

# **Critical Issues, Opportunities and Experiments in Sustainable Development of Society, Industrial Development, Material, Energy and Environment**

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**Sericulture as a Livelihood Option in Raigarh, Chhattisgarh**

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**Abstract.**

Sericulture is a developmental industry for rural development, as it works well with farming methods and has the potential to generate attractive income throughout the year. It has modest startup costs and provides year-round employment. Sericulture, which belongs to the cottage and small-scale sector, is an environmentally benign, labor intensive and economically attractive economic activity based on agriculture. The entire sericulture sector has a long supply chain, from mulberry planting to textile production. Sericulture is important for the social and economic advancement of the rural residents. Out of 6,38,588 villages in India, there are about 69,000 villages that produce silk, employing about 82.5 million people, out of which 9, 47,631 families make a living from sericulture. India is the only country in the world to cultivate all known commercial types of silk, including mulberry, tropical tasar, oak tasar, eri and muga. India is still the world's second largest producer of silk. The country produced a total of 35820 MT of raw silk in 2019-20, and in 2020-21 this number decreased to 33770 MT, mainly due to the corona epidemic, while in 2021-22, the total production of raw silk was 34923 MT, This created 8.7 million jobs. All the 27 districts of Chhattisgarh are engaged in the work of sericulture. The state is implementing three different sericulture activities: Tasar, Mulberry and Eri. Raigad district produces 15,93,7,216 lakh cocoons with 63,6375 beneficiaries in a total area of 222.6 hectares. This article attempts to inform and explore the relevance of sericulture. Current research examines possible career paths resulting from problem analysis of the subject area. According to research, sericulture offers residents of Raigad district a business option that doubles their income. We discovered a strong link with economic growth. Tribal lifestyle is changing as a result of economic development and progress. The sericulture industry improves without having any negative impact on the traditional business. The study concludes with a number of recommendations to increase the long-term viability of silk production.

**Keywords:** Sericulture, Occupation, Employment, Tribal, Tasar,.

**Introduction**

Sericulture is a labor-intensive, low-investment, small-scale, agricultural enterprise that benefits both marginal and small landowners due to its high returns, rapid growth, and opportunities for female employment. About 400 years ago, sericulture was brought to India, where it prospered as an agricultural sector until 1857, producing two million pounds of silk fibre annually. Between 1857 and 1895, the industry managed to endure the Pebrine disease's onslaught (Mohanty, 1998). Sericulture is primarily an agro-industry that involves the art and science of raising silkworms, food plants, rearing silkworms, and producing silk. It is separated into the farm and industrial sectors. Growing food plants for silkworms, raising them to build cocoons, and generating eggs are all part of the farm industry. The industry sector is made up of reeling, twisting, dying, printing, finishing, knitting, and felting (Sreenivasa and Hiriyanna, 2014).

Sericulture is essential to rural development since it works well with farming methods and has the ability to produce lucrative income all year round. It offers year-round work and has cheap capital requirements (Hanumappa and Erappa, 1985). With very little production in Jammu and Kashmir, Uttar Pradesh, and some areas of Rajasthan, the sericulture sector is primarily restricted to the states of Andhra Pradesh, Karnataka, Tamil Nadu, and West Bengal (Dhane and Dhane, 2004). Sericulture, which belongs to the cottage and small-scale sector, is an environmentally benign, labor-intensive, and commercially appealing economic activity based on agriculture. The entire sericulture sector, from mulberry planting through fabric production, has a lengthy supply chain. India is the second-largest producer of silk after China. A total of 34923 MT of raw silk were produced in India in 2021–2022, of which 25853 MT (74.02%) were produced from mulberry (Annual report, CSB, 2021-2022).

Sericulture is crucial for the social and economic uplift of rural populations (Sreenivasa and Hiriyanna, 2014), and it is best suited for marginal and small-scale landowners due to its low investment, high assured returns, short waiting period, and abundance of opportunities for income augmentation and year-round family employment (Hajare, et al., 2005). The four recognised types of silk, including Mulberry, Eri, Tasar, and Muga, are solely produced in India. In India, sericulture is a cottage business that is somewhat structured, heavily labor-intensive, and located in rural areas. 22 states are involved in cultivation, which spans 172,000 hectares over 54,000 communities and uses 258,000 handlooms and 29340 power looms. (Dewangan et al 2011). The only nation in the world to cultivate all known commercial kinds of silk, including mulberry, tropical tasar, oak tasar, eri, and muga, is India. 19,690 MT of raw silk were produced in India in total each year, making up 15.44% of the world's total production. In 2009–10, the output of mulberry raw silk was roughly 16,322 MT. The remaining 3,368 MT came from silks other than mulberry (Qadri, et al., 2011). All 27 of Chhattisgarh's districts engage in sericulture operations. The State is implementing three different sericulture activities: Tasar, Mulberry, and Eri. Tasar raising and fabric production are carried out as traditional cottage industries. The socially and economically poorer segment of society, those living in poverty, especially women in rural regions, might find profitable employment through sericulture (Yadaw, 2014). In the region where host plants are being planted for the raising of silkworms, Raigarh district takes the top spot. There are 63, 6375 beneficiaries of Daba Tasar farming in Raigarh district, which has a total area of 2022.6 hectares. In the Korba area of Chhattisgarh, the socioeconomic status of tasar rearers, reelers, and weavers was examined. The bulk of the rearers (44 percent) earned between Rs. 5000 and Rs. 10,000 from raising tasar silkworms, which accounted for around 19% of their total revenue of Rs. 47631.58. (Brahmachari, et. al. 2006). Sericulture has been identified as one of the key economic activities. Sericulture generates an average net revenue per hectare of Rs. 67296 a year (Dandin, et. al. 2008). According to Bhatia et al. (2009), the indigenous women who participated in this occupation in Surguja were BPL, with annual household incomes

of little more than Rs. 11,850. According to (Ali, 2010), between 50,000 and 1, 00,000 was the yearly income range for 26.66% of respondents, followed by 1, 00,000 to 1, 50,000 for 20% of respondents. While other groups have comparable yearly income levels. According to Dewangan et al. (2012), the average monthly income for households with workers in the sericulture industry is \$3840. The monthly spending total is around \$2380. The respondent tribe in the research region gathers forested minor goods, and as a result, they make an annual income of around 5950/-29, which is sufficient for low-income families. According to (Todmal et al. 2013), the majority of respondents (53.75%) had medium experience in sericulture, consisting of five to six lots, while 43.75% had low experience (three to four lots), and 2.50% had high experience (7 and above lots) (Mote and Sananse 2014), Using the compound growth rate and other statistical methods, conducted trend analyses of the global area, production, growth rates of the global export and import scenario of raw silk. According to the growth rate analysis, between 1997–1998 and 2011–12, China and India's total silk output grew at a substantial rate of 6.90 percent and 2.60 percent, respectively. We attempted for this sort of task and chose Raigarh district, Block Tamnar since all of the research studies conducted by scientists as indicated above were done outside of Chhattisgarh.

#### **Methodology**

The Raigarh District in Chhattisgarh State, where both mulberry and tasar sericulture are conducted, was specifically chosen for the study based on its potential and capacity to produce tasar/mulberry cocoons. Although the research area's effective size is about 80–120 acres, there are around 364 acres of mulberry cultivation there. There are 18 mulberry gardens in all. Mulberry Reeling Unit in a single quantity. Traditional and unique to the tribe in the research region, tasar culture has been practised for 13 years. Tasar centres encompass a total of roughly 3153.25 acres, however their actual effective area is just about 2350 acres. There are 22 tasar centres. The 3795-acre Tasar plantation, which is part of the CGSP, is spread out over 57 locations. 4729.88 acres of land are used for tasar raising in the forest. 3347 of the 5739 total beneficiaries in the district are tribal. The local sericultural department of Tamnar Block initially provided the list of sericultural villages and the names of the



beneficiaries. The primary data was then collected from the sampled respondents using the personal interview method and a structured interview schedule standardised by Nagaraja (1989). Four villages were chosen from the aforementioned research region, and 25 recipients were randomly chosen from each village for the purpose of data collecting. 100 recipients were therefore chosen at random from the block. Based on the engagement of employment, the farmers were post classified into main and additional groups. Three different sorts of information were requested from the respondents who were engaged in sericulture activities. The first type dealt with broad knowledge. The second type of information concerned the following: Occupational Status, Employment Days in a Year, Total Monthly Income, Total Expenditure, Main Occupation Related to Sericulture, Duration of Sericulture Work, Average Annual Income from the Old Occupation, Number of Crops Taken in a Year, Number of Cocoons Produced in Each Crop, Profit from Each Crop, Annual Production of Cocoons, Average Annual Income. The third category of information concerned Sericulture Losses, Government compensation, loans made in accordance with requirements, attachment to sericulture, if sericulture is advantageous, Whether or not traditional business is impacted Total labour hours, changes in economic circumstances, annual income changes brought about by sericulture, displacement caused by sericulture, impacts on way of life, and economics of silk production. Mean, mode, and median were three statistical methods used to examine both primary and secondary data.

**Result And Discussion**

**3.1 Status of Living**

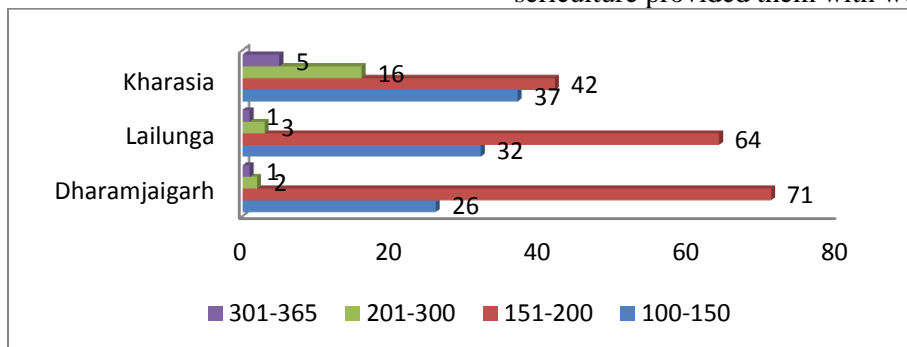
The Kachha home status in Lailunga block is the lowest, at 87, while in Dharamjaigarh and Kharasia, all survey participants have 100 Kachha houses, which is the highest number. The Permanent dwelling status is highest 09 in Lailunga block, while all respondents in Dharamjaigarh and Kharasia have no Permanent dwelling. The status of house ownership in Lailunga block is 99, whereas in Dharamjaigarh and Kharasia, all respondents own a home.

**3.2 Family Members Participating in Sericulture**

It has been noted that in the Tamnar block, there are working individuals in 62 households with 2, 31 families with 3, 3 families with 4, and 4 families with 5. The analysis makes it obvious that 3 family members from typical families are employed. It indicates that each family's members have a cheerful mindset. 98 percent of recipients chose sericulture as their secondary occupation, while the remaining respondents chose it as their major occupation.

**3.3 Earning Days from Sericulture**

In block Dharamjaigarh, 26 respondents were employed for 100-150 days, while 71 were employed for 150-200 days. 2 Respondents from 201-300 days of employment and 301-365 days of employment is 1. In Block Lailunga, 32 participants were employed for 100-150 days, while 64 were employed for 150-200 days. 3 respondents obtained employment for 201-300 days, whereas 1 got employment for 301-365 days. In Block Kharasia, 37 respondents were employed for 100-150 days, while 42 were employed for 151-200 days. 16 people obtained employment for 201-300 days, while 5 people earned employment for 301-365 days. Almost all respondents said that the job location is in their own community, and that sericulture provided them with work.



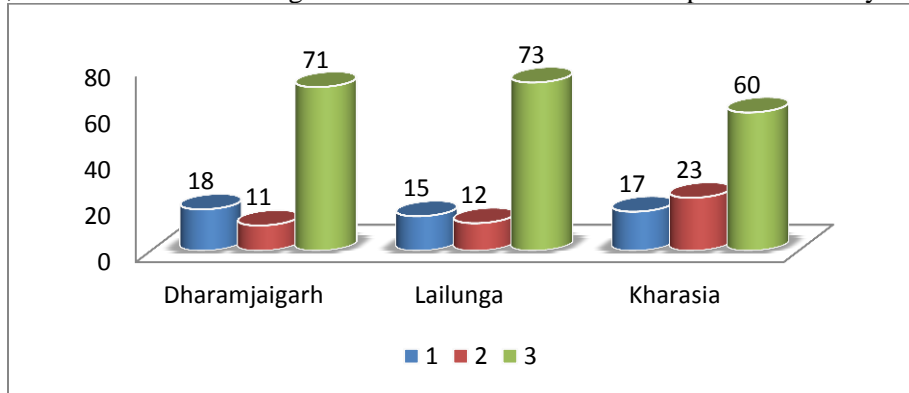
**Graph 1: Men's Earning days from Sericulture**

### 3.4 Incomes from Sericulture

The total average income from all sources is just Rs. 3660/- in Kharasia block and Rs. 3840/- in Lailunga block, while it is Rs. 3770/- in Dharamjaigarh. The average wage of the participants has been estimated to be Rs. 6750/- from forest minor crop collection and disposal (once a year) in Kharasia, Rs. 5350/- in Dharamjaigarh, and Rs. 5950/- in Lailunga. The respondent's average spending by all means is around Rs. 2665 in the Dharamjaigarh block, Rs. 2410 in Kharasia, and Rs. 2380 in Lailunga.

### 3.5 Cocoons Production

It has been discovered that 18 responders from Dharamjaigarh, 15 from Lailunga, and 17 from Kharasia block only plant one crop every year. In Dharamjaigarh block 11 respondents grow two crops every year, in the Lailunga block 12 respondents and in the Kharasia block 23 respondents. 71 responders from Dharamjaigarh block, 73 from Lailunga, and 60 from Kharasia grow three crops every year. All responders receive DFLs from Sericulture centres, and the Government Sericulture Department readily meets their need.



**Graph 2:** Cocoon Production per year

### 3.6 Manufacturing of Cocoons and Profit

The number of cocoons generated in each crop is 6350 in Dharamjaigarh block, 5900 in Lailunga block, and 7800 in Kharasia block. The respondent gained 5160 Rs. from the sale of cocoon from Dharamjaigarh block, 5720 Rs. from Lailunga block, and 5960 Rs. from Kharasia block. The respondent in the Dharamjaigarh block produces 18900 cocoons every year, in the Lailunga block 18300, and in the Kharasia block 20550. The estimated yearly income from Cocoon manufacture is projected to be at 16980 Rs. 18220 Rs. from Dharamjaigarh block and Lailunga block, and 16140 Rs. from Kharasia block. Dewangan S.K. (2017) observed comparable findings as well.

### 3.7 Properties, both Portable and Permanent

As per the study, livestock, agricultural equipment, and vehicles are owned by 66, 42, and 23 respondents from Lailunga block, 93, 32, and 03 respondents from Dharamjaigarh block, and 21, 13 and 16 respondents from Kharasia block. In the Lailunga block, 57 respondents have cattle houses, 68 respondents have farmland, 62 respondents have residences, and 02 respondents have a well or

biogas plant. The responders in Dharamjaigarh block were 41, 46, 44, and 04, while those in Kharasia block were 24, 15, 42, and nil. Land and buildings were rated as fixed assets by 53 and 46 respondents from Lailunga block, 80 and 74 respondents from Dharamjaigarh block, and 49 and 55 respondents from kharasia block, respectively.

### 3.8 Occupation Status

Agriculture is the primary occupation of 58 respondents from Lailunga block, and agricultural labour is the main occupation of 35 respondents from Dharamjaigarh block, and agriculture is the main occupation of 71 respondents from Dharamjaigarh block and 07 respondents from Kharasia block, respectively. It is noteworthy that 148 male and 131 female human groups engaged in sericulture in the Lailunga block. Sericulture is practised by 160 males and 147 females from the respondent family in Dharamjaigarh block, and 118 males and 104 females in Kharasia block. Worm culture (Rearing), agriculture, and field construction (preparation) are the most common occupations among respondents in the research region. In Lailunga block, financial condition in old



profession was normal for 72 respondents, terrible for 08, and very poor for 20 respondents, but in Dharamjaigarh, it was assessed average for 82 respondents, bad for 18 respondents, and very poor for 2 respondents in Kharasia block. The average yearly income from old profession in Lailunga was projected to be Rs. 19350/-, Rs. 20950/- in Dharamjaigarh block, and Rs. 21800/- in Kharasia block. Limunggura and Boonchoo (2007), Geetha and Devi (2008), Malathesh et al. (2009), Balakrishnappa and Rajan (2010) and Dewangan S.K. (2017) all observed comparable findings.

### **3.9 Plants Affected by Disease**

On *Terminelia arjuna*, 93 responders came from Dharamjaigarh, 90 from Lailunga, and 95 from Kharasia block. Matamari Disease affects host plants, according to 72 responders from Dharamjaigarh, 68 from Lailunga, and 87 from Kharasia. Only 31 responders from Dharamjaigarh, 56 from Lailunga, and nil from Kharasia block agree that the plants are afflicted by stem borer, whereas 5 responders from Lailunga and 3 from Dharamjaigarh block accept that the plants are harmed by root rot. All responders who said sericulture work is superior to others were correct.

### **3.10 Sericulture's Social Implications**

Sericulture has the following impact, according to all respondents: conservation of the ecosystem, There will be no tree cutting or falling. Interstate migration is controlled, and local jobs are created. It

provided an extra source of revenue. Regular saving habits have been created, and I intend to continue with sericulture. It is appropriate for their way of life. The task is straightforward and free of charge. Can provide a better source of supplementary revenue and pave the road for the creation of local jobs. Everyone agreed that their financial situation had altered. The yearly income of respondents in Lailunga and Dharamjaigarh block was expected to be Rs. 20000/- and Rs. 19450 for Kharasia, respectively.

### **3.15 Suggestions for Change**

In the study area, 62 respondents from Dharamjaigarh block, 52 from Lailunga block, and 60 from Kharasia block propose that the field work area be changed. Change in rising is suggested by 23 responders from Dharamjaigarh, 28 from Lailunga, and 17 from Kharasia block. Change in training is suggested by 32 respondents from Dharamjaigarh, 40 from Lailunga, and 56 from Kharasia block. Changes in facilitation are suggested by 19 respondents from Dharamjaigarh block, 34 from Lailunga, and 22 from Kharasia block. 63 respondents from the Kharasia block request that Technical Assistance be changed, while the remaining two blocks had no comments. 17 respondents from Kharasia block and 8 from Dharamjaigarh block wish to improve their marketing technique, while Lailunga respondents had no comments.



**Fig. 1:** Tasar Silkworm Larva



**Fig. 2:** Silkworm Eggs

## Conclusion

Sericulture has provided downstream income - earning opportunities production in rural and semi-urban regions, and also a significant level of engagement for low-income and socially disadvantaged groups, a higher role for women in development, and a substantial potential contribution to export revenues. Sericulture is vital not just for producing rural employment and reducing rural migration, but also for environmental conservation, socio-economic transformation, heritage, and socio-cultural values. It can involve the entire family, and the job can be done in addition to the daily activities. Sericulture is always followed by the development of downstream jobs in reeling and weaving, whether in the household or in the organised industry. Sericulture is a type of agriculture activity. Tasar culture is used to cultivate forest plants in their natural state. The benefit of tasar cultivation is that it does not need the purchase of a plantation, rearing equipment, power, or other necessities such as mulberry sericulture. Sericulture employs more than half of the respondent in a year, thereby halting interstate migration. According to the MNREGA, the people must work 100 days per year, but sericulture employs respondents for 151-200 days, or 54 percent of the time. As a shortcoming of sericulture in the study region, gaps in technological transfer and extension assistance, insufficient market accessibility, and poor connection among different stakeholder groups have been identified. The silkworm rearers's income creation process is threatened by a number of supply-side restrictions, including technology inefficiency, cost inefficiency, labour inefficiency, and market inefficiency.

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## Electric Vehicles for Sustainable Future

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### Abstract

Indian transport sector is one of the largest oil consumers. Conventional fuel vehicles consume fossil fuels and produce toxic greenhouse gases which lead to long term adverse effect on human health and our environment. Many states in India are more polluted, specifically air polluted while India is the 5<sup>th</sup> most polluted country in the World. But now consumers in worldwide are preferring electric vehicles. Electric vehicles are a better option for this because they are non-polluting and have a consistent linear performance. According to European Energy Agency research, driving an electric car emits 17-30% fewer carbon emissions than driving a gasoline or diesel vehicle. In India, people consider energy savings as the primary reason for switching to an electric vehicle. In this paper researchers initially tried to show that, how electric vehicles are demanded. Then state-wise demand, vehicle categories- demand and other sales related data. In India, in connection to encouraging people to use and buy electric vehicles governments are investing in e-vehicles related infrastructure also. Research and development sector also working more actively in this field. At the end, researcher tried to show the relationship between electric vehicles and sustainable future with its advantages.

### Introduction:

Pollution has become a key concern in the World. Especially, air pollution is a foremost issue of many countries in the World. Mainly urban areas or cities are more affected by the air pollution. When we talk about India, NDTV highlights IQAir's World Air Quality Report, 2021<sup>1</sup> where this report says that 10 Indian cities are include in top15 most polluted places in the world.

There are various reasons of air pollution and transportation is one of the major reasons. Petrol and Diesel engine vehicles produce CO<sub>2</sub> which contaminate air and affect our environment. A report of Center for Science and Environment (cseindia)<sup>2</sup> says that, Indian transport sector is largest oil consumer. According to Asian Development Bank total fuel consumption of on-road vehicles in India increased 6 times in 2015 than 2005. It shows that use of oil or fuel in India is increasing massively. Following table shows that, as per the IQAir report- 2021 top most polluted countries in the world in 2021.

**Table No. 1: Most Polluted Countries in the World- 2021**

Rank	Country Name	Rank	Country Name
1	Bangladesh	2	Chad
3	Pakistan	4	Tajikistan
5	India	6	Oman
7	Kyrgyzstan	8	Bahrain
9	Iraq	10	Nepal

Source: [www.iqair.com](http://www.iqair.com)

The above table indicates that, in the list of top polluted countries in the world majority are Asian countries and important part for us is that our country, which stands on 5<sup>th</sup> rank in the world. This reality demonstrates that we Indians must think seriously and take proper strategic steps towards control on pollution.

**Table No. 2: Most Polluted Cities in India- 2021**

Rank	City Name	State
1	Bhiwadi	Rajasthan
2	Ghaziabad	Uttar Pradesh
3	Delhi	Delhi NCR
4	Jaunpur	Uttar Pradesh
5	Noida	Uttar Pradesh
6	Baghpat	Uttar Pradesh
7	Hisar	Haryana
8	Faridabad	Haryana

<sup>1</sup> [www.iqair.com/world-air-quality-report](http://www.iqair.com/world-air-quality-report)

<sup>2</sup> [www.cseindia.org](http://www.cseindia.org)



Source:

www.hindustantimes.com

The above table shows eight most polluted cities in India. Out of eight cities, four belong to Uttar Pradesh. So, we can say that, Uttar Pradesh is most polluted state in the country. Even in every winter season Delhi also faces the problem of Smog which is nothing but effect of air pollution.

