.08 | 2250.11 | 9.07 |
| $2017-18$ | 3217.51 | 36.76 | 8.21 | 0.18 | 3262.66 | 13.26 |
| $2016-17$ | 2266.86 | 203.08 | 1254.9 | 0.00 | 3724.84 | 27.98 |
| $2015-16$ | 13097.16 | 1349.59 | 4386249 | 74312.69 | 4475008.44 | 18117.44 |
| $2014-15$ | 48632.35 | 9794.26 | 20129226 | 175088.34 | 20362740.95 | 83797.29 |
| $2013-14$ | 63493.84 | 54599.42 | 9055201 | 46130.69 | 9219424.95 | 36730.81 |
| $2012-13$ | 122429.78 | 3420.07 | 7027482 | 10246.32 | 7163578.17 | 28654.31 |
| $2011-12$ | 178448.83 | 10215.70 | 618342.4 | 1469.09 | 808476.02 | 3246.89 |
| $2010-11$ | 154.08 | 0.00 | 0.25 | 0.00 | 154.33 | 0.61 |
| $2009-10$ | 96.00 | 0.30 | 137.76 | 0.00 | 234.06 | 0.96 |
| $2008-09$ | 11757.22 | 8.49 | 9.12 | 0.00 | 11774.83 | 48.46 |
| $2007-08$ | 234660.16 | 7609.24 | 38.66 | 0.35 | 242308.41 | 965.37 |
| $2006-07$ | 55490.86 | 3515.50 | 0.06 | 0.20 | 59006.62 | 236.97 |
| $2005-06$ | 5.00 | 0.49 | 3.2 | 0.09 | 0.03 |  |
| $2004-05$ | 13599.66 | 212.85 | 2297.23 | 2.58 | 16112.32 | 63.69 |
| $2003-04$ | 3082.63 | 1680.34 | 0 | 258.84 | 5021.81 | 19.77 |

Source: Collected from the BSE website
Figure 8: Growth graph of NSE \& BSE


Source: Author's computation using NSE \& BSE data.

## Summary \& Conclusion

With a lengthy history of trading in a wide variety of derivative products, the Indian derivative market has seen impressive expansion throughout the years. The market for derivatives has seen both rising and falling prices. To accommodate the demands of a wide range of investors, a wide range of derivative products has developed throughout time. Any developed market should have a strong framework such as liquidity and transparency. The use of derivatives is a great way for traders and other financial institutions to control risk. Derivatives allow risk-averse parties to sell their security to risk-seeking parties. In India's recent history, the creation of an equity derivatives market has been received with a tremendous amount of success. The derivatives market's turnover on the NSE has recently overtaken that of the stocks market. The value of the overall turnover of derivatives on the NSE steadily increased from 2365 crore in the financial year 2000-2001 to 1961789899.40 crore in the fiscal year 2022-2023. This is a tremendous increase in the value of the turnover. India is among the most successful developing countries when it comes to a lucrative market for exchange-traded derivatives.

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# Drinking Water in Mahendragarh District of Haryana: A Qualitative and Quantitative Assessment 

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#### Abstract

Drinking Water availability is one of the basic fundamental requirements of any region. It's availability in terms of accessibility and quality is a determining parameter of a region's living standard. However, with rapid development and population expansion, the stress on water resources has been increasing. With the growing population the share of drinking water sources has been affected significantly. It therefore, makes it necessary to regularly monitor and analyze drinking water sources to avoid any event of water shortage or scarcity. This paper examines the drinking water status of Mahendragarh district in terms of quantity and quality, Mahendragarh district is characterized by a semi-arid climate with limited surface water sources. As demand has increased with the growing population, the district's ground water resources are under stress. In addition, rainfall is scarce in the region which makes replenishment rate of ground water lower than the withdrawal rate. Poor drinking water quality has been observed in many locations across the district with increasing concentration of total dissolved solids.


Key Words: Drinking Water, Water Availability, Water Quality, Ground Water, Mahendragarh, Haryana.

## Introduction

Globally, water scarcity is becoming a major cause of concern for all governments. Continued population growth and rising prosperity will result in increased water demand (Ashoori, et al., 2017). Consequently, in the foreseeable future, there will be a considerable increase in cases of water shortages. The urban population will rapidly grow, driving demand well beyond the capacity of already scarce water supplies. As a result, water resource management has become an urgent and growing requirement (Olmstead, 2014). The United Nations General Assembly enacted Resolution 64/292 on July 28, 2010, recognizing the human right to water and sanitation, stating that clean potable water and sanitation are necessary for the realization of all human rights (Heller, 2015). The Resolution urges states and international bodies to provide financial resources to capacity-building and technology transfer in order to assist countries, particularly developing countries, in providing safe, healthy, adequate and affordable drinking water and sanitation to all.

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India's valuable and delicate water supplies are being stressed and exhausted as a result of increased urbanization, population development and rapid industrialization, while sector demands for drinking water, industry, agriculture and other uses are rapidly developing (Rodell, et al., 2009). As a result, per capita availability has decreased, and quality has deteriorated. As a result, management of increasingly vulnerable water resources has become a key concern (Das, 2019). Due to a physical shortage of water, a widening gap between rising demand and falling freshwater supply, or a combination of the two, many dry and semi-arid regions are facing severe water shortages.In many locations, excessive groundwater removal is causing depletion and quality degradation (Dangar, et al., 2021). As a result of increased population, urbanisation and industrialization, demand for ground water is increasing day by day, while fresh water availability per person is diminishing (Albert, et al., 2012). As a result of the scarcity of surface water, the pressure on ground water is increasing, causing a dip in the water table and concerns about water quality.

## Study Area

The Mahendragarh district of Haryana is located in the state's southwest corner. The district covers a total area of 1899 square kilometers out of which the rural areas comprise of 1866.02 square kilometers and urban areas cover only 32.98 square kilometers. Narnaul sub-division has a total area of 922.34 square kilometers, whereas Mahendragarh and Kanina sub-division has a total area of 976.66 square kilometers. The district is divided in eight blocks: Ateli, Kanina, Mahendragarh, Nangal Chaudhry, Narnaul, Nizampur, Satnali and Sihma. Rainfall and the canal network system are restricted in this district. Mahendragarh is a semi-arid area with a long hot dry season. Each year, the district receives an average of 407 mm of rain. The area receives roughly 90 per cent of its yearly rainfall from June to September. Consequently, groundwater is the major water source for agricultural, residential and industrial purposes.

## Objectives of the Study

- To analyze the main sources of drinking water that determines the quantitative availability of water in the district for drinking purposes.
- To analyze the quality of drinking water in terms of its safety for drinking purposes.


## Data and Methodology

The study is primarily based on secondary data sources. The data on sources of drinking water has been derived from Census of India, 2011. Additionally, the data for quality of drinking water has been obtained from the Public Health and Engineering Department (PHED) and Ground water cell, Mahendragarh District located at Narnaul. The data is obtained for 38 villages located in the eight blocks of Mahendragarh District. The list of sampled villages and their location have been shown in the following table 1 and figure 1.

Table 1: List of Sampled Villages

| Sl. <br> No. | Name of the Selected Villages for Primary Survey | Block | Sl. <br> No. | Name of the Selected Villages for Primary Survey | Block |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Ganiyar | Ateli | 20 | Bachhod | Ateli |
| 2 | Kheri | Ateli | 21 | Salimpur | Ateli |
| 3 | Nautana | Kanina | 22 | Sihor | Kanina |
| 4 | Karira | Kanina | 23 | Buchawas | Kanina |
| 5 | Khairana | Kanina | 24 | Surjanwas | Kanina |
| 6 | Jarwa | Satnali | 25 | Degrota | Satnali |
| 7 | Bairwas | Mahendragarh | 26 | Lawan | Mahendragarh |
| 8 | Buchauli | Mahendragarh | 27 | Budin | Mahendragarh |
| 9 | Kurahwata | Mahendragarh | 28 | Majara Kalan | Mahendragarh |
| 10 | Kharkhara | Mahendragarh | 29 | Deroli Jat | Mahendragarh |
| 11 | Dongra Ahir | Sihma | 30 | Salarpur | Sihma |
| 12 | Deroli Ahir | Sihma | 31 | Khaspur | Sihma |
| 13 | Ganwari Jat | Nizampur | 32 | Bayal | Nizampur |
| 14 | Budhwal | Nangal <br> Choudhry | 33 | Kalba | Nangal Choudhry |
| 15 | Nangal Kalia | Nangal <br> Choudhry | 34 | Meghot Hala | Nangal Choudhry |
| 16 | Bhushan Kalan | Narnaul | 35 | Kanwi | Narnaul |
| 17 | Nangal Kath | Narnaul | 36 | Kojinda | Narnaul |
| 18 | Balaha Kalan | Narnaul | 37 | Mandlana | Narnaul |
| 19 | Kanwariwas | Narnaul | 38 | Mukandpura | Narnaul |

## Figure 1: Location of Sampled Villages of Mahendragarh District



## Results and Analysis

The occurrence, source, quality and availability of groundwater in the district are all linked to the area's recent aquifer formations, which do not contain significant amounts of groundwater (Sharma, 2020). Ground water development in the district ranges from 49 per cent (Narnaul Block) to 178 per cent (Kanina Block) (Central Ground Water Board, Ministry of Water Resources). The district's total
replenishable ground water resource is 21,435 hectare metres. The net ground water draught is 22778 hectares, which means 1343 hectares of ground water are untapped. According to the Central Ground Water Board's 2013 report, the ground water table in Ateli block is deteriorating at the quickest rate (up to 2 metres per year), while that in Kanina block is deteriorating at the slowest rate ( 0.385 metres per year).The depth to the water table has been discovered to have a direct relationship with the volume of groundwater storage and the extent of depletion (Konikow \& Kendy, 2005). The Ateli block had the greatest decline in storage volume and magnitude of depletion. Southern Haryana, a semi-arid region with an agricultural economy, is experiencing acute water constraint at the moment. Rainfall is minimal in this region, especially Mahendragarh district, due to a poor canal network, and surface water availability is limited. In this area, the annual net recharge of groundwater has been much less than the discharge. As a result, maintaining a delicate balance between replenishment and use has become a challenge in this location.

## Main Sources of Drinking Water in Mahendragarh District

The distribution of main source of drinking water in Mahendragarh district in 2011 is shown in Table 2. In Mahendragarh district, about a third of families rely on tap water from untreated water sources. The number of families using treated tap water in the district is comparable to, but lower than, the number of homes using untreated tap water in 2011. Tubewell/borewell is also widely used for collecting drinking water. The use of hand pump is found to be declining with increasing adoption of tap water. Wells along with other sources of drinking water, such as tanks, ponds, lakes, and other bodies of water, are not widely used in the district. The use of uncovered well is also quite prevalent in the rural parts. Dependency on spring or river/canal has been very low in the district.

Table 2: Households Distribution by Main Source of Drinking Water in different Blocks of Mahendragarh District (2011)

|  | Main Source of Drinking Water |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Block Name | Tap water from treated source | Tap water from untreated source | Covered well |  | Hand pump | Tube well/ Borehole | Spring | River/ <br> Canal | Tank/ <br> Pond/ <br> Lake | Other sources |
| Ateli | 36.36 | 38.75 | 1.6 | 1.51 | 0.44 | 17.42 | 0.03 | 0.01 | 2.29 | 1.58 |
| Kanina | 28.04 | 37.4 | 0.86 | 3.47 | 2.05 | 24 | 0.05 | 0.02 | 1.29 | 2.85 |
| Mahendragarh | 50.39 | 23.59 | 1.51 | 1.09 | 0.28 | 20.8 | 0.01 | 0.03 | 1.18 | 1.1 |
| Nangal Chaudhry | 18.26 | 35.32 | 1.23 | 1.53 | 1.04 | 32.44 | 0.02 | 0.03 | 1.94 | 7.77 |
| Narnaul | 34.9 | 22.3 | 1.71 | 3.36 | 1.4 | 24.59 | 0.06 | 0.03 | 5.16 | 6.48 |
| Nizampur | 5.41 | 20.03 | 2.45 | 6.95 | 2.36 | 41.06 | 0.03 | 0.13 | 11.74 | 9.84 |
| Satnali | 19.83 | 40.36 | 1.49 | 1.67 | 0.13 | 33.86 | 0 | 0.09 | 1.82 | 0.75 |
| Sihma | 35.4 | 37.47 | 0.61 | 4.02 | 1.27 | 17.22 | 0.01 | 0.04 | 3.02 | 0.92 |

Source: Census of India, 2011.