**Conventional Fuel Vehicles and their sales:**

Burning oil (fuel) being used in transportation produces various toxic gases like, Carbon Dioxide (CO<sub>2</sub>), Carbon Monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), Hydrofluorocarbon (HFCs), Sulfur Dioxide (SO<sub>2</sub>) and other Green House Gases etc<sup>3</sup>. which are harmful to the human health and our environment. Financial express provides data of WHO, which states that, polluted air kills around 7 million lives in the world every year, where India alone accounting more than one million deaths. Also, it adds, as many as, 14 of 20 most polluted cities in the world, 14 are in India.<sup>4</sup> While Center for Science and Environment (cseindia) report also adds that, overall transportation sector in India accounted 15% emission of CO<sub>2</sub> and this emission is increasing with fastest rate at more than 6% per annum. Further this report says use of public transport in India may drop/reduce it from 75.7% in 2001-02 to 44.7% in 2030-31. So, use of private vehicles for transportation purpose will create more carbon in air.

**Table No. 3: Sale of Automobiles in India<sup>5</sup>**

Year	Unit sale (in No.)	Growth rate (%)
2015-16	2,04,68,971	-
2016-17	2,18,63,281	6.38
2017-18	2,49,81,312	14.26
2018-19	2,62,66,179	5.14
2019-20	2,15,45,551	-17.97
2020-21	1,86,15,588	-13.60

Source: SIAM, [siam.in/statistics.aspx](http://siam.in/statistics.aspx)

The table no. 3 shows that, sales of automobiles in India (fuel vehicles) from 2015-16 to 2020-21. Sale in 2019-20 and 2020-21 is affected by COVID- 19 so, in these years growth rates is in negative. Also, in these two years sales of electric

vehicles increased in all categories. It means customers are preferring electric vehicles too.

**Impact of Air Pollution:**

Air Pollution makes negative or adverse effect on human health. It increases the risk of respiratory infections, lung cancer, heart diseases, irritation of the eyes, nose and throat, coughing, chest tightness etc. affected by the air pollution. Acid rain, Eutrophication, Haze, effect of wildlife, Ozone depletion, Crop and forest damage, Global climate changes are the other major effects of air pollution on environment. So, it is clear that polluted air can affect human resources as well as environment too.<sup>6</sup>

**Electric Vehicles and their sales-**

In the modern time electric engines are using in almost all types of vehicles but the growth of these engines can be traced back to the 17<sup>th</sup> century (P. Rajiv, 2018)<sup>7</sup>. Our modern world realized the importance of electrical engines in all ways of the life to minimize the effect of other modes of transports to the environmental degradation.

Chart No. 1: All types of E-Vehicles Sales in India- Feb 2021 to Feb 2022



Source: JMK Research & Analytics Report- 2021 and 2022

Electric two-wheelers are more attracting and preferred by modern consumers. More research and development in sports and ultra-modern bikes is trying to target young generation. These electric vehicles are helpful to solve some environmental problems and now they are competing to conventional fuel engine vehicles. Chart no. 1 shows that sales of all types of electric vehicles in India from February 2021 to February 2022. Due to second wave of COVID-19 again affected sales in April, May and June 2021. But if we see average monthly growth rate of last nine months (June 2021 to February 2022) it is 21.8%. Growth rate or monthly sales shows that, customers are preferring electric vehicles in good amount.

<sup>3</sup> www.epa.gov.in

<sup>4</sup> www.financialexpress.com

<sup>5</sup>

<https://www.siam.in/statistics.aspx?mpgid=8&pgidtra il=14>

<sup>6</sup> Department of Environmental Protection, one winter street Boston, MA 02108.

<sup>7</sup> A Study on the consumer perception towards electric Bike at Vellore district in Tamil Nadu- Rajiv P. (2018)

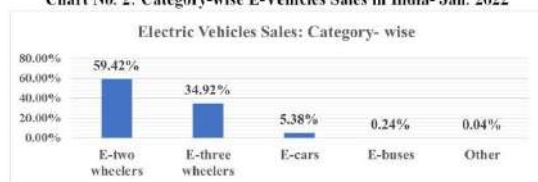


**Table No. 3: Region-wise Registered E-Vehicle Sales in Top 5 State/UTs - Jan. 2022**

Sr. No.	State/UT	%
1	Uttar Pradesh	16%
2	Maharashtra	15%
3	Karnataka	11%
4	Tamil Nadu	9%
5	Delhi	8%

Source: JMK Research & Analytics Report- 2022  
Table no. 3 shows that, registered electric vehicle sales in top five states and union territories. Uttar Pradesh stands on first rank. These five regions are covered almost 60% of e-vehicles sales in India.

**Chart No. 2: Category-wise E-Vehicles Sales in India- Jan. 2022**



Source: JMK Research & Analytics Report- 2022

Chart no. 2 shows that, category wise electric vehicle sales in India in January 2022. This chart clearly shows that, out of all types of EV sales most preferable are E-two wheelers. Then e-three wheelers are demanded by the people. That is also confirmed by CNBC TV18<sup>8</sup>. But E-cars are not much popular yet because, there are very less seller of e-cars, less infrastructure, range issue etc.

**Relationship between Electric Vehicles and Sustainable Future:**

E-vehicles use the energy received from the rechargeable battery which is cheaper than filling petrol and diesel. If we use renewable energy source to charge those batteries then the use of these vehicles will be more eco-friendly. Renewable energy source like solar energy can at least provide good amount of electricity in summer and winter seasons. These electric vehicles don't have more moving parts and they need less servicing requirements than combustion vehicles. So, electric vehicles have lower maintenance cost, which save resources of the World. Our planet having limited fossil fuel stock

and those fuels produce toxic Green House Gases (GHG) which led to long term, adverse effect on human health and our environment. The emission impact of electric vehicles is much lower than petrol or diesel vehicles. Fully electric vehicle does not produce any carbon, but when we talk about electricity production then petrol and diesel vehicles emit almost 3 times more carbon dioxide than the average e-vehicle<sup>9</sup>. With control of air pollution, electric vehicles do not produce noise too. No engines in electric vehicles so they have silent functioning capability and that's why electric vehicles do not create noise pollution.

**Conclusion:**

The primary advantage of an electric vehicle is its environmental friendliness as compared to gasoline or petrol and diesel-powered vehicles. They are helpful to control air and noise pollution in better extent which has become a serious problem at world level. EVs are easier to operate, you can install EV charging units in our house, porch or in parking place instead of going to a gas/petrol station. EVs surely contribute to achieve the goal of sustainable development or green development. Electric vehicles are also much quieter, and their mileage is now significantly improved with the recent developments in the EV industry, particularly while driving at low speeds in cities and densely populated areas. Government is also creating awareness and encouraging people to purchase electric vehicles. It gives tax benefits and subsidies on purchase of electric vehicles. So, we need to shift from conventional fuel vehicles to modern electrical vehicles. as alternative source of transportation at individual and public level. There are some factors affect to use of electric vehicles, like still infrastructure for electric vehicles (recharge points and longer recharge time etc.) is in development stage, people use conventional electricity for charge their vehicles, compared to fuel vehicles these electric vehicles have low speed so people use them for short distance travel, sometime no noise becomes a reason for accidents etc. However, modern technology and growing research towards embarking upon these shortcomings will unquestionably boost this industry with the positive support of union and state governments

<sup>8</sup> www.cnbctv18.com (30 July 2020) & www.thequint.com

<sup>9</sup> https://e-amrit.niti.gov.in/benefits-of-electric-vehicles

and play significant role to achieve millennium goals of sustainable development.

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**INFORMATION SCIENTISTS, BIBLIOMETRICIAN & DOCUMENTALIST OF  
LIBRARY AND INFORMATION SCIENCE**

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**Abstract**

In today's age of technology, information and its updates are happening daily. New versions of this information are being provided to us in an updated manner. A group of such people are working day and night to update that information. Which should get you all the information timely and accurate. There is no gap between them day and night. There is no rest in their work. People are doing the work of storing small information, bringing it into form and analyzing it and conveying that information to us. Those are the people we call experts. In library and information science, there have been some scientists, documentalists, bibliometricians without whose contribution this science could not have been completed. In this article we are going to discuss about some such important scientists.

**Keywords:** Scientist, Bibliometrician, Documentalist

**Introduction**

Researching, organizing and documenting information is a high-risk task in the field of library and information science. If it is processed with wrong information, its conclusions will turn out to be wrong. For that, it is necessary to dissimilation of information in both micro and macro way.

From the 16th century, the process of information research, analysis and its results began. Since then, till now opportunities and challenges are facing the person in this field. Therefore, considering all these things, the person working on this process has to be called an expert.

**Objective**

- 1) Studying Scientist in Library and Information Science around the world.
- 2) Studying Bibliometrician in the field of library and information science worldwide.
- 3) Studying Documentalists in the field of library and information science around the world.

**Library and Information Science**

Although library and information science are two different concepts, they are seen to work in the same way. This area deals with information management, storage, edition, preservation, etc. Does it in a physical or immaterial way. In the 1960s, due to the information explosion, the newly created academic discipline, and the early growth of human computing power, many academic institutions began to attach the name information science to libraries. Most schools adopted it in the 1970s and 1980s. And in the 1990s, almost all library schools added the name

information science to their names. These changes took place on a large scale in every corner of the world. There were some exceptions to this. E.g., In 1997, the Royal School of Librarianship in Denmark changed its English name to The Royal School of Library and Information Science.

**Information Scientists**

We see how the world came to be and why it is. Every thoughtful soul is curious about this. But to understand the reality of this one who conducts research to advance knowledge in the field of interest and who is motivated to do many things is called a scientist. Scientists in antiquity had no real ancient analogues. At that time, philosophical studies were conducted using natural philosophers to evaluate natural elements. Between 624 and 545 BC, a scientist named Thales described how the elements of the universe could first be considered natural. In the 19th century, the scientific term was coined and its use was less. Famous historian William Wavell popularized it in 1833.

In modern times many scientists have progressed in the field of science. Along with this, the field of library and information science is ahead.

**Information Bibliometrician**

After researching a piece of information, the user presents the findings of that information by analyzing it statistically using mathematical formulas. Such an expert and subject matter expert is called a bibliometrician in the field of research. By using sophisticated techniques and dealing with the nuances of the field, the subject conclusion is highlighted.

**Information Documentalist**

A researcher who undertakes his work to create scientific and technical documentation, takes some of the burden of his work. A person who does such work is called a Documentalist. This person is trained and professional. From whom

mistakes are not likely to be made. Analysis of different types of articles, papers is done by Retrieval of information is done by collecting and recording it. And this can only be done by an expert, an expert we call a Documentalist.

**Some Popular Name of Information Scientist, Bibliometrician and Documentalists Scientists:**

**Information Scientist**

<u>Sanford Berman</u>	<u>John Shaw Billings</u>	<u>Luzanne Briet</u>	<u>James Duff Brown</u>	<u>Chis Mai Chan</u>	<u>Ingetraut Dahlberg</u>	<u>Elville Dewey</u>	<u>Douglas John Foskett</u>
<u>Michel Gorman</u>	<u>Allen Kent</u>	<u>Frederick Kilgour</u>	<u>David A Kronick</u>	<u>Frederick Lancaster</u>	<u>Thleen De La Pena McCook</u>	<u>Alexander Ivanovich</u>	<u>Herbert Ohlman</u>
<u>Lope Olson</u>	<u>Paul Otlet</u>	<u>S.R. Kanganathan</u>	<u>Ronald Salton</u>	<u>Claire Kelly</u>	<u>Lesse Shera</u>	<u>Line Syenonius</u>	<u>Robert Taylor</u>
<u>Barbara Tillett</u>	<u>Carla Hayden</u>	<u>Charles Cutter</u>	<u>Ris Sherratt</u>	<u>Lian Campbell</u>	<u>Herbert White</u>	<u>Eugene Garfield</u>	<u>Lesse Shera</u>

**Bibliometrician:**

<u>Blaise Cronin</u>	<u>Eugene Garfield</u>	<u>Jorge Hirsch</u>	<u>Macroberts M.H.</u>
<u>Macroberts B.R.</u>	<u>Henk Moed</u>	<u>Per Ottar Seglen</u>	<u>Derek J</u>

**Documentalist:**

<u>M.D. Bowles</u>	<u>S.C. Bradford</u>	<u>A.J. Meadows</u>
<u>L.Olsson</u>	<u>J. Shera</u>	<u>R.V. Williams</u>

**Conclusion**

Major philosophers have contributed immensely to library and information science. These people are constantly striving to collect and analyze information about the current situation and reach it to the readers. In this article, we have tried to provide information about such philosophers. Their main purpose is to let us know the world from their point of view. These people pave the way for our curiosity. These people are constantly trying to find the answer to the question we have. In this article, we have studied Library and Information Science Scientist, Bibliometrician, Documentalist here. Which person was important in which field, and what work was important or what they were famous for. An attempt has been made to explain this here.

The world's greatest scientist, Bibliometrician, Documentalist will always be alive in the question of our lives and its answer. I really thank these people from the bottom of my heart.

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**New Trends and Policies in Library and Information Science**

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**Abstract:**

The present study has analyzed the recent trend advances on library information science in detail. Cover the study process of knowledge classification, cataloguing, documentation, library administration, Internet, information literacy, change management, and library security. The usefulness and safety of libraries is constantly increasing by programmers, literacy programmers, etc. LIS education and training facilities in India are undergoing radical changes. It is necessary to collect information and knowledge in the library. The present study is useful for BLIS and MLIS students, research as well as knowledge for library staff. Library and information science technology is evolving rapidly. Innovations are becoming more common over the years, introducing new technologies. Library and information science or studies is an interdisciplinary field of study that typically deals with the organization, access, collection, and preservation/management of information, whether in physical or digital form. Despite various trends in merging the two fields, some consider library science and information science to be two distinct disciplines. Library and Information Science (LIS) degree program. In addition to books, newspapers, magazines, and audio-visual materials, 21st century library resources are significantly enhanced by new digital formats, which allow libraries to expand their offerings without expensive physical renovations. For libraries, both national information-related and other national are part of larger mosaic policies, e.g. Education contributes to and is related to, but not dependent on, these other policies. In the first instance they are developed separately and independently. They need to be updated as country conditions and policies evolve and change. National policies for libraries are formulated according to the political, economic and social needs and circumstances of the country.

**Keywords:** *Trend, Policies, Innovation etc.*

**Introduction:**

Library and information science technology is an area that has a tremendous impact on entire industries and careers. In recent years, university management has been required to be more efficient and outsourcing of skilled library services has increasingly been used in academic libraries in Japan. The term outsourcing is used here to refer to outsourcing user services, i.e. the external procurement of services traditionally provided within the library and information services (Sho Sato and Hiroshi Itsumura 2009). The most common audience for information policy analysis includes undergraduate and graduate students, scholars, policymakers, policy analysis, as well as those members of the public who have taken an interest in understanding the effects of the laws and regulations involving information. Although information policy generally has a broader definition and encapsulates a multitude of components, its scope and impact can vary depending on the context. For example, in the context of an information lifecycle, information policy refers to the laws and policies that deal with the stages information goes through

beginning with its creation through its collection, organization, dissemination, and finally to its destruction (Abhay Bhakte 2019). A Master of Management degree in Library and Information Science can help prepare students in a variety of fields to incorporate current and future technologies into their communities. Recent trends have been analyzed in detail in the present study. Include this study process of Knowledge classification, cataloguing, documentation, libraries Governance, Internet, Information Literacy, Change Management and library security. Its usefulness and safety are found. The library is constantly growing by programmers and the masses Literacy programmers etc. LIS education and training facilities in India Impulsive changes are taking place. Collection is needed for Information and Knowledge in Libraries. The present study is helpful For students, research as well as library staff for BLIS and MLIS the knowledge. In India, individual research started near about in 1930s with Dr. S.R. Ranganathan who was actively involved in various areas of library and information science profession like a classification, cataloguing, documentation, library administration, etc. About



face is the dominant factor of human life. There is inestimable to change in present period and it is the cause of human progress. The LIS is no exception to this. Therefore, it is automatic to include new trends in the syllabi. As a result of this change new concepts are coming forward. In the age of demolition of information science, the task of fulfilling the reader's expectations totally depend upon the skillful librarian. To prepare a skilled librarian the library organization and the syllabus it is very important. Now a day's library is not only confined to the transaction of books but it has become acknowledge resource center (Kadam Rohini Madhukar and Dandge Satish Vasant 2021). According to Sato & Itsumura's 2008 survey, 90% of academic libraries outsourced some services. Non-professional services like binding or circulation services are frequently outsourced, but professional services like original cataloging (outsourced 26.9%) or reference services (19.5%) are also outsourced.

**Objective of the Study:** The main aim and objective of the study is to trace new trend and policies in Library and Information Science.

**Methodology and Scope of the Study:**

The data for the present study has been collected for the related to the research topic in different websites, Published and unpublished some data sources, requests to librarians and personal contacts. The scope of present study is limited to new trends and policies in library and information science.

**New Trends in Library and Information Science**

In this article, we look at the latest trends in library and information science in three different categories:

**I.** Collection management

**II.** User engagement

**III.** Security

**I. Collection management**

As repositories and access points to information, libraries are often defined by their collections. Collection management is a key component of any library and information science (LIS) degree program. In addition to books, newspapers, magazines, and audio-visual materials, 21st century library resources are significantly enhanced by new digital formats, which allow libraries to expand their offerings without costly physical renovations. Below are some collection management innovations that are being used to

make vast amounts of information available to everyone:

**1. Electronic Resource Management (ERM):**

With the growing selection of eBooks, e Journals and the like, a great deal of information is now available in digital form. ERM helps librarians keep track of what is available and what is not (in terms of both availability and authorization), who is accessing it, and what specific items people find most useful. All this simplifies both collection development and management.

**2. Cloud computing:**

Just as library services have expanded to include computers and Internet access, library collections are now significantly enhanced by cloud computing, which allows libraries to make digital information available to their patrons (and which does not have to be physically stored anywhere).

**3. Federated search (FS):**

Similar to the concept of cloud computing, federated search allows users to search for information spread across multiple databases using a single interface. It enables virtual integration of information resources without the hassle of actual physical integration, making research easier.

**II. User management:**

Beyond all other considerations, the primary function of a library is to inform and improve the lives of its patrons. It is a testament to the power of libraries that they continue to do so even though so many other diversions are now available. One of the reasons libraries have been successful is because they have embraced technological advances. Hopefully, we will always have a library stack full of knowledge, but the following technology developments have been added to keep users engaged

**1. Digital Display:**

There's certainly nothing wrong with an old-fashioned sign printed or scrawled in pen or chalk that tells patrons where to go to find what they want. But think how many eyes can be drawn to a digital display complete with graphics and the ability to scroll through multiple announcements. With so much attention paid to digital screens these days - why not fill at least one of them with something that could make for a real library adventure?

**2. Gamification/Augmented Reality:**

For anyone scoffing at the idea of a library visit as an adventure, we present the following two innovations. Game activities that encourage reading

and augmented reality spots that patrons can access through their devices encourage reading, research and learning.

### **3. Makerspaces:**

If the ultimate goal of a library is not only to provide information to individuals but also to help them think about how they can use that information, why not give them a space in the library where they can express their ideas. For testing? This idea informs the current proliferation of library makerspaces, which are exactly what they sound like: places where people can make things with the help of library-equipped machines.

### **4. Big Data and Data Visualization:**

Aggregating information in a way that makes it less overwhelming represents a significant innovation for our current systems. Through the use of visual aids such as maps, graphs and charts, the data stored in an information system on a particular subject can be presented in large quantities so that the user can more easily find and access what they need.

### **5. Mobile-based library services:**

Much of the physical space of the library discussed above relates to its users. But what about those who can't visit the library? There are mobile apps that allow patrons to access library user services remotely through their smartphones. These are often paired with learning management systems that support self-paced online courses by managing, tracking, and documenting the learning plan.

## **III Security**

It's almost strange now to think back to the days when some people were reluctant to give out personal information for fear of the library falling into who's hands. As libraries increasingly rely on technology and digital interaction, the problem of securing information is astronomically greater than when all you had to worry about was the wrong person rummaging through a drawer full of index cards. Here are some innovations that help libraries maintain security:

### **1. Single Sign-On:**

This is an automated authorization system whereby the user, once verified, needs to click only one link to access the system. Not only does this negate the need for a more complicated authentication process, single sign-on further personalizes the patron/library experience by using the same technology that identifies the user

to "remember" which information services the user uses most often.

### **2. Radio-frequency identification:**

This technology allows libraries to use radio waves to tag and track items in an institution's collections. Not only does this increase security by ensuring that library inventory is not stolen, it also streamlines the check-out/check-in process for patrons and allows librarians to quickly determine whether an item is available or on loan.

## **Development in Library and Information Policy in India:**

A recognition that the National Information Policy for the country has been in place in India since 1980. The importance of new knowledge was convinced even earlier in 1957, when Jawaharlal Nehru made this clear in his Scientific Policy Resolution of the Government of India in 1958. India's efforts towards developing a National Information Policy. The Indian Library Association (ILA), the Indian Association of Special Libraries and Information Centers (IASLIC), the Society for Information Science (SIS), were urging the government to initiate efforts towards formulating a National information policy, through a number of seminars and conferences. Separate draft policy statements were prepared by ILA and the Rammohan Roy Library Foundation and submitted. These were submitted to the Government of India in 1984. As a consequence, the Department of Culture set up a Committee in October 1984 under the chairmanship of Prof Chattopadhyay for formulation of a National Policy for a Library and information System (Abhay Bhakte 2019). Regarding the future of information policy, it should be flexible and changeable in variation. As conditions increase, the ability to access, store and share information increases. Galvin suggests that information Policy may include setting boundaries for uncertainty in this area. As information policy becomes a big and important topic, it will become a big topic in terms of government regulations Also the future of technology. This will also include the study of subjects such as Information Science, Communication, Library Science and Technology Studies. Information strategies will bring more benefits, for national and institutional, such as getting the best out of Web 2.0 development at the national level and in Influence people to pay attention to institutions, social aspects and socio-technical systems Securing the protection of

digital content, bringing information production, as well as respecting all users and Making time to think respectable. To achieve this national organization, it will be important Focus not only domestically but also nationally. Collaborating with domestic organizations internationally (and vice versa) thinking will not be very successful.

**Conclusion:**

Collection management is a key component of any library and information science (LIS) degree program. In addition to books, newspapers, magazines, and audio-visual materials, 21st century library resources are significantly enhanced by new digital formats, which allow libraries to expand their offerings without costly physical renovations. The primary function of a library is to inform and improve the lives of its patrons. It is a testament to the power of libraries that they continue to do so even though so many other diversions are now available. As libraries increasingly rely on technology and digital interaction, the problem of securing information is astronomically greater than when all you had to worry about was the wrong person rummaging through a drawer full of index cards. For libraries, both national information-related and other national are part of a larger mosaic Policies, e.g. Education contributes to and is related to, but not dependent on, these other policies. In the first instance they are developed separately and independently. They need to be updated as such Country conditions and policies evolve and change. National policies for libraries are generated from it Political, economic and social needs and conditions of the country.