The main sources of drinking water vary in different blocks of Mahendragarh district. Tap water from an untreated water source forms the major source of drinking water in Ateli, Kanina, Nangal Chaudhry, Satnali and Sihma. Satnali block has the highest per cent of homes dependant on tap water from untreated source in Mahendragarh district during 2011. About 40 per cent of households in Satnali are dependent on tap water from untreated sources. At the same time, Ateli, Kanina, Nangal Chaudhry and Sihma blocks have similar per cent of households around 37 per cent dependant on tap water from untreated sources. Mahendragarh and Narnaul blocks have most of the households' dependant on tap water from treated sources, being the only two blocks with relatively better quality water supply in the district. It is to note that in Nizampur block tube well/borewell continue to be the major source of drinking water source where more than 40 per cent households still collect drinking water sources from tube well/bore well.

The sources of drinking water like spring, River/canal, tank/pond/lake has decreased over time with very low per cent of household's dependant on such sources. However, tube well/ bore well continue to serve quite significant per cent of households in all the eight blocks of Mahendragarh district. The per cent of households' dependant on tube well/ bore well varies from 17 per cent in Ateli and Sihma block to more than 40 per cent in Nizampur Block. On the other hand, the use of wells and hand pump has been low in the district. As of 2011, tap water, both treated and untreated, was the most common source of drinking water in the district, with the majority of families having drinking water sources on their premises.

## Quality of Drinking Water in Mahendragarh District

Satisfactory drinking water in terms of quality and quantity is a vital indicator of a society's health and well-being, and it is thus critical for a country's growth (Gundry, et al., 2004). Contaminated water is not only dangerous to humans, but it can also affect an individual's productivity. Water and sustainable development have a link or nexus that extends far beyond social, economic and environmental factors, according to the UN World Water Development Report, 2004. According to the research, solving developmental concerns such as public health and food security requires access to safe and clean drinking water. Water, food and energy, in particular, are inextricably linked (Smajgl, et al., 2016). Although the dangers of drinking contaminated water are well-known, many individuals, particularly in rural areas, choose to disregard them. Contagious infections, such as those spread by water, are the major cause of death, particularly among youngsters (Brick, et al., 2004). Because of the potential threat of anthropogenic contamination, it is now vital to define and control the quality of drinking water (Logeshkumaran, et al., 2015). The Bureau of Indian Standards has developed standards for safe drinking water (BIS). Table 3 lists the desirable and permissible limits for several pollutants found in drinking water.

Table 3: Drinking Water Quality Standards - BIS (IS-10500, 2012)

| Parameters | Prescribed Limits (mg/l) <br> IS: 10500 |  |
| :--- | ---: | ---: |
|  | Desirable Limits <br> (mg/l) | Permissible Limits <br> (mg/l) |
| pH | 6.5 | 8.5 |
| Total Hardness (TH) | 200 | 600 |
| Alkalinity | 200 | 600 |
| Total Dissolved Solids (TDS) | 500 | 2000 |
| Chloride (Cl) | 250 | 1000 |
| Fluoride (F) | 1 | 1.5 |
| Calcium (Ca) | 75 | 200 |
| Magnesium (Mg) | 30 | 100 |
| Iron (Fe) | 0.30 | No Relaxation |
| Sulphate (So4) | 200 | 400 |
| Nitrate (No3) | 45 | - |

The BIS has established drinking water quality standards in order to ensure that people have access to clean drinking water. Regular testing of drinking water sources is required to determine whether the water meets established criteria. BIS (IS 10500 and amended module IS 10500: 2012), according to the Central Ground Water Board, establishes requirements in the Uniform Drinking Water Quality Monitoring Protocol. The water is labelled unsuitable for human consumption if any metric exceeds the limit.

Table 4: Physico-chemical Analysis of Drinking Water in Mahendragarh District

| Block | pH | $\begin{aligned} & \mathrm{TH} \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ | ALKA- <br> LINITY <br> (mg/l) | $\begin{aligned} & \text { TDS } \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ | Electrical <br> Conduct- <br> ivity <br> (ohm/cm) | $\begin{aligned} & \mathrm{Cl} \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ | $\begin{aligned} & \text { Fl } \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ | $\begin{array}{\|l\|} \hline \mathbf{C a} \\ (\mathrm{mg} / \mathrm{l}) \end{array}$ | $\begin{aligned} & \mathrm{Mg} \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ | $\begin{aligned} & \mathrm{Fe} \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ | $\begin{aligned} & \mathrm{So4} \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ | $\begin{aligned} & \mathrm{No3} \\ & (\mathrm{mg} / \mathrm{l}) \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ateli | 6.4 | 317 | 347 | 1034 | 2223 | 407 | 0.65 | 49 | 45.3 | 0.08 | 32.3 | 11.98 |
| Kanina | 7.1 | 270 | 341 | 921 | 2120 | 323 | 0.8 | 60 | 37.1 | 0.06 | 48.9 | 8.24 |
| Mahendragarh | 6.8 | 235 | 282 | 868 | 2550 | 265 | 0.72 | 33 | 38.9 | 0.04 | 34.1 | 9 |
| Nangal Chaudhry | 7.1 | 178 | 350 | 593 | 1442 | 240 | 0.285 | 42 | 17.4 | 0.1 | 16.5 | 3.9 |
| Narnaul | 6.7 | 238 | 366 | 835 | 1593 | 316 | 0.66 | 38 | 52.5 | 0.08 | 35.4 | 9.81 |
| Nizampur | 7.1 | 273 | 331 | 976 | 1270 | 330 | 0.78 | 46 | 39.2 | 0.01 | 38 | 8.71 |
| Satnali | 6.9 | 237 | 283 | 994 | 1838 | 300 | 0.6 | 21 | 40.8 | 0.01 | 60.3 | 4.99 |
| Sihma | 6.5 | 295 | 304 | 1038 | 2350 | 353 | 0.64 | 37 | 74.5 | 0.02 | 19 | 9.94 |

Source: Public Health and Engineering Department, Narnaul, Mahendragarh.

In Mahendragarh district, the majority of population relies on groundwater for drinking purposes. The concentration of fluoride in the drinking water of Mahendragarh district varies from 0.02 miligrams per litre to 1.77 miligrams per litre (Fig 2).

Fig 2: Fluorides in Drinking Water in Mahendragarh District


The highest concentration of fluoride in drinking water is found in the Mahendragarh and Kanina Block. Presence of fluoride in drinking water in these two blocks is found to be more than 1 milligram per litre (Fig 2). However, Dhanonda village located in Kanina block has the lowest fluoride presence in the district. At the same time the villages in Kanina tehsil namely Rasulpur, Kapori and Kakrala have the highest fluoride concentration of 1.7 milligrams per litre in the district. Satnali, Narnaul, Nizampur and

Ateli are blocks that have relatively lesser levels of fluoride in drinking water with most of the areas in the district having concentration of less than 1 mg per litre in the respective blocks.