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**Atmanirbhar Bharat: A Way Forward through Sustainable Education and Employment**

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**Abstract**

India which is a developing country over the years have achieved an impressive growth due to various policy measures adopted over the years. Of the several objectives, one of the most important objectives was to achieve the objective of self-reliance and become Atmanirbhar Bharat. There are several challenges which the country has to overcome, of which rising educated unemployment being one among them. The present study is an attempt to integrate atmanirbhar concept to achieve sustainability in the wake of rising educated unemployment. The country has to bring about changes in its educational system by making it sustainable and at the same time to introduce more sustainable employment opportunities by which the challenges can be converted to its advantage.

**Key words:** Atmanirbhar Bharat, Self-Reliance, Educated Unemployment, Sustainable Education, Sustainable Employment.

**Introduction**

Before the colonial rule, Indian economy was self-reliant and flourishing and the wealth of India had attracted invaders across the world towards plundering it. The discovery of sea-routes helped to establish trade relations with India and later on led to colonial rule which had shattered the Indian economy. However, to revive the Indian economy from its deplorable condition, the ruling governments of India adopted various policy measures. Consequently, India could achieve growth rate across various sectors to some extent, even though it was fluctuating. India, later liberalized its restrictive policy measures and opened up the economy globally by adopting the New Economic Policy in the year 1991. The economy has been passing through a series of growth process and stages over the years. The recent covid-19 pandemic adversely affected the growth of various sectors and to give a boost to these sectors, the government revived the self-sufficiency concept in terms of adopting the Atmanirbhar Bharat project.

**Statement of the Problem**

The sudden and unexpected crisis that emerged due to COVID-19 was unprecedented and had affected various sector like industry, services, manufacturing, hospitality, education etc. Unorganised sector was one of the worst hit. It devastated the economy as a whole. In order to transform the crisis into an opportunity, the Government came up with the scheme 'Atmanirbhar Bharat'. In the present Globalized era, the concept of self-reliance has its significance. Self-reliance doesn't imply self-

centredness, rather self-dependency contributing to the progress of the whole world. The present study is an attempt to integrate atmanirbhar concept to achieve sustainability in the wake of rising educated unemployment.

**Objectives**

To understand the concept of Atmanirbhar Bharat.  
To identify the gap between the educated and vacancies available in the selected year in India.  
To investigate and bring forth suggestions to achieve atmanirbhar bharat integrating sustainable education and employment.

**Methodology**

The present study is descriptive in nature and has reviewed various secondary sources of literature available on similar areas. Based on the information received from various secondary data sources like World Bank, government sources, Niti Ayog reports, websites including various print and electronic media, conclusions were arrived at. The study mainly focused on the facts and figures drawn from the Reports of the Government of India, and various articles published by experts in this field.

**Conceptual Clarification**

Atmanirbhar Bharat is a synonym put forward by the Government of India to the age old idea of 'Make in India'. Self-reliance doesn't imply isolation or inward orientation. Rather self-reliance imply instilling self-confidence among the people to achieve self-development by reducing the dependence on other countries. Dependence is a situation in which a country's economy is "conditioned by the development and expansion of another economy. A country should



not be dominated or dependent on another economy in order to be self-reliant” (Dos Santos 1970, p. 231). According to Prime minister Narendra Modi, Aatmanirbhar Bharat doesn’t imply the country to be self-contained or isolated from the world, rather suggest being self-sustaining and self-generating. India will stick to policies which promote efficiency, equity and resilience. To achieve self-sufficiency, the country should have adequate educated skilled people, who pursue activities keeping in mind the objective of sustainable development. "Education for Sustainable Development allows every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future” (UNESCO 2014). This can contribute

towards concentrating on jobs which are sustainable and beneficial for the economy and present as well as future generations. “Sustainable jobs are referred to as those which preserve and protect social, environmental and economic conditions while striving towards growth.” (Knockaert. & Maillefert, 2004). India has been an insightful nation who believed in the philosophy of Vasudhaiva Kutumbakaom and this spirit of co-existence was very much required for the country to become self-reliant. India took measures to improve its economy and the governance and this has been indicated by the annual growth rate of Gross Domestic Product (GDP), as provided by the World Bank.

**Table 1: GDP Annual Growth (in %) in India**

GDP Annual Growth (in %)	1990	1995	2000	2005	2010	2015	2018	2019	2020	2021
	5.53	7.57	3.84	7.92	8.50	8.00	6.5	4.04	-6.60	8.9

Source: World Bank Data (WB, 2022)

The annual growth rate in India has been fluctuating over the years even though compared to the 1990 growth rate, there has been an increase in all the years except in 2019 and a negative growth rate in 2020. The fall in growth rate in 2019 was as a result of the contraction in secondary sectors like manufacturing and construction (National Statistical Office National Accounts Data 2018-19), whereas the negative growth was a repercussion of the covid pandemic which hit several sectors of our country. With the revival of economy from the pandemic, the country achieved one of the highest growth rates confirming that the proper implementation of various policies suitable for the development of the country can enable it to become atmanirbhar. Atmanirbhar Bharat is a synonym put forward by the Government to the idea of ‘Make in India’. Self-reliance doesn’t imply isolation or inward orientation. Rather self-reliance implies instilling self-confidence among the people to achieve self-development by reducing the dependence on other countries.

**Five Pillars of Self-Reliance<sup>1</sup>**

The Government has put forward five pillars to become Atmanirbhar such as Economy, which brings in radical changes and not gradual progress; Infrastructure, which represents modern India; System which is technology driven; Vibrant which is technology driven; Capable which is technology driven; Strong which is technology driven

demography, which is the source of strength for self-sufficient India; and the Demand, whereby full capacity utilization of our demand and supply chain could be achieved. Atmanirbhar Bharat Abhiyaan can enable the country to concentrate more on local manufacturing, local market and local supply chains thereby promoting local products globally through vocal and other ways. Local product manufacturing and various entrepreneurial activities can promote the make in India campaign leading to self-dependency. Self-reliance will prepare the country to face tough competition in the global supply chain by increasing the efficiency as well as ensuring quality in various sectors of production.



**Figure: 1 Atmanirbhar Bharat-Five Pillars**

<sup>1</sup> [https://www.pmindia.gov.in/en/news\\_updates/pm-gives-a-clarion-call-for-atmanirbhar-bharat/](https://www.pmindia.gov.in/en/news_updates/pm-gives-a-clarion-call-for-atmanirbhar-bharat/)



Of the five pillars of Self-reliance, India is the second largest country in terms of population and undoubtedly enjoys an advantage in terms of Demographic Dividend over China, which is the most populous country. To achieve self-reliance, bold reforms should take place in several areas one of which being to develop capable human

**Table 2: Discipline wise turn out as well as vacancies in percentage during 2018-19**

Branch of Study	Out turn G/PG	No. of vacancies	% of vacancies to out-turn
Engineering	863243	24463	2.83
Technology	278723	457	0.16
Agriculture	62241	3327	5.35
Medicine	275939	14996	5.43
Natural Science	227852	3068	1.35
Social Science			
including teaching	1803193	13291	0.74
Misc. Discipline	4463588	181881	4.07
Total	7974779	241483	3.03

Source: Government of India, Ministry of Labour & Employment 2021<sup>2</sup>

The above table clearly indicates the huge gap in terms of the job available with respect to various streams. The percentage of vacancies to outturn for various streams taken together is 3 percent which indirectly shows high educated unemployment. Creating adequate employment opportunities has been a major problem in many of the developing countries especially characterized by huge population. The Govt. should try to provide and create adequate employment opportunities to the qualified youth. Private sector also should involve with the government in creating adequate employment opportunities making use of the youth and their skill towards the benefit of their organization and their growth. Attitude of the youth should also change. Rather than depending on government and private sector for providing employment, they

<sup>2</sup> The study of demand side has been made on the basis of number of vacancies notified in 2018-19 to Union Public Service Commission, State Public Service Commissions, Railway Recruitment Boards, Institute of Banking Personnel Services, Agricultural Scientists Recruitment Board and Employment Exchanges including Central Employment Exchange under the provisions of Employment Exchanges (Compulsory Notifications of Vacancies) Act, 1959 by employers for graduates, post-graduates, doctorate awardees, diploma holders, non-graduates etc., to various recruiting agencies.

resources. To make use of the demographic dividend to its advantage, India should invest more in the skill development of human resources, for which adequate quality social infrastructure in terms of education is very essential.

should develop their entrepreneurial skill wherein, they should start their own enterprises and become employment providers for which adequate financial support should be provided by the government. The government of India has come up with various supports schemes to promote the young entrepreneurs. Another key area which require reform is up skilling the youth to meet the demand of Industry. Education sector should bring about reforms in this aspect. According to a study by HSBC<sup>3</sup> almost 71 percent of the parents are ready to take loans to finance their children's University or College education. On one side educated unemployment is on the rise and on the other side, parents are ready to be in debt to educate their children. The sustainability in education is ignored here. Education can become sustainable only if it encourages the educated to be self-sufficient and self-dependent by promoting employment opportunities through developing entrepreneurial talent.

### **Conclusion and Policy Recommendations**

Atmarnirbhar Bharat while promoting investment opportunities should encourage sustainable entrepreneurship, which is the need of the present day world, where activities are driven on the basis of fulfilling the goals of sustainable development. India should create a conducive environment to encourage private investment, startups etc., which uses environment friendly methods of productive activities. India with the second largest populous country enjoying a demographic dividend has several advantages over other countries, one such being a large market for goods. Startups can help in dealing with educated unemployment. India should make use of its human capital by providing them with skill development, entrepreneurial setup that encourages

<sup>3</sup>Value of Education — foundations for the future' study.

<https://www.thehindubusinessline.com/news/most-parents-willing-to-get-into-debt-to-fund-childs-college-education-hsbc-survey/article8752006>

brainstorming and innovation. To achieve better employment opportunities and growth, the education system should stress more on passion-driven careers for students rather than succumbing to societal and parental pressure. The educational institutions should collaborate with advanced institutes across the country and world, for cultural exposure and as a creative platform to boost students' confidence. This will work as a motivating strategy and investment in skill enhancement and overall personality building can

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help the students to face the demanding job market. The government should encourage new entrepreneurs by creating convenient investing environment with adequate funding and also various tax and other incentives. Special additional incentives should be provided to those entrepreneurs who invest in green technology, green innovations and green enterprises which promote sustainable employment opportunities which in turn can take India forward to be Atmanirbhar in its future endeavours.

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**A Review: Sustainable development of Biodegradable Polymer Material**

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**Abstract:**

The sustainable development can be support through the development of biodegradable materials. The overuse of compound materials from fissile sources has generated an oversized volume of waste that causes environmental impacts because of the degradation time. Green materials offers a unique characteristic and properties including abundant in nature, less toxic, economically affordable and versatility in term of physical and chemical properties. Green materials can be applied for a numerous field in science and technology applications including for energy, building, construction and infrastructures, materials science and engineering applications and pollution management and technology. The technological advance has excited explore for alternatives that may contribute to property. In this context, the use of biodegradable polymers, that uses raw materials from renewable sources stand out because they have that ability to form films and come from abundant sources. Also, within the expectation of optimizing the environmental edges during this method, it's doable to price the agro-industrial residues, victimization them as material within the synthesis of the compound, the physical, chemical and mechanical properties of those polymers area unit necessary to judge the doable applications. In this study, the current research on renewable sources, including agricultural and industrial residues, to obtain biodegradable polymers, highlighting their properties and application.

**Keywords :** Biodegradable, Renewable, Sustainable development, Polymer.

**Introduction**

Polymeric material presently plays a vital role in way of life which have distinctive range of properties. Compared to alternative ancient materials, plastics supply several blessings, like performance and flexibility, durability, lightness resilience to corrosion, easy process, high productivity, low cost, environmental facet, etc. Innovation in plastics can therefore build a valuable contribution to increasing economic process and quality of life and facilitate to unravel environmental issues. Now, there's a noteworthy increase within the potential use of perishable polymers in numerous areas like medication, pharmacy, agrochemistry or the packaging trade. Attributable to their wide-ranging properties, each artificial and nature chemical compound materials perform an important and present role in way of life. Having a amount of effectiveness, biodegradable polymer materials break the development of biodegradation. it's valuable to tell apart between biodegradable polymer materials on the idea of their origin: native or artificial. Native biodegradable polymer materials represent the synthesis developed throughout a protracted course of evolution in nature. Each leading

to materials possessing tailored characteristics for various applications. They embrace proteins (collagen, gelatin, and albumin), polysaccharides (cellulose, chitin, and alginate), nucleic acids, and ranging properties, each artificial and natural chemical compound materials perform an important and present role in way of life. In the perspective of sustainable development, biodegradable polymers can be considered as safe for the environment, and are an interesting alternative to conventional polymers[1,2]. There are huge sources of biodegradable polymers, which are from natural polymer to synthetic polymers. Natural polymers are obtained from renewable sources in huge quantities and synthetic polymers are obtained from non-renewable sources i.e. petroleum resources [3,4]. Variety of perishable polymers is developed in recent decades. With relevance the origin of the stuff they are divided into two groups: i) perishable polymers from renewable resources (e.g., polymers of microbiological origin similarly as artificial polymers from renewable monomers) and ii) perishable polymers of non-renewable/fossil resources[5]. Natural polymers area unit out there in massive quantities from renewable sources, whereas artificial polymers

area unit created from non-renewable crude oil resources. Biodegradability depends not solely on the origin of the chemical compound however conjointly on its chemical structure and also the environmental degrading conditions [6,7,8,9].

#### **Biodegradability**

The American Society for Testing of Materials (ASTM) and the International Standards Organization (ISO) define degradable plastics as those which undergo a significant change in chemical structure under specific environmental conditions [10]. These changes end in a loss of physical and mechanical properties. Perishable plastics suffer degradation from the action of present microorganisms like bacterium, fungi and algae. Plastics are categorized as photodegradable, oxidatively degradable, hydrolytically degradable, or those which can be composted. Within the start, the accelerator binds to the compound substrate so catalyses a hydrolytic cleavage of the compound. Polymer gets degraded into low relative molecular mass oligomers, dimers and monomers and in conclusion to greenhouse emission and liquid. These compound degrading microorganisms expel living thing enzymes that diffuse through the agar so degrade the polymer into water soluble substances. By applying this technique, degraders like poly (hydroxybutyrate) (PHB), polypropiolactone (PPL) and Polycaprolactone (PCL) are extensively distributed in diverse environments.

#### **Classification of Biodegradable Polymer**

According to chemical composition, origin, economic importance, application, synthesis and processing methods etc. Biodegradable polymers are classified into two classes: i) Natural biodegradable polymers; ii) Synthetic biodegradable polymers. Natural polymers are obtained from renewable sources in huge quantities and synthetic polymers are obtained from non-renewable sources i.e. petroleum sources [11]

#### **Synthesis of Biodegradable polymer**

Polyesters can be synthesized by polycondensation of alcohols and acids, ring opening polymerisation (ROP), and metalcatalysed polymerization reactions. This polymerization is step-wise via condensation of an acid and an alcohol with elimination of water which drive the equilibrium reaction in forward direction. The Ring Opening Polymerisation of

cyclic dimeric alcohol (glycolic) or lactic acid produce  $\alpha$ -hydroxy acids, which then polymerize to give poly-( $\alpha$ -esters). A range of organometallic initiators are often applied to start out the chemical process of polyesters, comprising tin, zinc, and atomic number 13 complexes. The synthesis of poly ( $\beta$ -esters) and poly ( $\gamma$ -esters) are often meted out by comparable ROP or condensation strategies like poly ( $\gamma$ -esters). Development of metal-free method that contains the

utilization of microorganism or catalyst chemical change in polyester formation is additionally being researched upon [12]. Polyanhydrides are often created through variety of strategies conjointly utilized in the synthesis of different polymers, comprising condensation, dehydrochlorination, dehydrative coupling, and ring opening polymerisation. Polyurethanes and polyester amides are utilized in biomaterials. Polyurethanes were at the start exploited for biocompatibility, durability, resilience. Polyurethanes are commonly synthesized employing a diisocyanate, a diol, and a compounds chain extender. The selection of terminal teams affects the properties of the ensuing compound. Moreover, the utilization of edible fat and biomass within the formation of polyurethanes, likewise because the conversion of poly-urethanes to polyols, is an energetic space of analysis [13].

#### **Properties of Biodegradable**

##### **Properties of Natural Biodegradable**

These Polymers are obtained directly from natural sources and their important properties are discussed below:

Collagen - Collagen could be a supemolecule found mostly in mammals and the major strength supplier to tissue. Albuminoid molecule consists of three entangled supermolecule chains that type a spiraling structure. It is non-toxic, produces solely a marginal response and is great for attachment and biological interaction with cells. They have unsuitable mechanical properties which shows contraction or shrinkage[14].

Chitosan - Chitosan is one kind of carbohydrate derived from polysaccharide. Recently chitosan has become fashionable within the tissue-engineering field because of many fascinating properties[15]. Chitosan combined with different materials so as to exted the strength and cell attachment potential. It should manufacture mixtures with artificial polymers like poly(vinyl



alcohol) and poly(ethylene glycol) or natural polymers like albuminoid[16,17] Gelatin – Gelatin is the common biopolymer which is obtained either by partial acid reaction or by partial base-forming reaction of animal scleroprotein. Gelatin is concerning tasteless and scentless. It's a vitreous, brittle solid faintly yellow in colour. Gelatin is soluble in liquid solutions of polyhydric alcohols like glycerin and propanediol. Its insoluble in fewer polar organic solvents as well as aromatic hydrocarbon, acetone, primary alcohols and dimethyl formamide. Gelatin colour depends on the extraction technique and also the raw materials used[18,19]. Alginate - Generally, alginate spring from brown algae, it's a sugar. Alginate will be processed simply in water as chitosan and is fairly non-toxic and unprovocative. The fascinating matter is that encapsulation of bound cell sorts into alginate beads may very well enhance cell growth and survival. Alginate has been explored to be used in liver, nerve, heart, and additionally animal tissue tissue-engineering. Like others, alginate has some drawbacks as well as mechanical weakness and poor cell adhesion. to beat these limitations, the strength and cell behavior of alginate has been increased by mixtures with alternative materials, as well as the natural polymers agarose and chitosan [20]. Lactose – Lactose disaccharide is found in milk. Lactose molecules are hydrolyzed by lactase in intestines. The intolerance disaccharide happens once an individual has issue or isn't able to digest milk thanks to lack of lactaid. The lactose glycemic index is smaller amount than that of malt sugar and aldohexose and nearly five hundredth under that of plant product. This disaccharide has sensible water solubility, it exists in a very ring kind with oxygen bonds between the primary and fifth carbon atoms. Disaccharide breakdowns to carboxylic acid that decrease the pH scale of the stomachal contents [21] Starch - Starch is created of amylose and amylopectin. Starch contains amylopectin (80-90%) and amylose (10-20%). Within the structure of starch, the linkage between aldohexose residues is 1-4 and at branch purpose linkage is of 1-6. Starch from potato demonstrates high coefficient owing to its phosphate monoester [22]. Once starch heated in excess of water, the semi-crystalline structure is broken and water molecules associate by H bonding to hydroxyl radical teams exposed the amylose and

amylopectin molecule. The solubility and swelling capability of starch describe the interactions of the chemical compound chains comprising the crystalline and amorphous grain fractions. The starch granules swell and increase many times in size, breaking the molecules and create three dimensional network and increase the viscousness [23]

Cellulose – Cellulose is common carbohydrate contain three hydroxyl groups for reaction in each unit. The hydrogen bonding among cellulose chains impart improved thermal stability and mechanical properties. The hydrogen bonds in molecules introduce order or disorder into the system counting on their regularity. It is water insoluble compound and contains rigid linear structure. Due to their, insolubility and physical rigidity, it is chemically inert. The animals have bacteria in their stomach which digest the cellulose can digest the cellulose [24]. Pectin – It is a biodegradable natural polymer which makes about one third cell wall of dry substance in higher plant. It is soluble in pure water and they have highest concentration in middle lamella of the cell wall. In apple contain 10-20% and in citrus peel contain 20-30% of pectin with different colour. The formation of gel is caused by atomic number hydrogen bonding between free carboxyl teams on the cellulose molecules and additionally between the group teams of neighboring molecules [25]

#### **Properties of Synthetic Biodegradable Polymer**

These Polymers are obtained from petroleum sources and their important properties are discussed below:

Poly(lactide)(PLA) – This polyester is linear and aliphatic which is biodegradable and also biocompatible thermoplastic it can be synthesized by fermentation of renewable resources. The L-lactic acid / D-lactic acid / mixture of both compounds are used in the synthesis of PLA and PLA has six months to two years half life of degradation depending on size and shape of articles, isomer ratio and temperature. The tensile strength of PLA depends on structural orientation and degree of crystallinity [26]. Polycaprolactone (PCL) – Polycaprolactone is biodegradable aliphatic polyester. These are synthesized caprolactone in presence of metal alkoxides by ring – opening polymerization. It has low melting point and low viscosity. It is degraded in presence of enzymes like esterases and lipases. [27]. Polyglycolide (PGA) – Polyglycolide is rigid



thermoplastic polymer which has high crystallinity and their glass transition temperature and melting point temperature of polyglycolides are 36°C and 255°C. These are insoluble in mostly organic solvents. Solvent casting specific action technique and compression moulding are accustomed fabricate Polyglycolide based mostly implants. Polyanhydrides - One of the foremost extensively studied categories of perishable polymers is polyanhydrides with incontestable biocompatibility and glorious controlled unharness characteristics. Tensile strength of 15-27 MPa and compressive strengths of 30-40 MPa. A vital property is that polyanhydrides are unit biocompatible have well defined degradagtion characteristics. Polyanhydrides show hydrolytic instability so they must be keep beneath moisture free frozen conditions and low mechanical strength. Polyorthoesters – Polyorthoester are biodegradable polymer which contain orthoester likage, that is acid labile and endure surface erosion like polyanhydrides. Polyorthoesters contain lactide segments as a part of the compound structure. Once the degradation of lactide segments processed, it produces group acids that catalyse the degradation of the orthoester .

#### **Applications of Biodegradable Polymers**

A wide range of sectors where applications for biopolymers have introduced including medicine, packaging, agriculture and the automotive industry. Biopolymers which will use in packaging still receive additional thought than those selected for the other application. Gelatin is natural chemical compound that used for coatings and microencapsulating numerous medicine for medicine applications. The use of polyose and its derivatives embrace in drug carriers and anti-cholesterolenic agents, blood anticoagulants, anti-tumor merchandise. Collagen, polyose poly-L-leucine are wont to prepare skin substitutes and wound dressing. Polyanhydrides are investigated in controlled unleash devices for medicine treating eyes disorder and victimization as native anesthetics, chemotherapeutical agents, anticoagulants, neuro-active medicine and antitumour agents. PLA incorporates a medium porosity level to water vapour and element. It's employed in packaging applications like films, cups, bottles. Films supported chitosan have verified to be effective in food preservation and might be probably used as antimicrobial packing. The agricultural chemicals involved are pesticides

and nutrients, fertilizer etc. Some natural polymer employed in controlled unleash systems are starch, cellulose, chitin, algin and polymer. The automotive sector aims to arrange lighter cars by the utilization of bioplastics and biocomposites. PLA has already wont to create a laptop case by Fujitsu company.

#### **Conclusion**

This review summarizes the natural and synthetic preparations for biodegradable polymer with their properties and applications. These polymers show a major contribution to property development visible of the broader varies of require steps to the event of perishable merchandise and maximize the environmental, social and industrial edges. In useful that has become crucial in medicine utilization. The well outlined structure biodegradability / biostability mechanical properties, multiple functionalities, stimuli-responsiveness, biocompatilbility and minimum toxicity of those biodegradable polymers. The sectors of agriculture, automotives, medicine and packaging all would like surroundings friendly plastics and polymers. Perishable plastic is associate degree innovative manner of resolution the plastic disposal downside from the point of view of development of latest materials. Environmental responsibility is continually increasing in importance to each shoppers and trade. Natural polymers have a crucial role within the controlled unharness of medication and their targeting to selective sites. The polymers have unbroken considerably additional thought within the fields known with natural insurance and therefore the support of physical successfulness. For enhancing the properties of perishable polymers, significant measures of techniques are created, for instance, absolute and piece copolymerization or change of integrity. Such reasonable ways enhance each the biodegradation rate and therefore the mechanical properties of the polymers. To avoid the disorder of scheme, process ought to be cyclic while not making any chemical or biological imbalance.

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## Change In Properties Of Magnesium Oxychloride By Incorporating Wood Dust As An Additive

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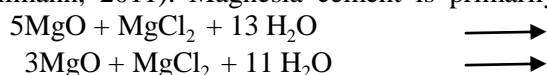
### Abstract

Magnesium oxychloride cement was invented by S.T. Sorel in 1867. It prepared by exothermic reaction of MgO and MgCl<sub>2</sub>. It has many properties superior to that of Portland cement, but its large scale application is limited due to its low early strength and poor water resistance. In wood industries, a lot of waste is produced during the cutting and manufacturing of wood materials. A parametric study was conducted to investigate the effect of wood dust on the setting time, compressive strength, moisture resisting efficiency, and durability characteristics of Magnesium oxychloride cement.

**Keywords:** Magnesium oxychloride, wood dust, setting times, compressive strength, moisture ingress, etc.

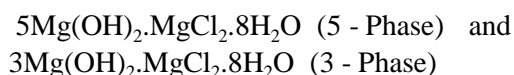
### Introduction

The qualities and possible uses of magnesium cement have drawn interest for many years. S. T. Sorel discovered magnesia cement in 1867, therefore it is often referred to as Sorel cement (Sorel, 1867). It is prepared by concentrated solution of Magnesium chloride (MgCl<sub>2</sub>.6H<sub>2</sub>O) and powdered Magnesium oxide (MgO). This reaction is exothermic, hence Dolomite is used as an inert filler in the system. Magnesia cement has various advantages over regular Portland cement, including higher fire resistance, lower thermal conductivity, and better abrasion resistance (Beaudoin and Ramachandran, 1975; Beaudoin et al., 1977; Bensted and Barnes, 2002; Chandrawat and Yadav, 2000; Matkovic et al., 1977). It also stands out for its high bonding, rapid setting time, and lack of humid curing (Maravelaki and Moraitou, 1999). Due to its potential to conserve energy and safeguard the environment, this cement has garnered a lot of study attention. For instance, compared to Portland cement, the synthesis of lightly burned Magnesium oxide utilized in magnesia cement requires substantially lower calcination temperatures (Li et al., 2010; Schollbach and Pollmann, 2011). Magnesia cement is primarily



Magnesia cement has many advantageous engineering and mechanical properties, but it has poor water resistance, resulting in a significantly decreased strength of the cement. Many researches on the water resistance property of magnesia cement have been carried out (Chandrawat et al., 2011; Chau et al., 2009; Chuanmei and Dehua, 1995; Sglavo et al., 2011).

utilized in commercial and industrial settings for lightweight wall panels, fire protection, industrial flooring, and grinding wheels. It is also used for decorative panels, interior plaster, and wall insulation panels (Beaudoin and Ramachandran, 1975; Liska and Al-Tabbaa, 2008; Shand, 2006). The setting and hardening of magnesia cement takes place in a through-solution reaction (Urwongse and Sorrell, 1980). Four main reaction phases in the ternary magnesia cement system are found: 2Mg(OH)<sub>2</sub>.MgCl<sub>2</sub>.4H<sub>2</sub>O (phase 2), 3Mg(OH)<sub>2</sub>.MgCl<sub>2</sub>.8H<sub>2</sub>O (phase 3), 5Mg(OH)<sub>2</sub>.MgCl<sub>2</sub>.8H<sub>2</sub>O (phase 5) and 9Mg(OH)<sub>2</sub>.MgCl<sub>2</sub>.5H<sub>2</sub>O (phase 9) (Hubbell, 1937; Özer et al., 2007; Sorrell and Armstrong, 1976; Zongjin and Chau, 2007). Excellent binding and mechanical properties developed during setting are attributed to the exothermic chemical reaction occurring between the two. There are several setting reactions possible. The two most prominent of them are the formation of a 5-Phase hydrated Magnesium oxychloride product [5Mg(OH)<sub>2</sub>MgCl<sub>2</sub>.8H<sub>2</sub>O] and a 3-Phase hydrated Magnesium oxychloride product [3Mg(OH)<sub>2</sub>MgCl<sub>2</sub>.8H<sub>2</sub>O] made by the following reactions:



Pulverized wood (wood dust) is a byproduct of wood industry. In the present research it is used to enhance the properties of Magnesium oxychloride. The findings showed that wood dust affected the cementing characteristics of magnesia cement (setting times, moisture ingress, comprehensive strength, etc.).

**Materials And Methods**

**Materials**

Magnesium chloride, dolomite powder, and lightly calcined magnesite (magnesia) were the raw ingredients for the research work. Commercial grade magnesia was collected from Jaipur. The chemical analysis of Magnesia in mass percentages is as follows: MgO=76.94%, SiO<sub>2</sub>=9.86%, CaO= 7.00%, Fe<sub>2</sub>O<sub>3</sub>= 0.18%, Al<sub>2</sub>O<sub>3</sub>= 0.75%, LOI= 9.90%

The Magnesium chloride (MgCl<sub>2</sub>.6H<sub>2</sub>O) that was used was grade 3 of the Indian Standard (IS 254-1973), which had the following properties: colourless, crystalline, hygroscopic crystals; highly soluble in water; Magnesium chloride minimum 94%; Magnesium sulfate, Calcium sulfate, and alkali chloride content, are less than 5% Inert filler Dolomite was collected from Alwar, Rajasthan. The chemical composition of Dolomite in mass percentage is as follows:

SiO<sub>2</sub>= 0.79%, CaO= 32.07%, Fe<sub>2</sub>O<sub>3</sub>= 0.84%, Al<sub>2</sub>O<sub>3</sub>= 0.28%, LOI= 44.58%

Dry mixes were made by combining dolomite and magnesia in 1:1 weight ratio. Gauging solution was prepared by dissolving Magnesium chloride in water to form a concentrate solution. Insoluble contaminants accumulated at the bottom of the container after this solution was let to stand for the entire night. The supernatant solution was filtered and transferred into a plastic container, and its specific gravity on the Baume's scale was calculated (<sup>0</sup>Be).

**Methods**

All of the experiments were carried out on the best Magnesium oxychloride cement composition (MgO: Dolomite was in a 1:1 proportion, and the density of the gauging solution was 24<sup>0</sup>Be). The effects of wood dust on Magnesium oxychloride cement were investigated in the following experiments.

**Setting (Hardening) time investigation:** The effect of wood dust on setting characteristics of Magnesium oxychloride cement was studied by admixing wood dust in the dry-mix in varying proportion. The amount of wood dust was calculated by weight of Magnesia. Wet-mixes were prepared by gauging 1:1 dry mixes (by weight of Magnesia and Dolomite) having different quantities of additive (5%, 10%, 15% & 20%) with Magnesium chloride solution of 25<sup>0</sup> Be. Standard procedures were adopted according to Indian Standard specification to determine standard consistency, Initial and final setting times using Vicat needle apparatus. Results are summarized in Table 1.

**Weathering effect investigation:** Standard blocks prepared for setting time investigation were used to determine the effect of weather. Variation in weights of setting time blocks was measured with passage of time after 24 hrs, 7days, 30 days and 45 days using chemical balance. Experimental findings are recorded in Table 2.

**Moisture ingress investigation:** Setting times blocks were exposed to boiling water for at least 30 hours in a closed steam bath after two months of curing. Readings were noted for interval of every 5 hrs up to 30 hours. Results are summarized in Table 3.s

**Compressive strength investigation:** To study the effect of wood dust on compressive strength of Magnesium oxychloride standard 50cm<sup>2</sup> cubes were prepared from the standard consistency pastes having wood dust in different amounts. These cubes were tested on universal strength testing machine after 30 days of curing. Results are recorded in Table 4.

**Results**

Results of wood dust on bonding properties of Magnesium oxychloride cement are summarized in Table 1-4.

**Table 1: Effect of wood dust on setting time investigation of Magnesium oxychloride cement**

Sr. No.	% of wood dust in Dry-mix composition of MOC	Setting Time	
		Initial (min)	Final (min)
1.	0%	68	249
2.	5%	63	268
3.	10%	60	255
4.	15%	57	250
5.	20%	58	253

**Table 2: Effect of wood dust on weathering effect investigation of Magnesium oxychloride cement**

Sr. No.	% of wood dust in Dry-mix composition of MOC	Weight of blocks in gm after			
		24 hrs	7 days	30 days	45 days
1.	0%	256.08	254.51	253.87	252.12
2.	5%	259.58	253.51	250.36	249.46



3.	10%	246.39	239.24	234.65	234.85
4.	15%	243.57	235.62	228.80	228.56
5.	20%	233.51	223.03	218.94	217.79

**Table 3: Effect of wood dust on Moisture Ingress investigation of Magnesium oxychloride cement**

Sr.No	% of wood dust in Dry-mix composition of MOC	Trial Blocks Kept In Boiling Water For					
		0-5 hrs	5-10 Hrs	10-15 hrs	15-20 hrs	20-25 hrs	25-30 Hrs
1.	0%	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
2.	5%	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
3.	10%	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
4.	15%	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
5.	20%	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.

N.C.: Not Cracked

**Table 4: Effect of wood dust on compressive strength of Magnesium oxychloride cement**

Sr. No	% of wood dust in Dry-mix composition of MOC	Compressive Strength (kg/cm <sup>2</sup> )
1.	0%	264.430
2.	5%	312.522
3.	10%	308.751
4.	15%	299.153
5.	20%	274.351

**Discussion:**

The setting time results for different Magnesium oxychloride cement composition is included in Table 1. Addition of wood dust in the matrix results in decrease in initial setting time due to the absorbing nature of the additive therefore hydrolysis takes place immediately during initial setting which accelerates the setting process. Final setting time increases first with the initial addition of the additive (5%). This increase in final setting period may be due to the reduced concentration of MgO (main component of Magnesia cement). As the concentration of the additive increases (10% to 20%) chances of formation of interlinking crystals between Magnesia and Wood flour also increases hence final setting time decreases. Data regarding weathering effect investigations of Magnesium oxychloride cement by incorporating Wood dust in the matrix are recorded in Table 2. Free moisture present in the matrix evaporates gradually causing decrease in weights. Table 3 represents the water resistance results. Formation of interlinking crystals improves water tightness of the product and makes the product sound. Due to the absorbing nature of the additive absorption and desorption takes place which do not affect the soundness of the product. Table 4 enumerates the results of compressive strength tests. Compressive strength of the product is increased initially by the addition of the additive (5%). Interlinking crystals are formed between OH group of the additive and Magnesium oxychloride cement

which provide strength to the compound. Later on increasing the quantities of the additive (10% to 20%), the chances of formation of strength giving composition (5.1.8) reduced as with increasing amounts of the additive concentration of MgO decreases, hence compressive strength decreases.

**Conclusions:**

A decreasing trend in the initial setting period and increased final setting periods are observed after admixing wood dust in Magnesium oxychloride cement.

Wood dust is a good additive for moisture resistance property.

The mechanical strength of Magnesium oxychloride cement is improved by wood dust.

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**Discrimination Against Female Employees In Workplace: A Study Of Women Discrimination  
In Auto Industry Outlets With Reference To Madikeri Taluk**

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**Abstract**

The social arrangement by which men and women are not regarded as equals is gender inequality. Some common inequalities that take place in the workplace based on gender have taken place over the centuries. For females, unequal pay, sexual assault, occupational segregation, gender differences in promotion, leadership and management are some of the most damaging gender inequalities. All these might not be more appropriate for the world today. Everything has moved, changed rapidly, anything in the world could change. Women can take full responsibility in the industry, in society, at home, and they've even accomplished everything, but women never feel as safe as men in the world. The percentage of discrimination could be smaller, according to the dates mentioned and others, but racism and sexual assault have never disappeared. The mindset of males towards females is always the same. So here with the paper, we focus on where it usually turns into discrimination in the workplace, and ultimately gender inequality is a never-ending social process, according to the different reports and paper. This research paper explores the issue of gender discrimination in the work place; specifically to assess how gendered assumptions affect women and to find out the factors affecting women's participation in higher job position and to ascertain whether prejudices regarding gender occur in the professional setting

**Keywords:** Sexual Assault, occupational Segregation, Gender inequalities, Society

**Introduction**

In 1950's the issues related to gender discrimination were highlighted but considered as the most important issue around 1980's & 1990's. Importance was given to female issues in that organization where males were dominating according to researchers. Gender discrimination is existing in various areas of management which includes differences in wages, salary, promotion, participation, decision making etc. Many of the employees are affected by the discriminatory issues & problems on gender bases. Therefore this study is conducted to study issues which contribute to gender discrimination in the workplace. This study is helpful for those companies where females are working & being discriminated against on the ground of lack of gender sensitivity & orientation & how it also affects their performance. An organization must accept the importance of females & should follow fair representation in every functioning of the organization when it comes to distribution of salary or wages, promotion, leadership, power etc.

The top management should avoid such discrimination as it may affect their survival. If we talk about our country, then India is the country who is a witness of discrimination from

its early history until today which is due to so many practices like political, social & religious also. It has not been stopped even after the enforcement equality law. People discriminate against females on the ground of work, allocation of food, healthcare & fertility choices. Only making of law & enforcing it is not the solution but there should be some practices adopted by organizations for social awakening & attitude change in the mind-set of male counterparts. This will not only reduce gender discrimination but also helps in women empowerment. The most of the researches show different factors that stuck women's involvement & participation in managerial leadership and in positions where decision making is important. It has been observed that these factors are interrelated. These include: lack of adequate educational facilities required for women, absence of commitment by the superiors (top management decision making) body, backward socio-cultural attitudes, lack of insufficient experiences to women for holding & controlling the leading top positions, overburden or excessive household obligations, as well as negative predispositions of men towards women, and last but not the least the weak confidence in women themselves. All these factors understood



as major hurdle considered as the barrier to senior position & leadership. In many of the organization it has been seen that females are entertained in terms of hiring, selection, wages due to the awareness among the females & also as per the norms in terms of policies for women in employment. But still, that has been seen that leadership & power allocation is also influenced by gender. Many researchers tried to study the relationship between leadership & gender. In many countries, participation rate of women has generally lagged behind the rate for men on account of the high commitment of women to household activities. It should be understood like both man & women have their importance in every field. So that made us study about even after so many changes in our social status regarding gender still there is discrimination. This discrimination not only affects the employee's productivity but mental peace, quality of work life, relationships at home & at workplace too.

#### **Review of literature**

Susan (1998) has focused on the work place gender discrimination rational bias theory. According to this theory, decision makers may choose to discriminate if they believe that their superiors or others having power over their careers expect or prefer it. The findings of their research showed that businessmen discriminated women and people at the top of the organization are most biased against women than people at the bottom. Their study has also confirmed that management support discrimination, though those discriminations were less than the findings of earlier research, reflecting increasing equal opportunity. It was also confirmed through their research that the discrimination is more because of external pressures than from internal. Habib (2000) has studied the effects of Brick Wall and Glass ceiling in public administration of Bangladesh. His analysis has shown that women are discriminated in civil services of Bangladesh from entry to the higher posts (Glass Ceiling). Social cultural factors are the principal stumbling blocks and build a wall for entry of woman into civil services. Their career path was hindered by the impediments of the systematic and attitudinal reasons. Government laws and regulations in this regard are proving ineffective. However, that discrimination was not for the women who came from upper class.

This disparate treatment against women had implications for their morale, motivation and performance. Sexual harassment has also been defined as sexual advances are it in touches, looks, or even jokes that undermine the diligence of the victims. Of course, forcing a worker to have sex, or rape, is also considered to be sexual harassment. According to Ross (2008) discrimination is somewhere is simple to identify &, and there could be so many different hypothetical analysis in the way of dealing treatment of one individual with another individual towards different sex. The main focus for the working woman is to be able & to show that a man was always in fact dealt with more favorably than the females which are highly visible & observable in giving promotion & recruitment & selection. This study revealed about the despite many advances & improvement gender discrimination still persists at workplaces, and it continues to be experienced by working women in the professional workspace. Hora (2014) said that women not only denied for superior leadership positions, but also stopped from availing to higher education which will make them more developed in terms of skills, and also gives them with lot of experience in learning & applying managerial decision-making methods, help them in enhancing their self-confidence in holding & controlling leadership positions. Sikdar (2008) examined the role of socially constructed gender stereotypes in leadership and their influence on leadership behavior of people. Hypotheses are tested by creating measures of Journal of Entrepreneurship Education Volume 21, Issue 3, 2018 3 1528-2651-21-3-202 congruence- self-made, self-female, male leader and female leader based on respondents rating of self, males or females and leaders. Correlation between four types of congruence and leadership, intention and behavior would be used to test the hypothesis. Shikha & Yuvika (2014) in their study shows that there is a variation which could be seen in between characteristics of male and female leaders. Many respondents believe women have the right stuff to be leaders on basis of emotions, creativity, intelligence, hard work and honesty. But when we talk about decisiveness and arrogance male leaders have upper hand. In one of the study, the researcher states that how management can be studied on the bases of gender in different ways. Broad bridge and Hearn



(2008) mentioned the new directions in the context of gender & management.

### **Research Methodology**

Analysis based on the available of primary and secondary sources. The study is prepared based on the primary data and secondary data.

**Title Of The Study: Discrimination against female employees in workplace** - A study of women discrimination in auto industry outlets with reference to Madikeri Taluk. For the study primary and secondary has been collected and presented in table and charts. 50 women employees are randomly taken for the study..

### **Collection of data:**

1. Primary data was collected using a structured interview schedule from the employees of some selected Automobile industry outlets at Madikeri.

And secondary data was collected from official website, articles and journals.

2. Research shows gender discrimination mostly in favor of men in many realms including the workplace. Discrimination affects many aspects in the lives of women from career development and progress to mental health disorders. While Indian laws on rape, dowry and adultery have women's safety at heart, these highly discriminatory practices are still taking place at an alarming rate, affecting the lives of many today. Gender discrimination, sometimes referred to as sex-based discrimination or sexual discrimination, is the unequal treatment of someone based on that person's sex. This behavior is a civil rights violation, and it's illegal in the workplace when it affects the terms or conditions of a person's employment.

### **Objectives Of The Study:**

3. To understand the reasons for the workplace discrimination.

4. To study the women perception towards gender discrimination on women employees in automobile industry outlets in the study area.

### **Casues For Gender Discrimination**

#### **1. Unequal pay**

In India the gender pay gap is still quit wide, According to the Monster Salary Index (MIS) published in March 2019, women in the country earn 19% less than the men. It services are

showed a sharp pay gap of 26% In favor of men, while in the manufacturing sector, men earn 24% more than women. It can be analyzed that women are still being paid less than men.

#### **2. Sexual harassment**

Sexual harassment at a work place is considered violation of women's right to equality life and liberty. It creates an insecure work environment, which discourage women participation in work. Indian Company reported more cases of sexual harassment in financial year 2019 compared to a year earlier. Data from BSE 100 companies which are required to punish this information, showed a 14% increase in reports of sexual harassment complaints in financial year 2019

#### **3. Women are promoted less often than men**

As many as 85% of working women in India have said they missed out on a raise, promotion or work offer because of their gender compared to the average of 60% in the Asia-pacific region. The linked –In opportunity Index 2021 said that more women in India have experienced the impact of gender on carrier development, when compared to the APAC region

#### **4. Job segregation**

One of the causes for gender inequality within employment is the division of jobs. In most of the companies there is a belief that men are simply better equipped to handle certain job. Most of the time, those are the jobs that pay the best. This discrimination results in lower income for women.

#### **5. Fear of ask for their rights at work place.**

We have come a long way from the past days where women's main role was taking care of the house, cooking and looking after kids. Indian women's are upon scared of chasing career dreams. Indian women are hesitate to open up their rights and paid. They always look for security in the job and even they are eligible to get more pay they are not take the initiative because fear of layoff. The principle of gender equality is enshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and Directive Principles. The Constitution not only grants equality to women, but also empowers the State to adopt measures of positive discrimination in favor of women.

**Data Analysis And Interpretation**  
**Table 1: Basic details of the respondents.**

Variables	Classification	Frequency	Percentage
Age	18 – 25	12	24%
	25 – 30	21	42%
	30 – 40	15	30%
	Above 40	02	04%
	<b>Total</b>	<b>50</b>	<b>100%</b>
Gender	Female	12	24%
	Male	38	76%
	Transgender	00	00
	<b>Total</b>	<b>50</b>	<b>100%</b>
Monthly Income	Below 10000	08	16%
	10000 – 15000	20	40%
	15000- 20000	14	28%
	Above 20000	08	16%
	<b>Total</b>	<b>50</b>	<b>100%</b>
Marital Status	Married	18	36%
	Unmarried	32	64%
	<b>Total</b>	<b>50</b>	<b>100</b>

Source: primary data

From the above table it can be analyzed that majority of the respondents (42%) are between the age group of 25-30, 76% of the employees are males, 40% employees having monthly income of 10000-15000. And 64% of employees are unmarried. So from the above table it can be

interpreted that the Automobile industry has given more importance for the male candidates than the female and for the unmarried too.