Fig 3: Chlorides in Drinking Water in Mahendragarh District


Chloride is primarily found as a result of dissolution hydrochloric acid salts such as table salt ( NaCl ), NaCO , through industrial waste and sewage. In comparison to ground water, surface water bodies frequently have low chloride concentrations. It is critical for the human body's metabolism and other major physiological processes. The presence of chloride in drinking water in the district ranges from 9 miligrams per litre to 1000 miligrams per litre. The majority of villages in the district have chloride levels in the range 250 to 500 milligrams per litre (Fig 3). The highest levels of chloride is found in the Kanina block. Kotia ( $1000 \mathrm{mg} / \mathrm{l}$ ) and Gudha ( $950 \mathrm{mg} / \mathrm{l}$ ) villages have the highest levels of chloride found in the district. Also, Nangal village located in Nangal choudhry block has chloride presence of $950 \mathrm{mg} / \mathrm{l}$. The blocks where chloride levels are found to be relatively less include Satnali,

Mahendragarh, Narnaul and Nizampur. Ghataser village located it Narnaul block has the lowest chloride levels of $9 \mathrm{mg} / 1$ in the district. Kotia, Rasulpur village in Kanina block and Dongra Ahir village located in Sihma block are the only villages with less than $100 \mathrm{mg} / 1$ chloride levels in the district.

Fig 4: Iron in Drinking Water in Mahendragarh District


The presence of iron in drinking water of Mahendragarh district ranges from 0.01 miligram per litre to 0.31 miligram per litre. Majority of villages in all the blocks of the district have comparatively lower levels of iron presence in drinking water and it is below 0.1 miligrams per litre (Fig 4). The highest concentration of iron is found in Mahendragarh and Kanina Block. Kotia in Kanina tehsil has the highest presence of iron where 0.37 miligram per litre iron is found in drinking water. Few villages in Ateli

Nangal and Narnaul blocks have moderate levels of iron in the range of 0.2 miligram per litre found in the district.

Fig 5: Calcium in Drinking Water in Mahendragarh District


Calcium is the fifth most prevalent element in the earth's crust and is essential for human cell physiology and bone formation. Its permissible limit in drinking water, according to BIS standards, is $200 \mathrm{mg} / \mathrm{l}$. Calcium in drinking water of Mahendragarh district ranges from 16 milligrams per litre to 920 milligrams per litre. Gudha village located in Kanina tehsil recorded the highest concentration of calcium in drinking water of the district where 920 milligrams per litre has been noted. Most of the villages in all the eight blocks have calcium presence less than 60 milligrams per litre (Fig 5). Satnali, Mahendragarh and Kanina blocks have calcium concentration in the drinking water ranging from 61
milligrams per litre to 120 milligrams per litre. Also, Karira and Gudha in Kanina block have the highest concentration of Calcium in drinking water, where more than 120 milligrams per litre concentration of calcium in drinking water is noted.

Fig 6: Magnesium in Drinking Water in Mahendragarh District


Magnesium is the eighth most abundant element in the crust of the earth and a naturally occurring component of water. It is present in minerals such as dolomite and magnetite and is necessary for the normal functioning of biological beings (World Health Organization, 2009). The permissible limit of magnesium in water, according to BIS guidelines, is $100 \mathrm{mg} / \mathrm{l}$. The concentration of magnesium in drinking water of Mahendragarh district ranges from 2.4 milligram per litre to 127.4 miligram per litre. Majority of villages in the district have magnesium concentration ranging between $11 \mathrm{mg} / \mathrm{l}$ and $60 \mathrm{mg} / \mathrm{l}$ (Fig 6). Mahendragarh, Sihma and Nangal Chaudhry blocks have few villages where magnesium
concentration in drinking water is found to be more than $60 \mathrm{mg} / \mathrm{l}$. Akbarpur Ramu located in Narnaul block has the highest concentration of Magnesium found in drinking water where it amounts to 262.2 $\mathrm{mg} / \mathrm{l}$.

Fig 7: Nitrates in Drinking Water in Mahendragarh District


Nitrate is one of the most important contaminants affecting water quality, causing serious ailments especially in newborns causing blue baby syndrome (Knobeloch, et al., 2000). Among the various source of nitrate, it includes the nitrogen cycle, industrial waste and nitrogenous fertilizers. In drinking water, BIS standards allow a desirable limit of $45 \mathrm{mg} / \mathrm{l}$ of nitrate. The concentration of Nitrates in drinking water in Mahendragarh district is found to vary from $0.7 \mathrm{mg} / \mathrm{l}$ to $28 \mathrm{mg} / \mathrm{l}$. Majority of villages in all the blocks have less than $18 \mathrm{mg} / \mathrm{l}$ nitrates concentration in drinking water (fig 7). It is mostly found in villages located in Ateli Nangal, Narnaul, Nizampur and Nangal Chaudhry. Kakrala and Kapori
villages located in Kanina Tehsil have the lowest concentration of Nitrates in drinking water in the district whereas Narheri, Chhilro in Narnaul, Gomla and Israna in Kanina block have the highest levels of nitrates in drinking water in the district and is found to be more than $24 \mathrm{mg} / \mathrm{l}$.

Fig 8: Sulphates in Drinking Water in Mahendragarh District


Sulfate is formed primarily through the dissolving of sulphuric acid and is found commonly in water bodies. Sulfate concentrations in natural water range from a few to several hundred milligrams per litre, although no notable adverse effects on human health have been documented. Sulfate levels in drinking water should not exceed $400 \mathrm{mg} / \mathrm{l}$, according to the BIS guidelines. The presence of Sulphates in drinking water of Mahendragarh district ranges from $3 \mathrm{mg} / 1$ to $346 \mathrm{mg} / \mathrm{l}$. The majority of villages in all the eight blocks are found to have less than $70 \mathrm{mg} / \mathrm{l}$ of sulphates in drinking water. The highest concentration is found in Kanina Block where two villages have more than $200 \mathrm{mg} / \mathrm{l}$ sulphates found in
drinking water (fig 8). However, most of the villages have comparatively less concentration of sulphates but still considerable amount of sulphates is found in the drinking water of the district.