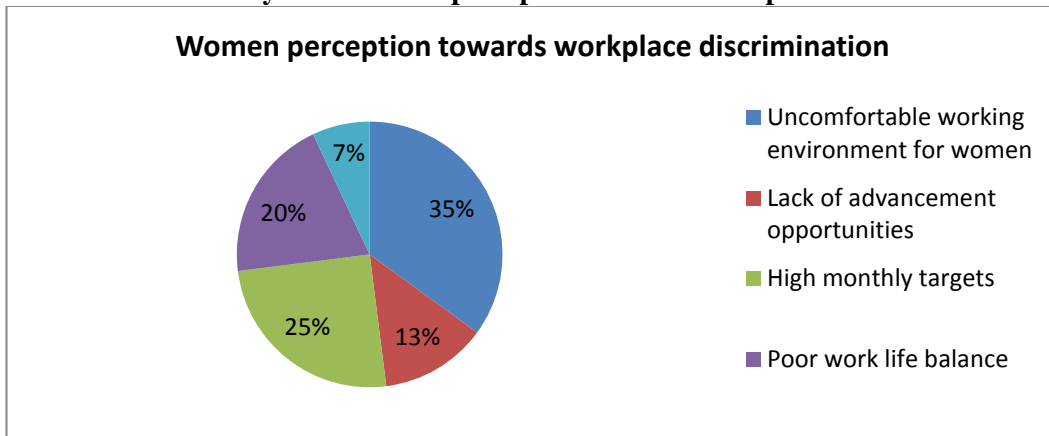
**Analysis on women perceptions toward workplace discrimination**

**Table 2: The following table shows the reasons for women employees avoiding career opportunities in Automobile industry outlets.**

Sl.No	Description	Percentage
1	comfortable working environment for women	35%
2	Lack of advancement opportunities	13%
3	High monthly targets	25%
4	Poor work life balance	20%
5	Unavailability of flexible schedule	07%
	<b>Total</b>	<b>100%</b>

Source: primary data

**Chart No 1: Analysis on women perceptions toward workplace discrimination**



**Source: primary data**

From the above table No: 2 and chart No: 1 shows that the analysis is done on women perception towards workplace discrimination. Out of the 50 respondents 35% of respondents says uncomfortable working environment for women, 25% of them says highly monthly targets, 20% says poor work life balance, 13% of the respondents says lack of advancement

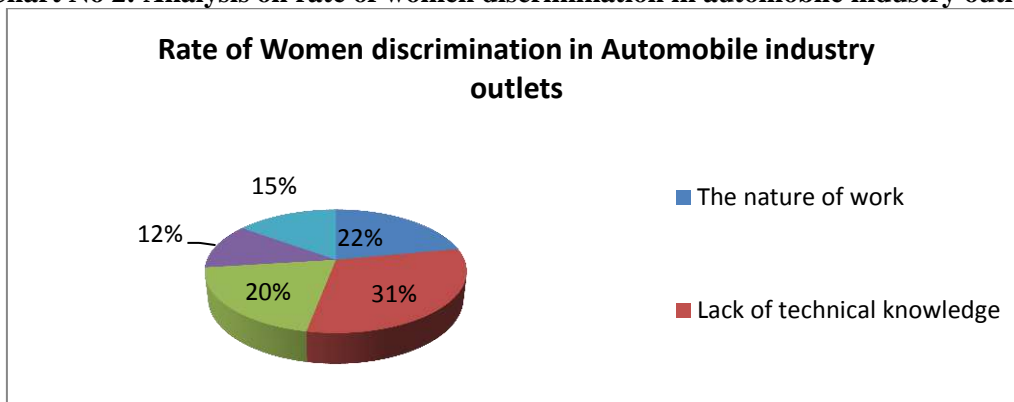
opportunities and remaining 07% of respondents says unavailability of flexible schedule. From the above it can be interpreted that due to uncomfortable working environment in the industry, high monthly targets and poor work life balance most of the women employees are avoiding career opportunities in automobile industry outlets.

**Table 3: The below table shows the women perception towards the reason for women discrimination in Automobile industry outlets**

Sl. No	Description	Percentage
1	The nature of work	22%
2	Lack of technical knowledge	31%
3	Men are preferred over women for leadership position	20%
4	Poor mentorship	12%
5	Unattractive income/ pay	15%
	<b>Total</b>	<b>100%</b>

**Source: primary data**

**Chart No 2: Analysis on rate of women discrimination in automobile industry outlets**



**Source: primary data**

From the above table the analysis is done on the perception of respondents on women discrimination in automobile industry outlets. The 22% of the respondents says nature of work, 31% of the respondents says lack of technical knowledge, 20% of them says men are preferred over women for leadership position and 12% of the respondents say poor mentorship. So from the above table and chart it can be interpreted that the main reasons for women discrimination at workplace is lack of technical knowledge. Because the discrimination based on lack of technical knowledge is prominent among all.

### **Findings**

It is found that majority of the respondents are aged between 25-30(21%), the number of males are found high (76%), majority of respondents monthly income is 10000-15000 (40%) and many of the respondents are found unmarried (64%). Through the survey we found that majority of the women perception towards workplace discrimination is uncomfortable working environment for women.

It is found that women perception towards the reason for women discrimination in Automobile industry outlets is highly found that lack of technical knowledge.

### **Conclusion**

Gender discrimination remains as issue of great concern based on my argument and reasoning. I take a point that women discrimination has many challenges in life as compared to the benefits; Discriminating women within the organizations are harmful to the business performance given that it tends to demoralize the ability of the employees to deliver their level best to enhance productivity. Treating employees on an equal basis gave them a sense of belonging. However, in some cases, reasons such tend to have a lower rate of workplace. Women tend to have a lower rate of workplace flexibility as compared to men, and that makes it a better reason for discriminating them.

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**Complete Information of ISBN, ISSN & CCE**

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**Abstract**

New concepts are emerging in information and technology science every day. The same effect is seen in library and information science. Librarianship faces daily opportunities and challenges. Part of that is having ISBNs for books, ISSNs for journals, and evaluating students. How to study all these processes. What will be its parameters? What are their standards at national and international level, how should they be handled. There are certain laws and rights for that. We are going to study all these things in this article.

**Keywords:** ISBN, ISSN, CCE.

**Introduction**

In the 1960s, Smith W. H. was the only book retailer in Great Britain. He announced that he wanted to move into a computerized warehouse. A standard numbering system was needed for the books they had then. He then appointed consultants who would act on behalf of the British Publishers Association's Committee on Distribution Methods and other experts in the book trade. A standard book number system was formulated in 1966 and implemented in 1967.

This agency was established in 1973 at the National Library of Australia. This system was first developed by UNESCO's World Science Information Program to control the registration of all serials and ISSN distributions in the world. It is a two-tier network with an international center in Paris and a national center in individual member countries. This AGENCY is responsible for distribution of all serial titles published there. All serial titles registered by AGENCY are sent to the Information Centre. And this information is published in ISSN Online and Compact.

CCE was established in 2009. This initiative of the Indian State Government's Right to Education Act was made compulsory. The Central Board of Secondary Education in India has started with this objective to evaluate the students. The program was initially for students of class 1 to 9 and then up to class 12. The main purpose of this was to evaluate the students.

**Objective**

1. To find out how and to whom CCS numbers are issued.
2. Find out how and to whom ISBN numbers are issued.
3. Find out how and to whom ISSN numbers are issued.

**International Standard Book Number (ISBN)**

The International Standard Book Number is an international standard assigned to books. The International Standard Book Number is 13 digits long. This change is effective from January 1, 2007 till now. Earlier its length was 10 digits. A number is validated by including a check digit. Simultaneously the calculation is done using mathematical formula.

The International Standard Book Number is made up of five elements. Each section is separated by a hyphen or space. Their length may be different.

1. Registration group element: Identifies the geographic regions, language areas, and specific countries covered by the system. This element can be 1 to 5 digits in length.
2. Registration Factor: This is 7 digits long and can identify the publisher and imprint.
3. Publication Factor: It is 6 digits long and can identify the edition and format of a particular title.
4. Prefix Element: It is 3 digits long and currently can be 978 or at most 979.
5. Check Digit: This is the last digit which mathematically validates all the remaining numbers. A 10-digit system with alternating weights of digits 1 and 3 is used to measure modules.

**What is the International Standard Book Number used for?**

It accurately identifies the registrant, version and format, specific title. It also has a product identifier for ordering, inventory, stock control purposes by booksellers, publishers, internet retailers, and supply chain participants.

**What does the International Standard Book Number indicate?**

Publication is given on the basis of text. E.g., Journals, Newspapers, Serial Publications.



A book produced for sale or free and made available to the public can be identified by ISBN. Which materials can be made available independently. They can also be used. E.g., Chapters of books, journals, periodicals, articles in serials.

#### **International Standard Book No. Rights and Law?**

In many countries it is used to identify light as a legal requirement. But it does not provide any kind of legal and rights protection. It only acts as an identifier.

#### **Who should apply for International Standard Book Number?**

If an author wants to self-publish his book, he can choose this route. A book publisher can apply for an ISBN. The publisher who is responsible for producing the product. And the publisher can be a group, organization, company or individual.

#### **International Standard Serial Number (ISSN)**

International Standard Serial Number is an international standard. Which is used to identify journals, periodicals, magazines, newspapers. It can be on any medium, print and electronic. This is always an 8digit code.

#### **Publications related to International Standard Series No.:**

An ISSN can identify all current resources regardless of the medium of a current resource. What form does it take, what is its role, where is it displayed and with what light is it associated with? All this can be recognized.

An ISSN is required by law for all publications in most countries. Archives, databases, blogs, magazines, periodicals, journals, newspapers, annual publications, etc. This includes

#### **International Standard Serial Number Format:**

This abbreviation takes the form of ISSN followed by a hyphen. It consists of two groups of four digits. The 8th digit is the check digit calculated by the Modules 11 algorithm based on the previous 7 digits. This can be the eighth control digit X if the result of the computation is a sum of 10. This can be used to avoid any kind of ambiguity.

E.g.

ISSN 2414-1117

ISSN 2040-112X

#### **Role of International Standard Serial Number:**

The role is to identify what type of publication it is.

#### **Where to Display International Standard Serial Number:**

##### **Showing for print publication -**

In the right corner of the cover.

The page that contains the editor's information.

##### **Showing for non-print publication-**

Publication ISSN and ISBN should be identifiable so it is necessary to mention both these identifiers when the publication is on physical media. If there is an online publication, it should be on the home page in any visible area.

##### **A digital code without internal meaning:**

No guarantee can be given as to the quality and validity of the content contained therein. Contains no information about the original content of the publication. This is only related to the title of the publication. If a publication changes, a new ISSN needs to be assigned.

#### **Continuous and Comprehensive Evaluation (CCE)**

The State Government of India has developed a system for evaluating students, called the Continuous and Comprehensive Evaluation (CCE) system. This is an initiative of Central Board of Secondary Education (CBSE). In this system scope is given to students' talents. Both academic and co-curricular are evaluated. Its specific objective is to evaluate every aspect of a student's school attendance during an academic year. His final result is based on his marks - grade, summative evaluation, co-curricular evaluation.

#### **Objective**

1. Assessing student learning in both in-class and out-of-class situations and environments.
2. Overuse of thinking power. Asking to reduce memory usage.
3. Developing emotional, psychometric and cognitive skills.
4. Making decisions about teacher and learning systems and learning environments and making those systems student-centered activities. At the same time, determining the social usefulness and effectiveness of the program.
5. Helping to make assessment an integral part of the teaching and learning process.

#### **Conclusion**

In this article, we have looked at the national and international standards. Where did it originate and what did it do? ISBN stands for book standard, ISSN stands for periodical standard, while CCE stands for student evaluation standard. How is it implemented? The procedure for that has been studied. Every user needs to reach his reading

material. It has also become a matter of necessity that the reading material has the right to safety and protection. Then it becomes necessary to study all these standards. This article is a good example of how to protect your reading material using certain standards.

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## **Internet Uses By Graduate Students**

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### **Abstract**

At present situation , internet is a very important tool used by students for entertainment more than educational use. Nearly all the educational institute provide internet service to the students, teachers, for the non-teaching staff. Now-a-days students access internet to collect information for their work. Because of the internet the students are not studying. Students are using internet for email, chatting,, reading news, sports information, download music, buy products online play games, download images. Through the research try to find out the use of the internet . Use of internet is negative and less support in learning activities.

### **Introduction:**

The internet is very beneficial for students in all aspects. It serves as a teacher to students from where you can ask everything and it will answer you. The internet can be used to get information and knowledge related to get your subject, field, education, institute etc. very fast.The growth of the Internet in the world provides many opportunities to many people around the world in different ways. Internet is used mainly for social and entertainment purposes. However, it is very obvious that the Internet provides not only social connection and entertainment, but also academic and scientific information as well. Additionally, the Internet can be used as a tool to learn the latest news all around the world as well as getting any kind of information that serves different purposes such as learning more information about a hobby or health. Therefore the Internet is the source of spreading information quickly to a large audience and of going beyond the limitation of time and space. Since the emergence of the Internet, it has become an important medium of communication as well as a research and leisure tool. People have started to access any kind of information easily on the Internet and also use it for social, educational and entertainment purposes. Basically, the Internet offers two main benefits which are communication and information (Warren et. al.,1998). Especially in education, the Internet has some functions, and these can be listed as (i) storehouse of information, (ii) communication without boundaries, (iii) online interactive learning, (iv) electronic/online research, (v) innovation in the new world, (vi) improve interest in learning, (vii) global education, and (viii) information catalogues (Park, 2009). As the Internet has many different functions, it is

important to consider to what extent it is used by students in higher education for academic purposes. Internet access very easily and with low cost for educational aspect. Internet also provides students asynchronous education where they can reach any kind of information anytime and anywhere.

The Internet provides not only social connection and entertainment, but also academic and scientific information as well. Thus, it is vitally important to encourage students to use this invaluable source to get any kind of information they need in their academic studies because the development of the Internet would be meaningless if it is not used appropriately in education. Therefore, new digital technologies have been widely involved in higher education institutions as well as other sections of the education system all over the world (Park and Biddix, 2008). In addition, Internet use has the potential to improve the quality of education (Ciglaric et al., 1998; Charp, 2000; Laurillard, 1992). Charp (2000) also stated that the Internet brought numerous positive changes to teachers and instructors. According to Dryli & Kinnaman (1996), the Internet enables students to find information as well as allowing them to think critically and creatively, to become collaborative and cooperative workers and to solve problems. Besides the children of the new technological era that we live in today are influenced by the new literacies and pedagogies, it is important to consider the fact that “the capability to use online and offline databases as well as web search-engines effectively is paramount in cyberspace” (Nentwich, 2003). Today’s students, future scholars and knowledge workers, are required to have the ability to reach the correct information and they need to be able to get the necessary and

accurate information amongst unlimited bits of information. "Finding the right information is only one side of the core business of academics. As Nentwich (2003) stated the other side is organizing, structuring and evaluating the information space. At this point, it is a necessity to mention the three important Internet literacies defined by Burgess (2006): (i) Critical Literacy – a deep, socially contextualized, and informed understanding of the Internet; (ii) Creative Literacy – The ability to experiment with the Internet in order to create and absorbing information; and (iii) Network Literacy – The ability and the impulse to effectively and ethically manipulate a range of the Internet technologies to communicate and collaboratively construct and share knowledge (Burgess, 2006). When the previous studies on the Internet are examined, it can clearly be seen that the majority is focused on the differences between learning outcomes of the courses taught with using the Internet and the courses taught in the traditional ways (Benoit et. al., 2006). However, it is important to be aware of the fact that students are not inactive receivers during the transmission of knowledge via the Internet.

The efficacy of students and looking at the picture through their eyes is vitally important in the way to reach success. As a result of the reasons supported by the literature and mentioned above, the aim of this study is look at the students' use of the Internet in their academic studies. Students are expected to prepare an oral presentation as part of their assessments so the majority asserted that they used the internet find source of information, to download pictures or photos and to do research. They also used the internet for translation as most of them did not feel themselves confident enough to write academic writing in English. Students use the various search engines. They use e-dictionary, e-books. Students connected with their friends to talk about school subjects and homework. They learn current information from the internet. To find out the source of the information on the internet. To download or watch videos related to lessons. To read the notes and other writings related to lessons from different web sites. To translate documents that are written in a foreign language. To do in-depth research on the topics that were explained and took my attentions in classes. To follow up recent news and events about education from the internet. To reach

resources that are related to foreign languages. For all those things we are using internet for academic purpose. But most of the students are using the internet for entertainment.

#### **Need**

Internet is today's need. From this research we know the use of internet by graduate students. If the students have using the internet for the proper way definitely students have benefit of the internet.

#### **Significance**

Internet is need of every field. In the other field using internet more than education.

1. The importance of the present research is to know about use of online submission , email, chatting.
2. The importance of the present research is students have known about the internet.
3. For the development of graduate students.

#### **Objectives**

1. To find out the knowledge of internet use by the students.
2. To find out the use of internet by graduate students.

#### **Assumptions**

1. Most of the students are studying at graduation level.
2. Internet is one of the source in covid-19.

#### **Scope**

1. The conclusions of the research applicable to the graduate students.
2. The conclusions of the research is applicable to the Kolhapur district.

#### **Sample**

The sample had selected according to non-probability. The researcher selected Chandgad taluka by purposive sampling method and also selected college by the purposive method. The students was selected by the incidental method. From the Chandgad taluka, selected Arts ,Commerce And Science College selected for the study. Total 30 students selected for the study. From these students, 10 students from arts faculty, 10 students from science faculty,10 students from commerce faculty. With the permission of the principal of the college, researcher was given questionnaire. All students were completed questionnaire properly.

#### **Delimitations**

1. The present research is delimited to the graduate students.
2. The present research is delimited to the arts and commerce faculty.

### **Research methodology**

In the present study, the researcher used descriptive method in which survey method. The tool for the research, researcher used questionnaire for data collection. The data for the present research was obtained quantitative data. The researcher used percentage for data analysis.

### **Conclusion**

This study aimed at identifying the use of internet. Internet is such a tool, which can affect every sphere of our life. So internet can be beneficial for students, teachers, the internet accessing to the relevant information for academic work. Finding of the study suggest that the students from all disciplines should increase the usages of internet because it plays a key role to improve the academic performance. The students are using internet for chatting, photos, for entertainment only. Many uses for academic achievement, but students are not using.

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**An Introduction to Environmental Chemistry and Green Chemistry and Its Global Impact**

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**Abstract**

As you see in the current situation, pollution is a global challenge. It affects the worldwide population, not even in India. The government has many policies to stop pollution, but still, it's very challenging for us. The primary aim of environmental chemistry is to minimize the pollution in the environment and also the impact of the pollutant substance. While green chemistry is based on the harmful effect of chemicals on the environment, we are studying the twelve basic principles in green chemistry, which can help to minimize the use of the chemicals which affect our environment. so may reason involved for the pollution and current time the primary cause which affects our environment is industrialization, cutting down trees over a large area, automobile and various chemical use in laboratories, use of a large amount of fertilizer. Effect of this, our air index quality is reduced to affect our lungs, which help to grow various lung diseases. In the future, if we overlook this severe issue, not for us, our generation will also affect by this.

**Introduction To Environmental Chemistry**

In the science of chemistry, environmental chemistry is a subdiscipline that focuses on the study of chemical and biological processes in their native environments. Green chemistry, which aims to eliminate pollution by managing it at its source, is in no way related to this concept. The study of the "origin, response, transit, effect, and destiny of chemical species in the air, soil, and water ecosystems" is one definition of this area of study. This term adequately captures the nature involved in this area—The effects of human and biological action on the natural environment. Environmental chemistry is an interdisciplinary branch of research that draws on analytical chemistry, connects to other scientific disciplines, and is concerned with environmental issues <sup>1</sup>To study environmental chemistry is to appreciate the natural world, its processes, the quantity and effects of its constituent chemicals, and the chemical combinations found within. Without it, it would not be easy to conduct reliable research on the impact of human activity on the environment due to chemical emissions. <sup>2</sup> To better comprehend what is occurring with a given chemical species in the environment, environmental chemists draw on a wide range of concepts from the disciplines of chemistry and environmental studies. That way, ecological chemists can do a better job of keeping the planet safe. In chemistry, it is crucial to have a firm grasp of the various chemical processes and equations and solutions, units, samples, and analytical procedures. <sup>3</sup>



Figure 1

**Introduction Of Green Chemistry**

Green chemistry is an area of study within the chemical sciences and chemical engineering that focuses on developing alternatives to traditional chemical processes and materials to reduce or eliminate the release of harmful by-products. Sustainable chemistry is another name for green chemistry. Green chemistry is concerned with the environmental impacts of chemistry, such as finding ways to use less non-renewable resources and figuring out how to solve pollution prevention issues by technological means. Green chemistry examines the influence of chemistry on the natural world, as opposed to environmental chemistry, which examines the impacts of polluting chemicals on the natural world. <sup>4</sup>

In the decades preceding the 1990s, green chemistry developed as an offshoot of several pre-existing ideas and areas of study (including atom economics and catalysis). The timing of this event is significant because it coincides with a growing awareness of the threats posed by declining resource levels and chemical pollution. Green chemistry, a new way of thinking about and tackling environmental problems, has its roots in Europe and the United States. This shift called for

a change from "end of the pipe" regulations that required reductions in industrial emissions to proactive measures that designed manufacturing technology to minimize pollution from the start. This step was essential to making the required transition toward pollution avoidance through active actions. The term "green chemistry" started trending in the middle to late '90s. The term "green chemistry" describes a set of interrelated ideas that spurred the creation of this term (which prevailed over competing terms such as "clean" and "sustainable" chemistry).<sup>5</sup>



Figure 2

### Principles of Environmental Chemistry.

Environmental chemistry is not based on any notions; instead, it is focused on parameters and quantitative characteristics that are concerned with finding natural resources, sources of pollutants, and these impacts. The area of environmental chemistry is called ecological chemistry. The following are some examples: Environmental chemistry is not based on any notions; instead, it is focused on parameters and quantitative characteristics that are concerned with finding natural resources, sources of pollutants, and the impacts of these things. The area of environmental chemistry is called ecological chemistry.<sup>6</sup>

The following are some examples of these:

Gasoline, motor oil, and other hydrocarbon compounds are examples of this type of pollutant, as are organometallic compounds, heavy metal contamination of land caused by industry, polycyclic aromatic hydrocarbons, nutrient leaching from agricultural land into water courses (algae), and urban runoff of pollutants like gasoline and motor oil. Other pollutants include organometallic compounds, heavy metal contamination of land caused by industry, polycyclic aromatic hydrocarbons, and algae. This

category also contains organisms known as algae.<sup>7</sup>

Air, water, and soil contamination are all forms of pollution.

Environmental indicators are a monitoring and inspection tool that focuses on environmental criteria.

Avoidance of risk or active risk management Effective treatment, in conjunction with elimination, recycling, and waste reduction measures

### Principles of Green Chemistry

In 1998, Paul Anastas and John C. Warner developed a set of guiding principles for the practice of green chemistry. These principles aim to reduce the environmental impact of chemical processes. [12] The twelve laws cover a variety of approaches to reducing the adverse effects of chemical products on the environment and people's health. They also highlight the research objectives that should be pursued to create green chemistry technology. When Warner worked for Polaroid Corporation, Anastas was the head of the Green Chemistry Program at the United States Environmental Protection Agency (EPA).<sup>8</sup>

### The principles cover such concepts as

the planning of procedures to incorporate the greatest possible quantity of raw materials into the finished product; the use of non-depletable sources of energy and material feedstocks; the use of chemicals that are safe and not harmful to the environment, including solvents, wherever it is feasible; the development of methods that minimize energy use; the elimination of trash at its source, as this is generally considered to be the most effective method of waste management; the use of non-depletable sources of energy and material feedstocks; the use of wherever<sup>9</sup>

### The twelve principles of green chemistry are:<sup>10</sup>

#### 1. Prevention.

Instead of removing or cleaning up trash that has already been created, it is preferable to prevent waste production in the first place before it can even be produced.

#### 2. Atom economy.

Synthetic processes should have as their primary objective the use of the maximum amount of the accessible material in the production of the final product. As a consequence of this, there will be a cutback in the volume of trash that is generated.

#### 3. Less hazardous chemical syntheses.

Synthetic processes should have as their primary objective the use of the maximum

amount of the accessible material in the production of the final product. As a consequence of this, there will be a cutback in the volume of trash that is generated.

**4. Designing safer chemicals.**

Products that make use of chemicals need to be designed in such a manner that they can perform their intended functions while also posing as minor of a threat as possible to the health and safety of people.

**5. Safer solvents and auxiliaries.**

Products that make use of chemicals ought to have their formulations designed in such a manner that they can achieve their intended functions while also providing the lowest possible potential danger to human health and safety.

**6. Design for energy efficiency.**

When it is practicable, energy needs should be kept to a minimum, and operations should be carried out at the temperature and pressure of the surrounding environment.

**7. Use of renewable feedstocks.**

It states that raw materials or feedstock should be renewable rather than depleting wherever it is physically and economically viable. In this situation, the use of common sense is vital.

**8. Reduce derivatives.**

The production of goods that are not necessary, such as protective groups, should be maintained to a minimum or altogether avoided if there is any chance that this is even remotely possible. These steps require additional chemicals and could generate various kinds of waste.

**9. Catalysis.**

Stoichiometric reagents are not as suitable as catalytic reagents, which, to repeat a reaction, only need to be employed in large quantities. Stoichiometric reagents are not as accurate. Stoichiometric reagents are considered to be of lower quality when compared to catalytic reagents (ones consumed in a response).

**10. Design for deterioration.**

Chemical products should be constructed to prevent them from polluting the surrounding environment; once they have fulfilled their function, they should break down into compounds that are not harmful to the living.

**11. Real-time analysis for pollution prevention.**

Continued work on developing analytical processes should be done so that real-time monitoring and control may be applied before

the creation of potentially harmful compounds.

**12. chemical is inherently safer to prevent accidents.**

When designing a process, its steps and stages, as well as the forms those stages and stages take, should be chosen to minimize the likelihood of undesirable outcomes such as explosions, fires, and unintended releases to the greatest extent practically possible.

**Benefits of Environmental Chemistry**

1. Some applications of environmental chemistry are mentioned below.
2. In environmental chemistry, one must do an in-depth study on the possible risks caused by each chemical to come to a solution that will prevent the environment from being harmed.
3. It plays a role in researching new products and the consequences of such effects on the environment in which they are placed.
4. The approach to safeguarding groundwater contaminated by soil, dust, and waste particles use environmental chemistry as a protection strategy.
5. The processes of sedimentation, bacteriology and radiation all play an essential role in protecting surface water from various pollutants.
6. The application of environmental chemistry can preserve the ecological integrity of the soil practices, such as using ecotoxicological and chemical indicators.
7. Impervious surfaces in urban areas, such as parking lots, roofs, and roadways, are prone to accumulating undesirable pollutants, such as motor oil, gasoline, nutrients and sediment (soil), hydrocarbon compounds, and metals. These pollutants can be removed from impervious surfaces by washing them regularly. Other instances include the following:
8. The fields of waste management and cleaner production are two areas in which environmental chemistry is employed.<sup>11</sup>

**The Obstacles Facing Green Technology -**

**Adoption** In most cases, the cost of green technology is higher than the cost of the technology that it seeks to supplant. This is because green technology considers the external environmental costs in many traditional production processes. This is one of the reasons why green technology is advantageous.<sup>12</sup>This is an entirely cutting-edge piece of technology, and many aspects are shrouded in mystery. Compared

to other technologies already in use, the expense of this one is significantly higher because it requires continuous improvement and extensive training. The anticipated earnings associated with this technique are also related to other aspects, such as the availability of supporting infrastructure, technological preparedness, human resource capabilities, and geographical characteristics.<sup>3</sup> A range of obstacles might make the diffusion and application of these technologies more difficult. Some of these issues may be institutional, such as the lack of an acceptable regulatory framework, while others may be tech technoparanoia, political, cultural, or legal. For example, the absence of an appropriate regulatory framework is one such institutional issue. One example of this would be the absence of an efficient regulatory structure<sup>13</sup>. In addition, from the perspective of the company, the obstacles to the adoption of environmentally friendly technology include the high costs associated with its implementation, the lack of data and information, the lack of alternative chemical or raw material inputs, the uncertainty regarding the impacts on performance, the lack of human resources, and finally, a lack of skilled personnel. In addition, overcoming these challenges is a process that is not only challenging but also time-consuming. Finding and removing the obstacles

that prevent developing countries from using environmentally friendly technology is essential in fostering sustainable development in these countries.<sup>14</sup> A range of other barriers might make the diffusion and application of these technologies more difficult. Some of these issues may be institutional, such as the lack of an acceptable regulatory framework, while others may be tech technoparanoia, political, cultural, or legal. For example, the absence of an appropriate regulatory framework is one such institutional issue. One example of this would be the absence of an efficient regulatory structure. In addition, from the perspective of the company, the obstacles to the adoption of environmentally friendly technology include the high costs associated with its implementation, the lack of data and information, the lack of alternative chemical or raw material inputs, the uncertainty regarding the impacts on performance, the lack of human resources, and finally, a lack of skilled personnel. In addition, overcoming these challenges is a process that is not only challenging but also time-consuming. Finding and removing the obstacles that prevent developing countries from using environmentally friendly technology is essential in fostering sustainable development in these countries.<sup>15</sup>

**Advantages and disadvantages of green chemistry technology<sup>16</sup>**

**Table no 1 Illustrates about advantages and disadvantages of green chemistry technology.**

Sr.no	Advantage	Disadvantage
1	Does not discharge anything that might be harmful into the atmosphere.	Initial Costs
2	Make specific regions more economically profitable.	Inadequate Savings
3	Need less upkeep and maintenance	Competition
4	Because it is renewable, there will never be a shortage of it.	Marginal Impact

Figure 3

**Benefits of GREEN Chemistry**

**Human health:**

1. Cleaner air releases potentially harmful compounds into the atmosphere, resulting in less lung damage.
2. Cleaner water: a reduction in the discharge of potentially harmful chemical wastes into the water, which results in cleaner water for consumption and recreational use.
3. Increased protection for personnel in the chemical sector; less exposure to hazardous substances; reduced need for protective gear;

reduced risk of injury in the event of an accident (e.g., fires or explosions)

4. Products that are available to the general public that is safer in every way, including the following: new, safer products will be made available for purchase; certain products, such as pharmaceuticals, will be manufactured using less waste; certain products, such as pesticides and cleaning products, will be substituted for products that are safer but have fewer benefits.



- Food that is safer as a result of the elimination of persistent toxic chemicals that can infiltrate the food chain and the use of safer pesticides that are hazardous only to certain types of pests and break down quickly after use
- Reduced contact with potentially hazardous substances such as hormone-disrupting compounds<sup>17</sup>

**Environment:**

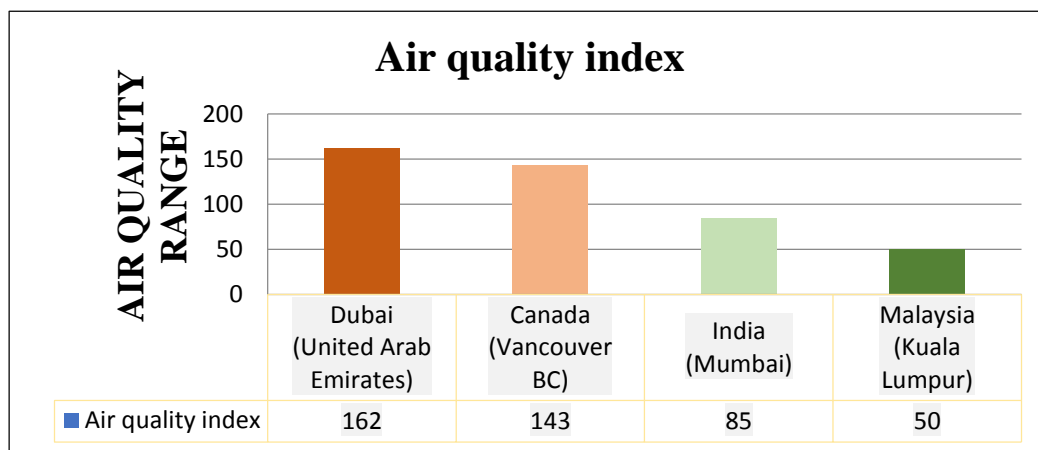
- The release of many chemicals into the environment can occur in one of three ways: intentionally, as is the case with pesticides; unintentionally, as is the case with emissions during manufacture; or by disposal. Green

chemicals are those that are either broken down into harmless by-products or are recovered for further use.

- The presence of toxic compounds in the environment has a mitigated negative impact on living organisms, including plants and animals.
- A lower risk of ozone depletion, global warming, and the creation of smog
- Less chemical interference in the world's ecosystems
- a decrease in the utilization of landfills, particularly land that contains hazardous waste<sup>18</sup>

**Air quality index and pollution according to different countries**

Figure 4 • <https://www.iqair.com/in-en/world-air-quality-ranking>



**Economy and business**

- Higher product yields from chemical reactions while using less starting material to produce the same quantity of end product.
- Fewer stages in the synthetic process frequently result in speedier production of goods, increases in plant capacity, and savings in energy and water.
- Material was reduced, eliminating the need for expensive cleanup, the disposal of hazardous waste, and end-of-pipe treatments.
- Permit the use of waste products in place of bought feedstocks
- Enhanced functionality, resulting in reduced product consumption while maintaining the same level of performance.
- decreased use of petroleum products, hence reducing the rate at which these resources are depleted and mitigating the risks and price swings associated with these resources
- a reduction in the size or footprint of the manufacturing facility as a result of greater throughput

- Earning and displaying a label indicating that the product is safer for consumers led to an increase in sales (e.g., Safer Choice labeling)
- Enhanced competitiveness of both chemical makers and the companies that buy their products

**Conclusion**

As sentient beings, we must do all we can to preserve the natural world. If individuals adhere to specific ideas, it will help improve the overall quality of our environment as well as the quality of human existence. Always have a compost pan in your yard or another area in your home and utilize it to make manure for your plants. This will help you decrease the fertilizers you use on your plants. Instead of asking for plastic carry bags, you might use a cloth bag. Keep in mind that we do not have solutions for every pro, whether you are shopping for groceries, veggies, or any other item; nevertheless, we can focus on topics that we feel strongly about and c to do something about. Environmental chemistry has much weight in the natural world. The heat is trapped by the gases mentioned before, which



leads to global warming. It is of the utmost importance to be aware of the fact that the same gases that are responsible for the existence of life on Earth are also the ones that are responsible for capturing the necessary quantity of solar energy for its maintenance. Reduce, reuse, and recycle are the three fundamentals of green chemistry that will reduce the amount of contaminant in the surrounding environment and marine trash. The most challenging obstacle to overcome to control environmental pollution effectively and, by extension, ocean pollution at its origin is incorporating environmentally friendly chemistry into the industrial laboratory. Although there have been several practical initiatives, much work still needs to be done. Educating and training a new generation of chemists to attain this goal is possible. Green chemistry needs to be taught to students of all grade levels as part of the required coursework to provide everyone with the knowledge necessary to lead a less harmful lifestyle in the natural world.

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## **Role of primary health centres in sustaining health of rural people**

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### **Abstract:**

Primary health care plays important role improving health of the people and providing basic health services in day to day life. Health care is responsible for the overall health and well being of the communities, families, patients and people. When individuals are suffering from a health problem, illness and diseases, they get medical treatment. In urban areas, these facilities are well developed but in rural area, people are still under these facilities because of unaware about medical facilities. In this way the present study focused on role of the primary health centres in improving health of rural people and examines the initiatives of the government in sustaining rural health in Chikkaballapur District. In this process, the present study is based on qualitative and quantitative in nature and the primary collected from rural people and secondary data collected from primary health cares centres. In this study, Total 120 respondents were selected from six taluks of Chikkaballapur district by using simple random method. In this background, the study explains role of primary health centres in sustain health of rural people.

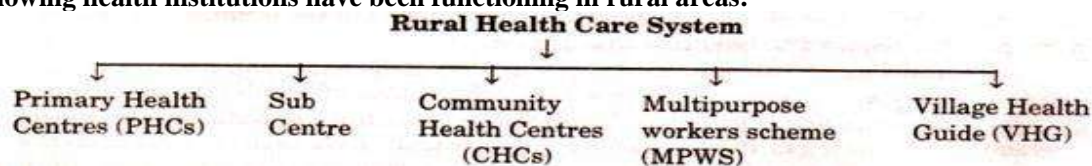
**Keywords:** Primary health care, Initiatives of the government and Sustainable health.

### **Introduction**

Health is a fundamental human right and contributing aggregate level of economic growth. It is an essential for every human being for better quality of life. It helps directly and indirectly to the sustainable development. Every country invest more on health sector but most of the under developed country spend less with low human development because of this reason health sector still remain under developed. In this process the primary health cares established and maintained by the State governments under the Minimum Needs Programme in India. According National rural health mission (NLHM) every PHC includes 14 paramedical and other staff. It acts as a referral unit for 6 Sub Centres and has 4-6 beds for patients. The activities of PHC involve curative, preventive, promotive and family

welfare services. At the national level, there are 24855 PHCs functioning (i.e 16613 PHCs and 8242 Health and Wellness Centres-HWCs) in rural areas as on 31st March 2019. There is an up gradation of 8242 of PHCs as HWCs. The significant improvement in the PHCs it observed in the States of Andhra Pradesh (1145), Uttar Pradesh (946), Odisha (827), Gujarat (772), Tamil Nadu (716) and Telangana (636). Significant increases in the number of PHCs have been seen in the States of Karnataka (446), Gujarat (406), Rajasthan (369), Assam (336), Jammu & Kashmir (288) and Chhattisgarh (275). Percentage of PHCs functioning has increased significantly from 69% in 2005 to 94.5% in 2019. After independence health services have been provided in rural areas.

**The following health institutions have been functioning in rural areas:**



#### **1. Primary health centres (PHCs):**

Primary Health Centre is the basic unit providing health services to rural masses. The scheme was launched during First Five Year Plan. Every block in the country in having a PHC. It has 2 medical officers, pharmacist, staff nurse, laboratory technician and other staff.

#### **2. Sub centres:**

Sub centres have been established in rural areas especially to provide family planning service to the

people. These are run by trained Auxiliary nurse (ANM) and a multipurpose health worker.

#### **3. Community health centres (CHC):**

The Community Health Centres are set up to provide specialised health services for one lakh population. It is a 30 bed hospital with specialist doctors in medicine, surgery, women and children diseases. X-Ray, ECG and Laboratory facilities etc. are also available here.

**4. Multi purpose workers (MPWs) scheme:**

The workers engaged in the control and eradication of communicable diseases are made multipurpose health workers through a special training. The MPWs are basic level workers and are the backbone of health services. They provide promotive, preventive and family welfare services to village people.

**2. Review of the Literature**

**Tavseef and Manvendra (2022)** discussed the health care system in sustainable development in India. They focused on current health care structures and procedures in India and provide solutions for making healthcare truly universal and consistent with sustainable development. Also find out infant mortality rate, from 125 per 1,000 live births in 1990- 91 to 50 per 1,000 live births in 2015-16, and the maternal death rate reduced from 212 per 100000 live births in 2007-09 to 167 in 2013. Moreover, they conclude that health is a crucial component in inclusive growth.

**Wafa Aftab et. al (2020)** measures the health impact on non-health sector work and analyse the high-quality monitoring approaches, data for accountability and coordinated achievement of goals. Also suggests that HHSDDG implementation is at various stages in different countries helps to multispectral work, capacity building, financial sustainability and data availability. Moreover, sustainable development and health is predominantly normative and highlights the fundamental role of effective governance and appropriate health institutions.

**3. Statement of the Research Problem**

Many of the studies already conducted on primary health care centers at the macro level and no one study have been made to find out the role of Primary

**5.1. Result and discussion**

**Table no:1 – profile of the respondents in Chikkaballapur district**

Variable	Classification	Respondents	percentage
age	Up to 10-20 years	29	24.16%
	20-40years	41	34.17%
	40-60 years	27	22.50%
	60 and above	23	19.17%
	<b>Total</b>	<b>120</b>	<b>100%</b>
Gender	Male	54	45.00%
	Female	66	55.00%
	<b>Total</b>	<b>120</b>	<b>100%</b>
Education	Illiterate	12	10.00%
	Primary	17	14.16%
	Secondary	26	21.16%
	PUC	18	15.00%
	Graduation	25	20.83%
	Post graduation	23	19.16%
	<b>Total</b>	<b>120</b>	<b>100%</b>

Health Care in improving the health of rural people in Chikkaballapur District at the micro-level. To improve facilities of primary health care services, there must be needed maximum support of central and state government to provide medical facilities in the rural area. The high quality in health care helps to prevent diseases and improve the quality of life. Also effective implementation of health care services helps to improve health and well-being of the people. In these conditions, the present study has undertaken to examine the role of primary health centres in sustain health of rural people.

**4. Objectives of the study**

To study the primary health centres in improving health of rural people.

To examine the initiatives of the government in sustaining rural health.

To find out the health care services of PHCs in Chikkaballapur district.

**5.The methodology of the Study**

The present study based on the qualitative and quantitative in the nature. The primary data have collected through simple random sampling method. In this process total, 120 samples were selected from six taluks of Chikkaballapur district from each taluk 20 samples were selected. The respondents are classified as public health care receivers, PHCs staffs and beneficiaries of rural people and Secondary data have collected through the annual report of National Rural Health Mission (NRHM), Chikkaballapur at a glance, Report of Health Department, census report, etc are collected regarding working of the PHCs, Health policy and programs of the central and state government and other services of the primary health care in improving rural health in Chikkaballapur district.

<b>Employment</b>	Daily wage worker	46	38.33%
	Agricultural laboures	54	45%
	Unorganized sector workers	20	16.66%
<b>Total</b>		<b>120</b>	<b>100%</b>

**Source: primary data from respondents**

Above the table:1 represents the profile of the respondents in the Chikkaballapur district. 34.17% of the respondent's age between 20 to 40 years and 19.17% of the people age between above 60 years. Under that 55% of the female and 45% of the male was answered. 10% of the people are illiterate, 14.16% and 21.16% of the people are

Primary/Secondary educators, 20.83% of the people are Under Graduates, and 19.16% Post Graduates. 38.33% of the samples are daily wage workers, 45% of the samples are Agricultural laboures and 16.66% are working under unorganized sector workers in the Chikkaballapur district in Karnataka.

**Table no:2- Health status of rural people in Chikkaballapur district**

Variable	Classification	Respondents	Percentage
<b>Distance from home to hospitals</b>	0-5km	56	46.67 %
	5-10km	48	40.00 %
	10km and above	16	13.33 %
<b>Total</b>		<b>120</b>	<b>100 %</b>
<b>Expenditure on health insurance</b>	Monthly	26	21.66 %
	Half-yearly	34	28.34 %
	Yearly	22	18.33 %
	None of the above	38	31.67 %
<b>Total</b>		<b>120</b>	<b>100 %</b>
<b>Preference of the hospitals</b>	Public	61	50.84 %
	Private	33	27.50 %
	Traditional medicine	17	14.16 %
	Other	09	7.50 %
<b>Total</b>		<b>120</b>	<b>100 %</b>
<b>Monthly Expenditure on health</b>	500-1000	29	24.16 %
	1000-2000	21	17.50 %
	2000-3000	18	15.00 %
	3000-4000	13	10.84 %
	4000 and above	39	04.16 %
<b>Total</b>		<b>120</b>	<b>100 %</b>

**Source: primary data from respondents**

Above table:2 represents the health status rural people of the Chikkaballapur district. The distance from home to hospitals in the district reveals that 46.67% of the people are between 0- 5 km distances, 40% of the people are between 5-10 km distances, 13.33% of the people are between above 10 km distances. Also, 21.66% of the respondents are monthly expenditure on health insurance and 28.34 % and 18.33 % of the respondents are half-yearly and yearly expenditure on health insurance and 31.67 % are the non-health insurance respondents.

Also its shows the people preferences of the hospitals under that 50.84 % are preferred public health cares and 27.50 % are preferred private health cares and 14.16 % are preferred Traditional medicine also 7.50 % are prefers others health services. The monthly expenditure on health explained that 24.16 % of the people are expenditure on health between 500- 1000 and 17.50 % of the people are expenditure between 1000-2000 and 15% of the people are expenditure above 2000-3,000 on health.

**Table no:3- Participation of the people in health camps in Chikkaballapur district**

Camps	Respondents	Percentage
Blood Donate camp	23	19.16 %
Eye camp	19	15.83 %



Maternal camp	17	14.16 %
Immunisation camp	15	12.50 %
Polio camp	19	15.83 %
Aids awareness camp	10	8.33 %
Malaria camp	17	14.16 %
<b>Total</b>	<b>120</b>	<b>100 %</b>
<b>Source: primary data from respondents</b>		

Above table:3 represents the participation of the people in various health camps conducted by the primary health cares. Under that 19.16% of the sample are attended the Blood Donate camp, 15.83% are attended the Eye camp, 14.16% are attended the Maternal camp, 12.50% are attended

the Immunisation camp, 15.83% are attended the Polio camp, 14.16% are attended the Malaria camp and 14.16% are said that they have attended the Aids awareness camp in different primary health cares in chikkaballapur district.