Fig 9: TDS of Drinking Water in Mahendragarh District


TDS which denotes the total dissolved solids in water in the district is found to range from $120 \mathrm{mg} / \mathrm{l}$ to $2500 \mathrm{mg} / \mathrm{l}$. The TDS level in the district's drinking water has been considerable where majority of the areas have more than $500 \mathrm{mg} / \mathrm{ltds}$ in drinking water (fig 9). Karira and Kotia in Kanina Block have the highest presence of TDS in drinking water where it amounts to $2500 \mathrm{mg} / \mathrm{l}$ and $2040 \mathrm{mg} / \mathrm{l}$ respectively. Bamanwas village in Narnaul block, Akbarpur Ramu in Narnaul Block, Kanina town, Gudha and Kapori in Kanina block have more than $1500 \mathrm{mg} / \mathrm{l}$ presence of TDS in drinking water in the district. However,

Kanina block also has few villages along with some villages in Narnaul and Nizampur block where the TDS in drinking water is found to be comparatively the lowest in the district (fig 9).

Fig 10: Alkalinity of Drinking Water in Mahendragarh District


The Alkalinity in drinking water of the district ranges from $100 \mathrm{mg} / \mathrm{l}$ to $700 \mathrm{mg} / \mathrm{l}$ in the district. The major areas in the district are found to have drinking water alkalinity higher than $200 \mathrm{mg} / \mathrm{l}$. Few villages in Kanina, Nizampur and Nangal Chaudhry blocks have alkalinity lower than $200 \mathrm{mg} / \mathrm{l}$ (Fig 10). Karira located in Kanina block has the highest alkalinity of $700 \mathrm{mg} / 1$ in the district whereas Bhojawas village also located in Kanina block has the lowest alkalinity of $100 \mathrm{mg} / \mathrm{l}$ in the district. Pawera, Akbar Ramu and Bamanwas village in Narnaul Block, and Rajpura in Ateli Nangal, Gudha and Karira in Kanina Block have recorded drinking water with more than $500 \mathrm{mg} / 1$ alkalinity.

Fig 11: pH of Drinking Water in Mahendragarh District


Water's pH is a crucial parameter for assessing its acid-base equilibrium. It denotes whether the water is acidic or alkaline. The BIS has set the pH maximum permissible limit at 6.5 to 8.5 . The pH of drinking water in Mahendragarh district varies from 4.8 to 8.2 . Most of the areas have drinking water with pH less than 7 and hence, the water in majority areas is acidic. However, there are significant areas as well that have pH more than 7 and hence comparable areas with alkaline drinking water. Few villages in Mahendragarh, Sihma, Naranual and Ateli Nangal are found to be comparatively more acidic (fig 11). Khanpur village in Narnaul block has the lowest pH value of 4.8 and hence, is the most acidic drinking water in the district. On the other hand, Gudha village located in Kanina block has the highest pH value of 8.2 and hence, has the most alkaline drinking water in the district. However, the pH across the district varies greatly with major areas having drinking water that is found to be acidic in nature.

## Fig 12: Total Hardness of Drinking Water in Mahendragarh District



The total hardness of drinking water in the district ranges from $50 \mathrm{mg} / 1$ to $600 \mathrm{mg} / 1$. Most of the areas in the district are found to have total hardness of drinking water above $180 \mathrm{mg} / \mathrm{l}$. few villages located in Kanina, Narnaul and Nizampur block have total hardness of drinking water less than $180 \mathrm{mg} / \mathrm{l}$ (Fig 12). Bhojawas and Kakrala in Kanina Block have the lowest hardness in drinking water that is less than 100 $\mathrm{mg} / \mathrm{l}$. Khanpur in Narnaul Block, Kanina, Karira and Gudha in Kanina Block and Kotia village have total hardness in drinking water accounting to more than $500 \mathrm{mg} / \mathrm{l}$.

Fig 13: Electrical Conductivity of Drinking Water in Mahendragarh District


The electrical conductivity of drinking water in Mahendragarh district ranges from 800 to $6000 \mathrm{ohm} / \mathrm{cm}$ where most part of the districts are found to have electrical conductivity of drinking water more than 1500 ohm $/ \mathrm{cm}$. EC is less than 1500 ohm $/ \mathrm{cm}$ only in majority parts of Nizampur and Nangal Chawdhry block and in few villages of Narnaul block. Dhanota village in Nizampur block has the lowest electrical conductivity noted in drinking water of the district where it is found to be $800 \mathrm{ohm} / \mathrm{cm}$ whereas Atali in Sihma block has the highest EC of $6000 \mathrm{ohm} / \mathrm{cm}$ (Fig 13).

In terms of BIS rules, the district's drinking water quality demonstrates that the pH of the district's drinking water is within the optimal range defined by BIS. Electrical conductivity, on the other hand, is found to be high, which is linked to high TDS levels in water as well as an excess of dissolved mineral salts that exceeds the BIS suggested limits. Calcium, chlorides, magnesium, sulphates and other inorganic and organic minerals or salts can all be dissolved in water. Water with these minerals has an unpleasant taste and a diluted appearance. This is a crucial parameter for water consumption. When water has a high TDS value, it has been heavily mineralized. For drinking purposes, TDS has a desirable limit of $500 \mathrm{mg} / \mathrm{l}$ and a maximum limit of $1000 \mathrm{mg} / \mathrm{l}$, both of which are prescribed. TDS levels in
ground water are usually safe for humans, but excessive concentrations can affect persons who have kidney or cardiac problems (Kavindra, et al., 2020). Water in two blocks of Mahendragarh and Kanina contains high fluoride levels, while water in two blocks of Kanina and Nangal Chaudhry contains high chloride levels. The amounts of calcium and magnesium are substantially below safe ranges. The district's drinking water has a total hardness of 50 to $600 \mathrm{mg} / \mathrm{l}$, which is well within BIS's acceptable and maximum allowable standards.

## Conclusion

Due to the lack of a perennial river, the district's water supply is severely limited. Rainfall, which is the primary source of ground water replenishment, is infrequent, variable and erratic. Due to limited rainfall, there is a visible deficit of water in a region with semi-arid to arid conditions. The demand for water for drinking and household needs grows as the population grows. Drinking water in a safe and sufficient quantity is a vital component of life. The tap water has now become the district's primary source of drinking water. The state government's efforts, however, have not been successful in covering all villages. Drinking water supply, which is primarily reliant on groundwater, has been beset by resourcespecific issues such as depletion and deterioration in quality, which are linked to both supply and demand variables. Drinking water quality-affected areas should be prioritized for providing clean drinking water, either through alternate sources or water treatment. Because operation and maintenance is a major issue in the water supply system, these tasks must be given top priority in order for the system to function properly. To conserve the main source of drinking water, a comprehensive institutional framework for groundwater conservation and recharge methods, as well as regular monitoring of ground water quality, must be promoted.