**Table no: 4- Government initiatives for the improving the sustainable health**

Schemes	Fully aware	Aware	Neutral	unaware	Total (%)
Yashashwini scheme	67(55.84%)	33(27.50%)	13(10.84%)	07(5.84%)	120(100%)
Sukanyasamriddi scheme	71(59.17%)	48(40.00%)	01(0.83%)	00(00%)	120(100%)
Ayusman scheme	59(49.17%)	55(45.83%)	04(3.33%)	02(1.67%)	120(100%)
Jyothi sanjeevini scheme	64(53.33%)	51(42.50%)	03(2.50%)	02(1.67%)	120(100%)
ESI Scheme	28(23.33%)	42(35.00%)	30(25.00%)	20(16.67%)	120(100%)
Mission Indra Dhanush	60(50.00%)	40(33.33%)	12(10.00%)	08(6.66%)	120(100%)
Natinal Programme for Family Planning	81(67.50%)	32(26.67%)	05(4.16%)	02(1.6%)	120(100%)
Aam Admi Bhima Yojana	75(62.50%)	35(29.16%)	07(5.84%)	03(2.50%)	120(100%)
Pradhan Mantri Suraksha Yojana	78(65.00%)	37(30.84%)	04(3.33%)	01(0.84%)	120(100%)

**Source: primary data from respondents**

Above table:4 represents the government initiatives for the improving the sustainable health. The central and state government introduced various programs such as Aam Admi Bhima Yojana, Ayusman scheme, ESI Scheme, Jyothi sanjeevini scheme, National Programme for Family Planning, Mission Indra Dhanush, Pradhan Mantri Suraksha Yojana, Sukanyasamriddi scheme and Yashashwini scheme.

**5.2-Central and state government schemes for improving health conditions as follows:**

- 1. Aam Aadmi Bima Yojana (AABY):** This is one of the latest National Health Insurance schemes having been established in the year 2007, October. It basically covers individuals from the age of 18 years-59 years. AABY insurance scheme is tailored for all those citizens living in the upcountry and in the rural areas. It also covers the landless citizens who are tenants living both in urban and rural areas.
- 2. Ayushman Bharat Yojana (2018):** Ayushman Bharat is a universal health insurance scheme of the Ministry of Health and Family Welfare, Government of India. The scheme offers a health cover of Rs 5 Lakh. In this scheme, it covers medicines, diagnostic

expenses, medical treatment, and pre-hospitalization costs. The poorest families of India can benefit from this healthcare scheme.

- 3. Employment State Insurance Scheme (1993):** This insurance scheme provided medical care facility to the workers and their families as well. This scheme is not applicable to each and every person or company. It is only applicable to all permanent factories employing more than ten employees. Recently, the scheme has been extended to various businesses including shops, restaurants, road and motor transports.
- 4. Pradhan Mantri Suraksha Bima Yojana (2015):** this is a accidental insurance for the people of India. People in the age group of 18 years to 70 years who have an account in a bank can avail benefit from this scheme. This policy provides an annual cover of Rs 2 lakh for total disability and death cover and Rs 1 lakh for partial disability. The policy premium gets automatically debited from the policyholder's bank account.
- 5. Mission Indradhanush yojana (2014):** It aims to immunise all children under the age of 2

years, as well as all pregnant women, against seven vaccine preventable diseases (like 7 colors of a rainbow/indradhanush). The diseases being targeted are diphtheria, whooping cough, tetanus, poliomyelitis, tuberculosis, measles, meningitis and Hepatitis B. The Mission Indradhanush aims to cover all those children who are either unvaccinated, or are partially vaccinated against vaccine preventable diseases.

6. **National Programme for Family planning (1952):** India was the first country in the world to have launched a National Programme for Family Planning in 1952. This scheme is not only achieve population stabilization goals but also promote reproductive health and reduce maternal, infant & child mortality and morbidity. Under the programme public health sector provides various family planning services at various levels of health system.

7. **Yeshasvini Health Insurance Scheme (2002):** The Karnataka State Government introduced Yeshasvini Health Insurance Scheme in June 1, 2003. Under the leadership of the former chief minister of S.M. Krishna. This scheme is a community based medical coverage scheme that aims to help workers belongs to middle class and low income groups in the informal sector in Karnataka. This scheme also useful for BPL card holders and farmers and who are associated with a co-operative society.

#### **Features and Benefits of Government Health Insurance Schemes:**

- Employee Health Scheme provides health cover to the state.
- Government health insurance schemes are offered at a low price.
- BPL families and low income groups can get more benefits from health programs.
- The policy ensures coverage for the rural poor people.
- The policy includes treatment in both private and government hospitals for better healthcare.
- Public health promotes the welfare of the entire population, ensures its security and protects it from the spread of infectious disease and environmental hazards.
- Health scheme helps to ensure access to safe and quality care to benefit the population.

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**Unique connection with Wild fragrant flora of Sendhwa Dist. Barwani (M.P.)**

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**Abstract**

Sendhwa is smallest tribal town of Barwani district & situated in the south west corner of Madhya Pradesh. The prevailing take a look at turned into aimed to determining the biodiversity of untamed aromatic and medicinal species of Sendhwa Dist. Barwani Madhya Pradesh, India. It has bestowed with specific range of ethnic tradition, herbal assets and bio-edaphic and topographical capabilities. The information become obtained by means of extensive surveys from 2019–2020. This area are the representative of climax flowers and exhibit the range of species including trees, climbers, epiphyte and different coloration loving herbs. The facts from the number one and secondary resources resulted within the documentation of 22 species belonging to 17 genera underneath 11 families. Arboreal species richness recorded till date within the observe location debts for 0.18 % of that of the entire Sendhwa town. There are 22 wild and naturalized species inside the 18 square km. Lamiaceae and Asteraceae had been the dominant families.

**Keyword:** Sendhwa, Wild Aromatic, biodiversity, Dry deciduous forest.

**Introduction**

The potentialities of exploring biodiversity for brand new drugs, meals, plants, insecticides, insecticides and different commercially treasured genetic and biological products and tactics are booming. Cultivation of medicinal flowers has several blessings. Firstly, this would ease the pressure on the natural populations. Cultivation of medicinal vegetation can assure a regular deliver of the desired Medicinal flowers to the person industries. Once the fine populations are diagnosed, most effective such populations may be cultivated for manufacturing of the raw cloth for industries. India is bestowed with precise variety of ethnic lifestyle, herbal sources. attributable to the wealthy plant biodiversity, especially the medicinal plant life and historic cultural history, India ranks one of the few nations inside the global that's utilizing the tremendous indigenous medicinal wealth in a massive manner considering the fact that Vedic generation (Billore 2013).

The richness of flowering flowers makes India one of the mega range nations within the international with 4 biodiversity hotspots and 3 mega facilities of endemism. India ranked 7th among 17 mega range international locations of the world and more than 17,000 species of better flora are said to India (anonymous 1993). Biodiversity keeps the ecological approaches in a balanced kingdom, which is essential for human survival (Kaur & Sharma 2014). Inside the gift paintings is designed with an goal to take a look at the floristic range and documentation of campus flowers.

**Study area:**

Sendhwa is the headquarters for Sendhwa tehsil, and, the largest town in the district. The name Sendhwa was derived after the rulers Sendhwa at period of holgars (Sisodiya & Sainkhediya 2018) Geographically Sendhwa is located 16 km from Maharashtra & Madhya Pradesh Border. Sendhwa lies between parallel of latitude 21°41'05"N and between parallel of longitudes 75°05'43"E. The area is bounded by the Rajpur tehsil to the north, Warla tehsils in south, Niwali to west, and Khargone district to east.

The eastern part of the district is covered by Satpura hill ranges and northern part of Malwa plateau, and Narmada valley. Sendhwa Fort was built in 10<sup>th</sup> Century. It is situated in middle of town. It is classical example of 4 directional Gate with Temple at Main entry gate. The land surface attains a maximum altitude of 409 m (1,342 ft) above mean sea level. Demographically Sendhwa had a population of 56,485 (census 2011). Sendhwa has an average literacy rate of 63%, higher than the national average of 59.5.

**Methodology**

The species richness facts changed into received by way of both secondary resources and extensive surveys from 2019–2020. Series of the plant species become performed in one of a kind season. All habitats of the examiner place surveyed cautiously. Plant collection accomplished through well-known method (Jain and Rao, 1977). Plant specimens have been preserved by way of dipping the complete specimens in saturated answer of Mercuric chloride and alcohol. Dry and preserved plant life is installed on herbarium sheets by adhesive glue. Identity of

flowers finished with the assist of flowers (Verma et al., 1993; Mudgal et al., 1997; Khanna et al., 2001; Duthi, 1960; Gamble, 1915; Hains, 1921-1924; cook, 1903; Hooker, 1872-1897; Naik, 1998) and different taxonomic literature.

### Result & discussion

The present look at was aimed to determining the biodiversity of untamed fragrant and medicinal species of Sendhwa Dist. Barwani Madhya Pradesh. Inside the Sendhwa, species richness facts turned into obtained by using in depth surveys from 2018–2020. This region is the representative of climax vegetation and showcases the variety of species including bushes, climbers, epiphyte and different color loving herbs. The facts from the number one and secondary resources resulted within the documentation of 22 species belonging to 17 genera beneath eleven families. Arboreal species richness recorded until date in the examiner place accounts for zero.18 % of that of the entire Sendhwa city. There are 22 wild and naturalized species in the 18 square km which gives species density of zero.18 %. Lamiaceae and Asteraceae were the dominant families respectively.

### Acknowledgement

The people of Sendhwa gram panchyat deserve thankful appreciation for sharing their information in the course of discipline paintings.

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**Table-1: Distribution of taxa**

sn	Name of the species	Family
1.	<i>Blumea lacera</i> (Burm.f.) DC	Asteraceae
2.	<i>Blumea mollis</i> D.Don Mirr.	Asteraceae
3.	<i>Cyathocline purpurea</i> (Buch.-Ham. ex Don.) Kuntze.	Asteraceae
4.	<i>Pimpinella adscendens</i> Del.	Asteraceae
5.	<i>Boswellia serrata</i> Roxb.	Burseraceae
6.	<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae
7.	<i>Acalypha fruticosa</i> For.	Euphorbiaceae
8.	<i>Anisochilus carnosus</i> (L.) Wall.	Lamiaceae
9.	<i>Anisomeles indica</i> (L.) Kuntz.	Lamiaceae
10.	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae
11.	<i>Leonotis nepetiifolia</i> (L.) R.Br.	Lamiaceae
12.	<i>Ocimum americanum</i> L.	Lamiaceae
13.	<i>Ocimum basilicum</i> L.	Lamiaceae
14.	<i>Ocimum gratissimum</i> L.	Lamiaceae
15.	<i>Ocimum tenuiflorum</i> L.	Lamiaceae
16.	<i>Syzygium aromaticum</i> L.	Myrtaceae
17.	<i>Syzygium cumini</i> (L.) Skell.	Myrtaceae
18.	<i>Cymbopogon martini</i> (Roxb.) Wat.	Poaceae
19.	<i>Murraya koenigii</i> (L.) Spem.	Rutaceae

20.	<i>Murraya paniculata (L.) Jaacq.</i>	Rutaceae
21.	<i>Vitex trifolia L.</i>	Verbenaceae
22.	<i>Curcuma aromatica Sal.</i>	Zingiberaceae



## **Arsenic Removal from Water Using Copolymer Resin**

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### **Abstract**

Copolymer resin (ANBAF) was synthesized by the condensation of 2-amino 6-nitrobenzothiazole, adipamide and formaldehyde with varying the molar ratio of reacting monomers 2:1:3 in the presence of acid catalyst. The ion-exchange properties of newly synthesized resin proved to be selective for certain metals. Water pollution due to arsenic leaching is one of the biggest problems all over the world. Ion-exchange studies of this purified copolymer resin was carried out for  $As^{3+}$  ions.

**Key words:** Resin, Copolymer, Polycondensation, Ion-exchange, Metal ion uptake, Distribution ratio

### **Introduction**

Many copolymers with reactive groups are now being synthesized, tested and used not only for the macromolecular properties but also for the properties of functional groups. Coordination polymers comprises of addition of metal ions into the polymeric backbone leading to the formation of the polymer-metal complex with enhanced chemical, mechanical and optical properties which have myriads of applications (Colon YJ et. al. 2020, Liu J et. al. 2020, Yang XG et. Al. 2019, Liu JQ et. Al. 2020, Hu Y et. Al. 2019 ).The resin has good selectivity to exchangeable adsorption of heavy metal ions indicating Cu (II), Hg (II), Pb (II) and Mg (II) under pH 5.0 and also suggested that the chelating ion-exchange resin containing 8-HQ could be used to enrich heavy metals in water and their analysis. Salih Bekir (Bekir, 2002) has prepared modified 1,4,8,11-tetraazocyclotridecane (cyclam) and with an AIBN initiator polymerized the modified cyclam. Cyclam containing polymer in bulk structure was removed from the suspension by filtration after washing and drying. The polymeric materials were used for transition metal ion adsorption and desorption of selected ions Cu (II), Ni (II), Co (II), Cd (II), and Pb (II) from aqueous media containing different amounts of these metal ions at different pH values.

The adsorption rates were high and the adsorption equilibrium was reached in about 30 min. The affinity order of the transition metal ions was Cu (II) > Ni (II) > Co (II) > Cd (II) > Pb for competitive adsorption. The chelating ion-exchange properties of 8-HQMF (Gurnule et al, 2001) were studied for  $Cu^{+2}$ ,  $Ni^{+2}$ ,  $Co^{+2}$ ,  $Zn^{+2}$ ,  $Cd^{+2}$ ,  $Fe^{+3}$  and  $Pb^{+2}$  ions. A batch equilibrium method was used to study the selectivity of metal ion uptake by measuring the distribution of a metal ion between the resin sample and solution containing the metal ion. The study was carried out at different pH ranges and in medium of different ionic strengths. The copolymer showed higher selectivity for Fe (III), Cu

(II) and Ni (II) ions than Co (II), Zn (II), Cd (II) and Pb (II) ions. A chelating terpolymer resin synthesized using an eco-friendly technique and reported its good binding capacity for  $Ba^{2+}$  and  $Zn^{2+}$  ions (Azarudeen et al, 2009). Recently, the chelating ability of the resin synthesized by a microwave irradiation technique involving salicylic acid and formaldehyde (Shah, 2008).

The present study deals with synthesis and an application of chelating and functional polymers is their capability to recover metal ions from waste solutions. Hence, the chelating ion-exchange property of the ANBAF copolymer resin was also reported for  $As^{3+}$  ions.

### **Experimental**

#### **Materials**

Adipamide (Merck, India) and 2-amino 6-nitrobenzothiazole (SRL, Mumbai) and were purified by rectified spirit, formaldehyde (37 %), metal chlorides and nitrates of selected metals (AR grade, Merck) were used as received. All the other chemicals, solvents and the indicators were analytical grades procured from Qualigens Fine Chemicals, Mumbai, India. Standardized  $Na_2EDTA$  was used as a titrant for all complexometric titrations. Double distilled water was used in all the experiments.

#### **Synthesis of ANBAF copolymer resin**

The ANBAF copolymer resin was prepared by condensing 2-amino 6-nitrobenzothiazole (0.2mol) and adipamide (0.1mol) with formaldehyde (0.3mol) in the presence of 2M HCl (200 mL) as a catalyst at 124 °C in an oil bath for 5 h with occasional shaking to ensure thorough mixing (Lingala et al, 2001, Mane et al, 2009, Tarase et al 2008). The solid resinous product obtained was removed immediately from the flask. It was washed with cold water, dried and powdered. The powder was repeatedly washed with hot water to remove unreacted monomers. Then it was extracted with diethyl ether to remove excess of p-cresol-formaldehyde copolymer which might be present

along with ANBAF copolymer resin. The purified copolymer resin was finely ground and kept in a vacuum over silica gel. The yield of the copolymer resin was found to be 80%.

**Ion-exchange properties**

The ion-exchange properties of the ANBAF copolymer resins were determined by the batch equilibrium method (*Patel K. D. et al, 1993*). The ion exchange properties of all the four resins have been studied. However, only the data for the ANBAF copolymer resin has been presented in this paper.

**Determination of metal uptake in the presence of various electrolytes and different concentration**

The copolymer sample (25 mg) was suspended in an electrolyte solution (25 mL) of known concentration. The pH of the suspension was adjusted to the required value by using either 0.1M HNO<sub>3</sub> or 0.1M NaOH. The suspension was stirred for 24 hrs at 30 °C. To this suspension 2 ml of 0.1M solution of the metal ion was added and the pH was adjusted to the required value. The mixture was again stirred at 30 °C for 24 h. The polymer was then filtered off and washed with distilled water. The filtrate and the washing were collected and then the amount of metal ion was estimated by titrating against standard EDTA (ethylene diamine tetra-acetic acid) at the same pH (experimental reading). The same titration has been carried out without polymer (blank reading). The amount of metal ion uptake of the polymer was calculated from the difference between a blank experiment without polymer and the reading in the actual experiments. The experiment was repeated in the presence of several electrolytes (*Tarase et al, 2008*). Metal ion,

$$\text{Percentage of amount of metal ion taken up at different time} = \frac{\text{Amount of metal ion adsorbed}}{\text{Amount of metal ion adsorbed at equilibrium}} \times 100$$

Percentage of metal ion adsorbed after 1 hr = (100X) / Y

Where, X is mg of metal ion adsorbed after 1 h and Y is mg of metal ion is adsorbed after 25 h, then by Using this expression, the amount of metal adsorbed by polymer after specific time intervals was calculated and expressed in terms of percentage metal ion adsorbed. This experiment was performed using 0.1M metal nitrate solution of As<sup>3+</sup>.

**Evaluation of the distribution of metal ions at different pH**

$$D = \frac{\text{Amount of metal ion on resin}}{\text{Amount of metal ion in solution}} \times \frac{\text{Volume of solution (ml)}}{\text{Weight of resin (g)}}$$

$$\text{Metal ion adsorbed (uptake) by the resin} = \left( \frac{ZX}{Y} \right) \frac{2}{0.025}$$

Where Z is the difference between actual experiment reading and blank reading, C (g) is the amount of metal ion in 2 mL 0.1M metal nitrate

its pH range, buffer used, indicator used and colour change are given in Table 3. The metal ion uptake can be determined as,

Metal ion adsorbed (uptake) by resin = (X-Y) Z mmol / g.

Where,

Z (mL) is the difference between actual experimental reading and blank reading.

X (mg) is metal ion in the 2ml 0.1M metal nitrate solution before uptake.

Y (mg) is metal ion in the 2ml 0.1M metal nitrate solution after uptake.

By using this equation the uptake of various metal ion by resin can be calculated and expressed in terms of milliequivalents per gram of the copolymer.

**Estimation of rate of metal ion uptake as function of time**

In order to estimate the time require to reach the state of equilibrium under the given experimental conditions, a series of experiments of the type described above were carried out, in which the metal ion taken up by the chelating resins was determined from time to time at 30 °C (in the presence of 25mL of 1M NaNO<sub>3</sub> solution). It was assumed that, under the given conditions, the state of equilibrium was established within 24 h (*Rahangdale et al, 2009*). The rate of metal uptake is expressed as percentage of the amount of metal ions taken up after a certain time related to that at the state of equilibrium and it can be defined by the following relationship.

The percent amount of metal ions taken up at different time is defined as.

The distribution of each one of the metal ions i.e., As<sup>3+</sup> between the polymer phase and the aqueous phase was determined at 30 °C and in the presence of 1M NaNO<sub>3</sub> solution. The experiments were carried out as described above at different pH values. The distribution ratio, D, is defined by the following relationship (*Patel et al, 2004*).

solution, and Y (g) of metal ion in 2 mL of metal nitrate solution after uptake.

## Results and discussion

### Ion-Exchange Properties

The results of the batch equilibrium study carried out with the copolymer resin sample ANBAF are presented in Fig.5 to 10. From this study with five metal ions under limited variation of experimental conditions, certain generalization may be made about the behavior of the copolymer sample.

### Effect of Electrolytes on Metal Uptake

The effect of electrolyte and its ionic strength on metal uptake by polymer was estimated  $As^{3+}$  using four different electrolytes with five different concentrations of each. We examined the influence of  $ClO_4^-$ ,  $NO_3^-$ ,  $Cl^-$  and  $SO_4^{2-}$  at various concentrations on the equilibrium of metal - resin interaction. Fig. 1 to 4 shows the amount of metal ions taken up by a given amount of copolymer depends on the nature and concentration of the electrolyte present in the solution. In the presence of perchlorate, chloride and nitrate ions, the uptake of  $As^{3+}$  ions increases with increasing concentration of the electrolyte, whereas in the presence of sulfate ions the amount of the above mentioned ions taken up by the copolymer decreases with increasing concentration of the electrolyte. This may be explained on the stability constant of the complexes with those metal ions.

### Rate of Metal Ion Uptake

The rate of metal adsorption was determined to find out the shortest period of time for which equilibrium could be carried out while operating as close to equilibrium conditions as possible. Fig. 5 shows the dependence of the rate of metal ion uptake on the nature of the metal. The rate refers to the change in the concentration of the metal ions in the aqueous solution which is in contact with the given polymer. The result show that the time taken for the uptake of the different metal ions at a given stage depends on the nature of the metal ion under given conditions. It is found that  $As^{3+}$  ions require about 3 h for the establishment of the equilibrium.

### Distribution Ratios of Metal Ion at Different pH

The effect of pH on the amount of metal ions distributed between two phases can be explained by the result given in Fig. 6. The data on the distribution ratio as a function of pH indicate that the relative amount of metal ions taken up by the ANBAF copolymer increases with increasing pH of the medium (Cotton F. A., 1972). The magnitude of increase, however, is different for different metal cations.

### Conclusion

A copolymer ANBAF based on the condensation reaction of 2-amino 6-nitrobenzothiazole and adipamide with

formaldehyde in the presence of acid catalyst was prepared. ANBAF is a selective chelating ion-exchange copolymer resin for certain metals. The copolymer resin showed a higher selectivity for  $As^{3+}$  ions. The uptake of some metal ions by the resin was carried out by the batch equilibrium technique. The uptake capacities of metal ions by the copolymer resin were pH dependent. From the results of distribution coefficients, it can be observed that  $As^{3+}$  has higher value of distribution ratio. Due to considerable difference in the uptake capacities at different pH and media of electrolyte, the rate of metal ion uptake and distribution ratios at equilibrium, it is possible to separate particular metal ions from their admixture by this technique.