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# A Critical Analysis of Incidences of IPC Crimes and the Characteristics of Convicts Imprisoned in Bhiwani District of Haryana 


#### Abstract

Acts such as murder, riots, kidnapping, dacoity, rape, robbery, theft, etc. are prohibited but the truth is that these exist all around the world. Unfortunately, due to increasing rates of unemployment, these sinful acts are increasing with each passing day and the same is true for the Indian state of Haryana. The present study attempted to analyze the incidences of major IPC crimes (such as murder, robbery, burglary, theft, riots, and kidnapping) and characteristics (such as sex, age, and literacy) of convicts imprisoned therein in the Bhiwani district of Haryana during the years 2015 to 2020 employing the secondary data sources.The findings of the research study revealed that the share of Bhiwani district in total registered cases of IPC crimes has declined from $5.46 \%$ in the year 2015 to $3.9 \%$ in the year 2020. While the number of registered cases of murder is fluctuating, cases of riots are increasing and the cases of kidnapping, robbery, burglary, and theft are declining over the years. The study, further, highlighted that the total number of convicts imprisoned as against the total incidences of IPC crimes in the district is declining over the years. Further, with regard to the age, sex, and literacy levels of the convicts imprisoned in IPC crimes, the study found that a majority of the convicts imprisoned are young literate males followed by illiterate males.


Key Words: IPC crimes, convicts imprisoned, murder, kidnapping, theft.

## Introduction

Bhiwani has been an important center of trade since the time of the Mughals. Owing to a large number of temples, it is also known as the "Small Kashi" of India. Bhiwani district is popular politically as well as it is the hometown of the former Chief Minister of Haryana-Ch. Bansi Lal, General Vijay Kumar Singh, former chief of Army Staff among others. Bhiwani is also known as "Mini Cuba" due to a storehouse of a large number of boxers. Many boxers and wrestlers from the district have brought laurels to the nation at Olympic and World Championship Games such as Vijender Singh, Sushil Kumar, Hawa Singh, and Jagdish Singh among many others. Thus, we see that district Bhiwani has many laurels to its credit in multiple fields such as economy, politics, religion, culture as well as sports. Recently, the government of Haryana has taken several meaningful steps, such as the seizure of illegal weapons, crackdowns on gangsters, intensive patrolling, etc. to lower incidences of crimes in the state, thereby, ensuring the safety and security of human rights and value of life. Therefore, it becomes important to analyze the impacts of such measures on the incidences of crimes. The present research

[^6]paper analyzed the incidences of IPC crimes and the characteristics of convicts imprisoned in the Bhiwani district of Haryana during the years 2015 to 2020.

## About the Study Area

Created on December $22^{\text {nd }}, 1972$, Bhiwani is one of the 22 districts of the prosperous state of Haryana. It forms a part of NCR and is situated 124 km west of the National capital of New Delhi. The Bhiwani district is surrounded by Charkhi Dadri and Mahendergarh districts on the south, Hisar district on the north, Churu and Jhunjunu districts of Rajasthan on the west, and Rohtak district on the east.

Alluvial Plains are noticed in the northern part of the district while the remnants of the Aravali Range Mountains are noticed in the southern region. The soil is loomy in the northern region and sandy in the southern region. The lack of any drainage system has rendered the groundwater to be saline at most of the locations. Available pockets of fresh water, found in the south-western region of the district, are declining rapidly. The district has an average elevation of 738 feet or 225 meters.

In the year 2011, district Bhiwani had a total of $1,634,445$ persons, constituting $6.45 \%$ of the total population of the state. Of the total populace, females and males were 7,67,773 (46.97\%) and $8,66,672(53.03 \%)$ respectively. According to the Census of India, 2011, the district had a population density of 342 persons per sq. km. and the general sex ratio was 886 females per thousand males and the child sex ratio (0-6 years) was just 832. The average literacy rate was recorded to be $75.21 \%$. Females ( $63.54 \%$ ) were less literate than males ( $85.65 \%$ ). Bhiwani district has a total of 12 police stations, including one traffic police station and one women police station.

## Review of Literatures

Gupta Neha and Lalit (2019) in their paper analyzed the inter-state variations in various crimes and their plausible reasons during the period 1991 to 2011 and found that the contribution of states in different crime heads raised in the last few years. Incidences of rape reported a significant increase because of increasing awareness among women for their rights and large reporting. The north-central and central region was found to be more prone to murder and rape than the rest of the country. Except for the states Bihar, Uttar Pradesh, and Gujarat, the cases of rapes showed an increasing trend. Kidnapping and abduction rates experienced the highest rates in Delhi owing to its increasing growth which led to inequalities among other states. Property crimes such as dacoity, robbery, burglary, theft, etc. declined significantly at the country level but saw a major rise in Haryana.

Chaudhuri Kaushik et al. (2014) attempted to develop a crime index by considering into account seven types of crimes viz., culpable homicide (amounting not to murder), attempt to murder, murder, rape, kidnapping and abduction ( K and A ), dacoity and robbery employing the district level data from India for three years viz., 1981, 1991 and 2001. Secondly, they utilized the crime index, thereby constructed, to determine the impact of socio-economic variables on the aggregated crime. The results of their study found a positive degree of correlation between crime and urbanization. The study, further, found that higher literacy rates and increased opportunities for employment reduce crime while crime increases with an increase in inequalities. The study also highlighted that increased participation of people in a state election (i.e., voter turnout) is found to decrease crime.

Sharma Ravi et al. (2014) generated crime maps to identify the hot spots of crime in Ajmer city in the desert state of Rajasthan by taking into account the crime data of the city's nine police stations from 2009 to March 2014 using the GIS (Geographical Information System) approach. In the Aadarsh Nagar Police Station, Pratapura Circle was identified as the major hot spot of crime. A majority of crimes related to kidnapping and home breaking were reported happening in the Sethi colony while the cases of robbery were mainly detected in the Ricco industrial area where a majority of official people visit. In the Dargah Police Station, a theft hot-spot was identified at Khwaja Mohinidin Chisti Dargah parisar because of the high crowd and in Kotwali Police Station, a four-wheeler theft hot-spot was mainly identified outside the swami complex and medical college. The study suggested that, in order to stop crime, particularly in hot-spot areas, police should use the latest equipment (such as metal detectors, CCTV cameras, scanners, etc.) to keep an eye on criminals.

## Research Objectives

The objectives of the present research study are two-fold, viz;

1) To understand the main types and intensity of major IPC crimes (murder, robbery, burglary, theft, riots, and kidnapping) happening in Bhiwani; and
2) To understand the characteristics (age, sex, and literacy) of the convicts imprisoned in IPC crimes in the study area.

## Research Methodology

The present research study is exclusively based on the secondary data, obtained from the statistical abstract issued by the government of Haryana during 2015-2016 to 2020-21. To analyze the data simple tabulation, averages, percentages, line and bar graphs, etc. have been used. Further, descriptive and judgmental analysis has been applied to draw conclusions.

## Data Analysis and Interpretation

The results of the present study may be elaborated under the following heads:

## Incidences of Registered IPC Crimes

Table 1: Incidences of IPC Crime in Bhiwani vis-à-vis Haryana (2015-2020)

| Sr. No. | Year | Total IPC Crimes Registered |  |
| :---: | :---: | :---: | :---: |
|  |  | Haryana | Bhiwani |
| 1 | 2015 | 84,310 | 4,604 |
| 2 | 2016 | 88,092 | 3,860 |
| 3 | 2017 | 97,392 | 3,077 |
| 4 | 2018 | $1,08,522$ | 3,870 |
| 5 | 2019 | $1,10,900$ | 4,266 |
| 6 | 2020 | $1,02,485$ | 3,996 |

Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21

Table 1 clearly reveals that a total of 4,604 cases of IPC crimes were registered in the Bhiwani district in the year 2015 which declined to 3,996 in the year 2020, thereby registering a negative growth of $13.20 \%$ over the given years. On the other hand, the number of such registered cases in the state increased from 84,310 in the year 2015 to $1,02,485$ in the year 2020, thereby registering a growth of $21.56 \%$. This leads us to conclude that while the incidences of IPC crimes are increasing, over the years, in the state, they are declining in the Bhiwani district.

Figure 1: Share of Bhiwani District in IPC Crimes Registered in Haryana during 2015-20


Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21
Figure 1 demonstrates that the share of Bhiwani district in total registered cases of IPC crimes was $5.46 \%$ in the year 2015 and it came down to $3.9 \%$ in the year 2020, thereby registering a decline of $28.57 \%$ over the given time frame. To conclude, we can say that the share of Bhiwani district in total registered cases of IPC crimes has been consistently low and has been, further, declining over the years.

## Types/Nature of Major IPC Crimes

Figure 2: Incidences of Murder and Robbery (2015-2020)


Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21
Figure 2 highlights that Bhiwani district reported a total of 26 cases of murder in the year 2015 which shoot up, surprisingly, to 62 in the next year, thereby recording a growth of $138.46 \%$ in just a
short span of 1 year. However, the number of cases came down to the 2015 level again in the year 2020. On the other hand, the number of robbery cases has been higher than the murder cases throughout the study years. In the year 2015, the district reported a total number of 54 cases which came down to 31 cases in the year 2017, thereby, registering a decline of $42.59 \%$ in two years. The registered number of such cases, further, came down to 26 in the year 2020. Thus, we can conclude that the number of registered murder cases showed a fluctuating trend while robbery cases represented a declining trend over the study years.

Figure 3: Incidences of Burglary and Theft (2015-2020)


Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21
Figure 3 clearly reveals that the number of cases of both burglary and theft has been considerably higher as compared to the registered cases of murder and robbery. However, it is important to know that both the cases of burglary and theft have been declining over the years. The number of registered cases of burglary was reported to be 400 in the year 2015 and come down to 271 in the year 2020, thereby, reporting a decline of $32.25 \%$ while cases of theft were reported to be 810 in the year 2015 and came down to 558 in the year 2020, thereby, registering a decline of $31.11 \%$ over the study years. To conclude, we can say that, although the cases of burglary and theft have been higher compared to murder and robbery cases, they are declining over the years and the number of cases of burglary declined more than the cases of theft.

Figure 4: Incidences of Riots and Kidnapping (2015-2020)


Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21

Figure 4 shows that the registered number of cases of riots was 219 in the year 2015 which rose to 276 in the year 2020 while the number of registered cases of kidnapping was 321 in the year 2015 which came down to 87 in the year 2020. While the number of cases of riots recorded an increase of $26.02 \%$ and the number of registered cases of kidnapping recorded a decline of $72.90 \%$ during the study years. However, it is important to know that in the year 2018, the number of cases of riots was the lowest in the district and the number of registered cases of kidnapping was lowest in the year 2017 among the study years.To conclude, we can say that the Bhiwani district is experiencing an increase in incidences of riots and a decline in incidences of kidnapping compared to the number of incidences reported in the year 2015.

## Convicts Imprisoned in IPC Crimes

Table 2: Convicts Imprisoned in IPC Crimes in Bhiwani vis-à-vis Haryana (2015-2020)

| Sr. No. | Year | Haryana | Bhiwani |
| :---: | :---: | :---: | :---: |
|  |  | 7,421 | 488 |
| 1 | 2015 | 7,115 | 222 |
| 2 | 2016 | 7,067 | 222 |
| 3 | 2017 | 7,067 | 255 |
| 4 | 2018 | 7,236 | 275 |
| 5 | 2019 | 3,338 | 109 |
| 6 | 2020 |  |  |

Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21
Table 2 depicts that, in the Bhiwani district, a total of 488 convicts in various crimes were imprisoned in the year 2015 which came down to 109 in the year 2020, thereby, recording a decline of $77.66 \%$ over the study years. To conclude, we can say that the total number of convicts imprisoned in the district is declining over the years.

Figure 5: Share of Bhiwani District in Total Convicts Imprisoned in Haryana (2015-20)


Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21

Figure 5 highlights that the share of Bhiwani district in total convicts imprisoned in the state was $6.58 \%$ in the year 2015 which come to 3.12 in the succeeding year, however, it again rose to $3.8 \%$ in the year 2019. It again came down to $3.27 \%$ in the year 2020. Thus, we can say that the share of Bhiwani district in total convicts imprisoned in the state is declining.

Figure 6: Convicts Imprisoned in IPC Crimes (2015-20)


Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21
Figure 6 highlights that, in the total registered incidences of IPC crimes, only $10.6 \%$ of convicts were imprisoned in the district during the year 2015-16 and it came down to $5.75 \%$ in the succeeding year. However, it again rose to $7.21 \%$ in the year 2017-18. Surprisingly, this, further, came down to $2.73 \%$, the lowest among the study years. Thus, we can say that the share of convicts imprisoned in IPC crimes in the Bhiwani district is declining over the years. This could be attributed to the slow progress of the hearing of cases in the court of law or the failure of police or prosecutors to produce valid proof against the alleged ones.

## Characteristics of Convicts Imprisoned in IPC Crimes

Figure 7: Sex-wise Share of Convicts Imprisoned in IPC Crimes (2015-2020)


Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21
Note 1: Information of district Charkhi Dadri is included in Bhiwani district

Figure 7 reveals that of the total convicts imprisoned, $94.88 \%$ were males while female counterparts constituted only $5.12 \%$ in the year 2015. Most surprisingly, $100 \%$ of the convicts imprisoned, in the year 2020, were males and none of them were females. Thus, it can be concluded that male convicts imprisoned are significantly higher in the Bhiwani district than the females. Also, the number of male convicts imprisoned is increasing while female convicts imprisoned are declining.

Table 3: Age-wise Distribution of Total Convicts Imprisoned in IPC Crimes (2018-2020)

| Sr. <br> No. | Year | Age |  |  |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\mathbf{1 8 - 3 0}$ |  | 30-50 |  | Above 50 |  |  |
|  |  | Female | Male | Female | Male | Female |  |  |
| 1 |  | 80 | 3 | 120 | 4 | 43 | 5 | 255 |
|  |  | $(31.37)$ | $(1.18)$ | $(47.06)$ | $(1.57)$ | $(16.86)$ | $(1.96)$ | $(100)$ |
| 2 |  | 97 | 3 | 121 | 5 | 43 | 6 | 275 |
|  |  | $(35.27)$ | $(1.09)$ | $(44)$ | $(1.82)$ | $(15.64)$ | $(2.18)$ | $(100)$ |
| 3 | 2020 | 57 | 0 | 43 | 0 | 9 | 0 | 109 |
|  |  | $(52.29)$ | $(0)$ | $(39.45)$ | $(0)$ | $(8.26)$ | $(0)$ | $(100)$ |

Source: Statistical Abstract, Government of Haryana, 2018-19 to 2020-21
Note 1: Information of district Charkhi Dadri is included in Bhiwani district, Note 2: Data in parenthesis represents percentage as against total convicts imprisoned

Table 3 clearly reveals that, in the year 2020, a majority of the convicts imprisoned in IPC crimes were males aged between 18 and $30(52.29 \%)$ followed by 30 and $50(39.45 \%)$ and above 50 years of age ( $8.26 \%$ ). Thus, we can conclude that a majority of the convicts imprisoned in IPC crimes in the district are young males followed by middle-aged males and old-age males.

Table 4: Education-wise Distribution of Total Convicts Imprisoned in IPC Crimes (2015-2020)

| Sr. No. | Year | Education |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |
|  |  | Literate |  | Illiterate |  | Female |
|  |  |  |  |  |  |  |
|  | Male | Female | Male | F |  |  |
| 1 | 2015 | 379 | 7 | 84 | 18 | 488 |
|  |  | $(77.66)$ | $(1.43)$ | $(17.21)$ | $(3.69)$ | $(100)$ |
| 2 | 2016 | 175 | 7 | 33 | 7 | 222 |
|  |  | $(78.83)$ | $(3.15)$ | $(14.86)$ | $(3.15)$ | $(100)$ |
| 3 | 2017 | 175 | 7 | 33 | 7 | 222 |
|  |  | $(78.83)$ | $(3.15)$ | $(14.86)$ | $(3.15)$ | $(100)$ |
| 4 | 2018 | 191 | 6 | 52 | 6 | 255 |
|  |  | $(74.90)$ | $(2.35)$ | $(20.39)$ | $(2.35)$ | $(100)$ |
| 5 | 2019 | 210 | 5 | 51 | 9 | 275 |
|  |  | $(76.36)$ | $(1.82)$ | $(18.55)$ | $(3.27)$ | $(100)$ |
| 6 | 2020 | 77 | 0 | 32 | 0 | 109 |
|  |  | $(70.64)$ | $(0)$ | $(29.36)$ | $(0)$ | $(100)$ |

Source: Statistical Abstract, Government of Haryana, 2015-16 to 2020-21
Note 1: Information of district Charkhi Dadri is included in Bhiwani district, Note 2: Data in parenthesis represents percentage as against total convicts imprisoned

Table 4 highlights that, in the year 2015, a majority of the convicts imprisoned in IPC crimes were literate males ( $77.66 \%$ ) followed by illiterate males ( $17.21 \%$ ), illiterate females ( $3.69 \%$ ), and literate females $(1.43 \%)$. However, the scenario got changed in the year 2020, wherein, literate males ( $70.64 \%$ ) constituted the single largest category of convicts imprisoned in IPC crimes followed by literate males ( $29.36 \%$ ) and none of the females was convicted of IPC crimes. Thus, we can conclude that a majority of the convicts imprisoned in IPC crimes in the district are literate males followed by illiterate males.

## Conclusions

The findings of the present research study revealed that the share of Bhiwani district in total registered cases of IPC crimes has been lower than the $6 \%$ and has, further, declined to less than $4 \%$ over the last 5 years. This is a positive sign and a big achievement for the district as a whole. While the number of registered cases of murder is fluctuating, cases of robbery are declining over the years. The cases of burglary and theft have been higher compared to the cases of murder and robbery, they, too, are declining over the years, however, the number of cases of burglary declined more than the cases of theft. With regard to the cases of riots and kidnapping, the study highlighted that the district is experiencing an increase in incidences of riots and a decline in incidences of kidnapping compared to the number of incidences reported in the year 2015. The study, further, highlighted that the total number of convicts imprisoned as against the total incidences of IPC crimes in the district is declining over the years. This could be attributed to the slow progress of the hearing of cases in the court of law or the failure of police or prosecutors to produce valid proof against the alleged ones. Further, with regard to the age, sex, and literacy levels of the convicts, the study found that a majority of the convicts imprisoned in IPC crimes in the district are young literate males.

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[^9]
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[^13]


























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## INSTRUCTIONS TO THE AUTHOR

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