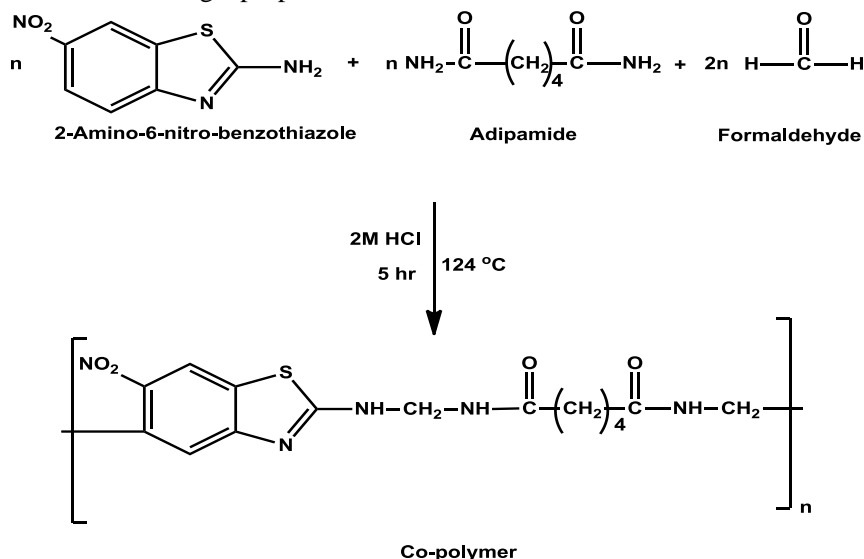
### Acknowledgement

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**Fig. 1. Reaction sequence of the synthesis of ANBAF resin**

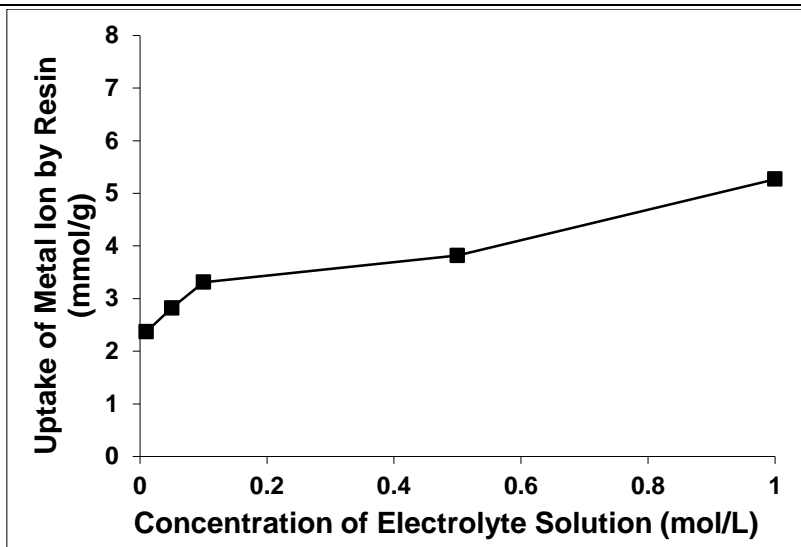


Figure 1. Uptake of several metal ions by ANBAF copolymer resin at five different concentrations of  $\text{NaNO}_3$  electrolyte solution

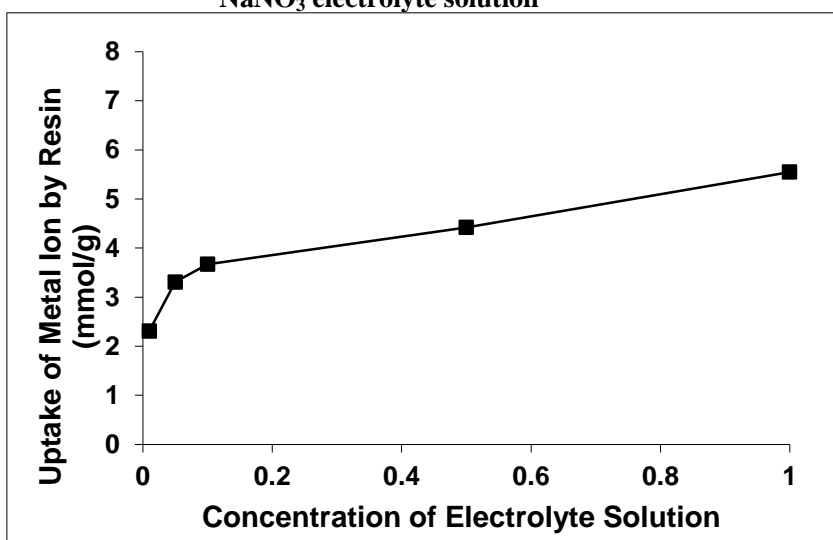


Figure 2. Uptake of several metal ions by ANBAF copolymer resin at five different concentrations of NaCl electrolyte solution

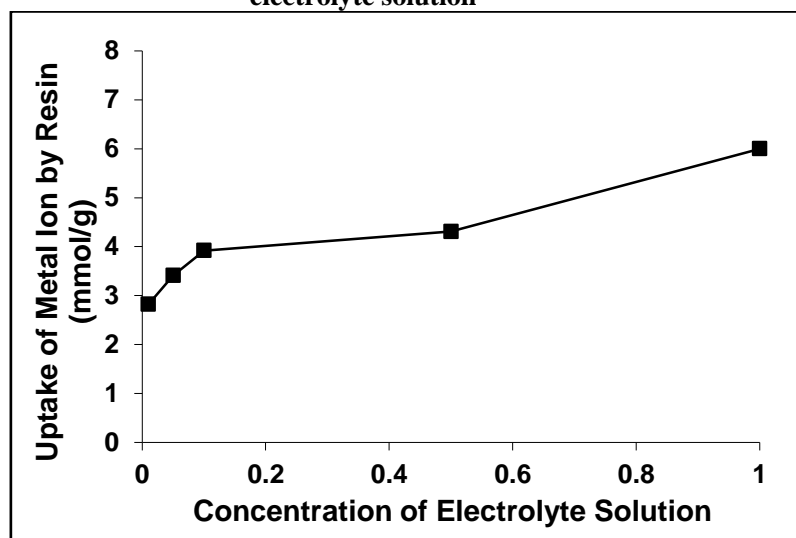


Figure 3. Uptake of several metal ions by ANBAF copolymer resin at five different concentrations of  $\text{NaClO}_4$  electrolyte solution



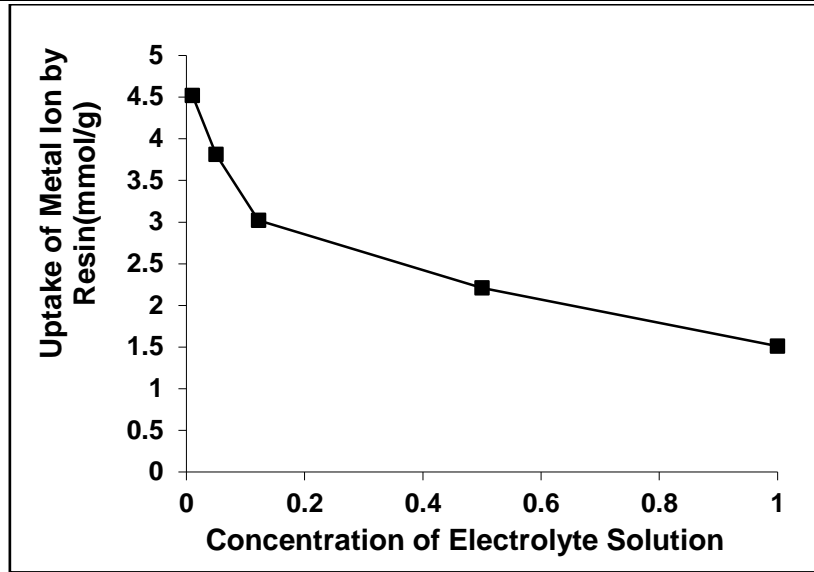


Figure 4. Uptake of several metal ions by ANBAF copolymer resin at five different concentrations of  $\text{Na}_2\text{SO}_4$  electrolyte solution

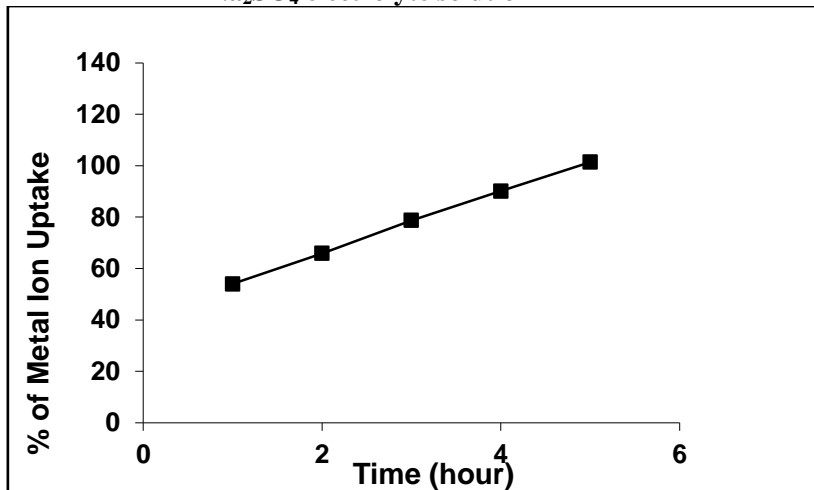


Figure 5: Comparison of the metal ion (M) uptake by ANBAF copolymer resin

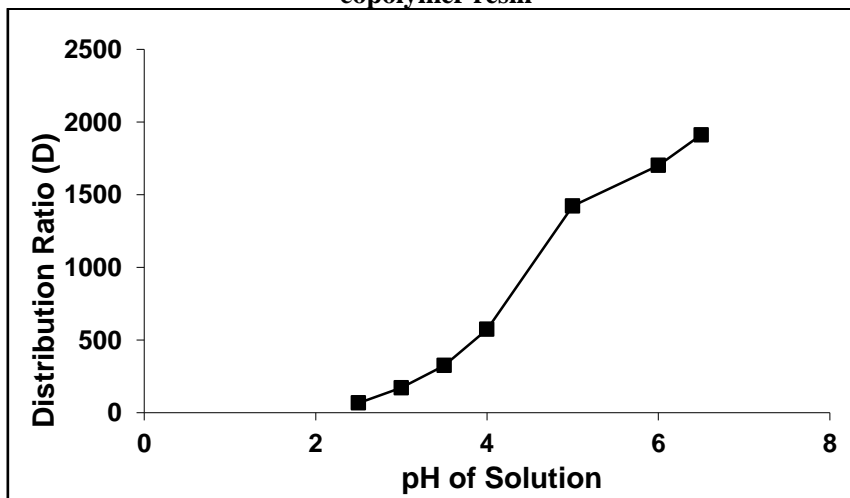


Figure 6: Distribution ratio D of various metal ions as function of the pH by ANBAF copolymer resin

## Secondary radiation flux with temperature at Udaipur, India

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### Abstract

Experimental study was conducted to detect secondary radiation flux with temperature at Udaipur (27° 43' 12.00" N, 75° 28' 48.01" E), India on dates June 18, 21, 22, 24, and 26, 2022. Data were collected for half an hour between times 18.00 IST to 19.30 IST using Scintillation detector. Analyzed data showed secondary radiation flux changes with the temperature in atmosphere of Earth

**Key Words:** Radiation flux, secondary radiation flux, temperature.

### Introduction

Coming radiation flux towards Earth has composition about 89% nuclei are protons, 10% nuclei of helium [1, 2, 3] and energy  $10^{20}$  eV or more [4]. Abundances with respect to chemical, cosmic radiation in different energy was shown by Simpson (1983) [5]. About 20 km from surface of Earth secondary particles formed and cascade of lighter particles formed [6]. Formed particles move down towards Earth surface [7, 8]. Therefore secondary shower formed in the atmosphere of Earth [9]. Electromagnetic component and other component present in this shower [10], [11], [12].

[13]. Secondary radiation flux can be detected using appropriate detector on ground [14], [15].

### Experimental Set-up and Observations

Scintillation detector [Figure 1] used to detect secondary radiation flux and is coupled with photo multiplier tube. This system is connected with 1k multi-channel analyzer has 1024 channels. Using anuspect software secondary radiation flux collected in computer as a function of time. The system was taken on the roof of Astronomy Laboratory of Department of Physics. Observation dates were June 18, 21, 22, 24 and 26, 2022 for half an hour between times 18.00 IST to 19.30 IST

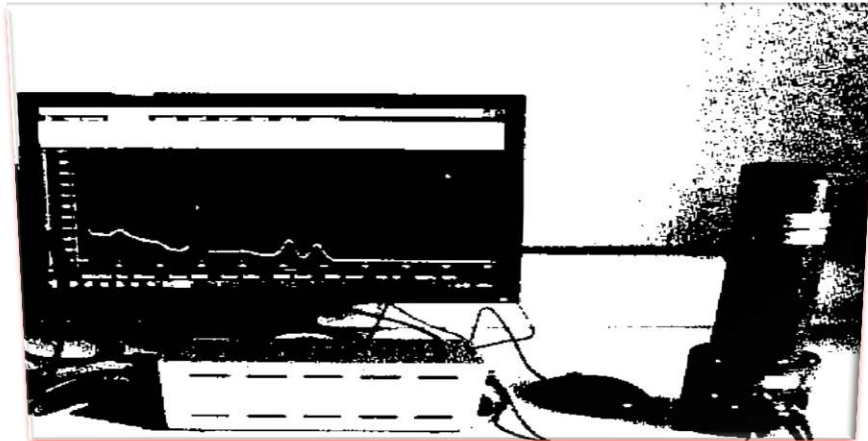


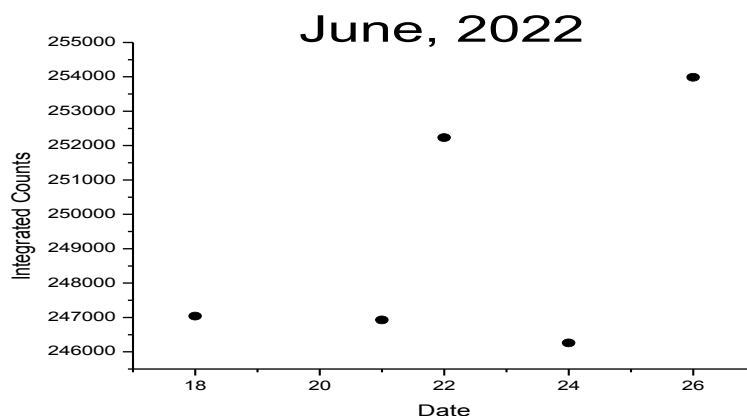
Figure 1 (Scintillation Counter System)

**Analysis and Results:** Table 1 showed the integrated counts of secondary radiation flux on various dates with temperature in the month of June, 2022

Date	Integrated Counts	Temperature
18	247037	32
21	246928	32
22	252232	32
24	246259	34
26	253985	37

Table 1 Temperature and integrated counts of secondary flux.

Using Table 1, Figure 2 made between various dates and integrated counts of secondary flux.



### Discussion

Table 1 and figure 2 showed that integrated counts of secondary radiation flux changes with the presence of temperature in the atmosphere of the Earth.

### Conclusion

This experimental study gave information that change of temperature, secondary radiation flux changes at the surface of the Earth.

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**Talent Management: Key for the Sustainable Development of an Organization**

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**Abstract**

In the era of globalization, every organization is striving to define and to meet organizational goals and objectives and strategies. Presently organizations or firms struggle to attain efficiency, effectiveness, and total quality in all its processes. This can be achieved through effective talent management practices and with the support of the HR department as they are responsible for sufficient supply of talents, their identification, development, and Retention. Talent management practices and interventions are used by companies to enhance the business performance as well as to meet career advancement and individual goals of staff. According to the latest survey most of the organizations are facing challenge of to find best fit and retain the same. Crises for high performers is the challenge for the industries today due to change paradigms of labour force. Purpose of talent management is to help organization to become high performance organization and gain competitive sustainable advantage.

**Keywords:** Sustainable Development, Talent Management, Employee Retention, Competitive Advantage.

**Introduction**

During these days talent management or people management is one of the significant topics of discussion for HR. Mainly talent management involves use of effective HR processes like attracting talent, selecting, and retaining high performing employees. Process of talent management includes series of various human resourced functions like talent acquisition, orientation, learning and development, succession planning, performance management, employee benefits, employee engagement and retaining the employees. Why talent management is so more essential because today's businesses want to achieve goal of sustainable development and talent management is the key only to reach towards organizational goals by recruiting the right fit or people with skill by justifying what is needed for the organization in upcoming years.

**What is Talent Management:**

Human Resource Management or Human Capital Management is also known as Talent management which includes investing in Attracting talent, talent acquisition and retaining the same. In talent management process high potential employees are selected for achieving organizational goals and objectives. In previous studies this term used in different ways. So, this study mainly focused on talent management role in attracting, selecting developing and retaining the same to survive in competitive era.

**Literature Review:**

McKinsey has evolved this new term talent management in the year 19998 for the first time and arguments started in the business and academia

world. According to McKinsey for becoming more successful in business leaders have to adopt talent mindset and apply it to motivate the high performers [ Mckinsey,1998]. Currently industries are more bother about acquiring, selecting and retaining talent and started investing recruitment, development and retention of high potential employees. [Box all and steenreld1999]. Now businesses use active management system to acquire, utilize, develop and nurture the talent for getting advantage to the teams and organizations [Meyer Becker and Vandenberg he,2004].As per CIPD 2006 report talent management is a process of acquiring, deploying, engaging and retaining the talented employees [CIPD,2006].People Management or talent management means use of effective human resource practices in brief it deals with gaining or experiencing competitive advantage or benefit to organization through talented employees [ Agrawal, 2006]. Focus of talent management is high potential and high performers within the organization [Sexton 2007]. According to McCauley, talent management includes work systems, processes and culture which is essential for sustaining talent in the organization [McCauley smith and Campbell 2007]. According to Blackman and Kennedy talent management is a specific way of attracting and retaining the key skills, Capabilities, and knowledge of the talented employees for future requirement (Blackman, Kennedy 2008). According to CIPD 2009 report, talent is one's ability, skill or knowledge which further can be enhanced or developed with learning and development. Talent management process includes systematic hiring, reorganization, development, engagement, retention, and

development of their employee who are fulfilling critical business role or occupy partitions in business [CIPD 2009]. Talent is an attribute of individual who have talent which is going to make effect on organizational performance by their contribution [Ford et.all,2010] A study conducted by Mitra, Gupta and Shaw, across 2014 organizations observed that competency based pay is going to lead to enhancing morale of staff so organization must inculcate their practices which leads to better talent management which also satisfies employees and helps in retention too [Mitra, Gupta, Shaw 2014]. According to King & Vaiman there is need of identification of talent and high performers, their contribution towards gaining future competitive advantage for organizations [King and Vaiman,2019]. Dayel states that organizations need to concentrate on Talent Management and change in traditional mindset is needed even though firm's motive is potential output and profitability (Dayel et al., 2020).

**Drivers of Talent Management /Talent Management Practices:**

**Competency Mapping:** Every business must have competencies in order to compete in a specific environment. Competencies are an organization's most important resource; Competency Mapping is one of the processes of identifying one's strength and weaknesses for improvement.

**Talent Acquisition:** For organizations to succeed in competitive era, it is necessary to invest in talent acquisition to get high quality talent. It reduces manual and paper processes, employee loyalty, productivity, and cost also.

**Learning and development:** It is necessary for growth of any organization to develop, execute and organize effective training programs based on TNI (Training Need Identification) for developing talent pipeline and future strong leaders.

**Performance and Management:** Organization must begin and later on having an effective performance management system to create a safe environment where to provide productive environment where staff will learn from their mistakes, give them continuous feedback and have annual review rating.

**Succession and Leadership development:** For any organization strong succession plan is required while formulating strategies for future leaders' development, including the number and types of positions required. Firms also must have talent pool which will be the future top leaders for successful

performance.

**Compensation and reward mechanism:** Organization compensation benefits should be attractive to retain the staff. By providing certain benefits like merit pay, bonuses, perks, incentives, travel allowance, insurance, and retirement benefits.

**Employee Engagement and Talent retention:** Employee engagement is one of the HR tool through which organization may know the employees confidence or commitment towards their duties or job. Industries with low employee engagement level may face problems of employee satisfaction towards job and they have to find out reasons behind it.

**Purpose or objectives of study**

- 1.To study the existing talent management Practices of companies and assess employee's feedback towards it.
2. To find out factors which drives Talent Management and leads to employee retention

**Hypothesis of the Study**

**H1:** The term talent management and employee retention are dependent of each other.

**H0:** The term talent management and employee retention are independent of each other.

**Research Design/Methodology**

This study focuses on Talent Management practices in MNC's and large-scale industries of Aurangabad Maharashtra. Researcher has selected 100 employees of different 10 MNC's and large-scale industries of Aurangabad, Maharashtra for the study and 92 respondents have given responses. Researcher got 92% responses for the study. Period for the study was Feb 2022 to July 2022. This is working paper so initially as a pilot study researcher targeted 100 employees and would like to add few other variables in future in the study. sampling method author used is convenient (non-Probability) sampling. Structured questionnaire was prepared for taking responses. Validity and reliability of the data verified and determined by having Cronbach alpha to find out questions were interpreted in same way by respondents to reduce research bias. 0.79 was the Cronbach alpha value.

Author has used descriptive statistics research design. Analysis of data and data interpretation was done by using software like SPSS. Author also utilized other methods like Chi-square test, Cross Tabulation, Simple Percentage Analysis as well as it is represented in tables and charts.

**Findings of the Study:** With the help of Statistical analysis researcher mentioned diverse results of the study. Outcomes and observations of the study are based on survey results

**Table 1: Demographical Variables Analysis**

Sr.No	Options	Frequency	Percentage (%)
1	Male	74	80.43
2	Female	18	19.57



3	0 to 5 (Exp)	15	16.30
4	6 to 10 (Exp)	39	42.39
5	More than 10 yrs (Exp)	38	41.30
6	Age(less than 30)	6	6.52
7	31 to 40	49	53.26
8	more than 40	37	40.22

To get responses of employees of different MNC's & large-scale industries towards TM practices, male with 80% and female employees with 20% responses received from survey. Whereas Responses categorized as per their work experience also, it was

categorized into 0 to 5 years, 6 to 10 years & more than 10 yrs. experience respondent's shows that mainly they possess to 6 to 10 years of experience. As far as age of respondents concerned, mostly respondents belong to 31 to 40 yrs. of age.

**Table 2. Organizations who identified Talent**

Sr.No	Options	Frequency	Percentage(%)
1	No	39	42.39
2	Yes	53	57.61
	Total	92	100.00

Pictorial presentation shows that 58 % of organization employees agreed that their organization has identified talent while 42 % are saying that their organization has not identified key

talent. This indicates that majority organizations identified individuals as key talent at their organizations but still few organizations must focus on their high performers and identify it.

**Table 3. Organizations with retaining talent as major challenge**

Sr.No	Options	Frequency	Percentage(%)
1	No	19	20.65
2	Yes	73	79.35
	Total	92	100.00

Above graph shows that 79 % of employees of different companies feel that retaining a key talent is a major challenge for them while 21% of employees

contrasted the same. This indicates that majority organizations are facing challenge of keeping key talent at their organizations.

**Table 4. Feedback towards Gap Analysis**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	0	0.00
2	Disagree	12	13.04
3	Neutral	2	2.17
4	Agree	45	48.91
5	Strongly Agree	33	35.87
	Total	92	100.00

From the above table 36 % of the employees strongly agreed that tasks jobs in their department are distributed based on specific competencies, followed by 49% of employees are also agreed on same point, while 2 % of employees are neutral about the distribution of tasks & 13 % are disagree

on distribution of tasks based on competencies. This inferred that near about 83 % of organization emphasize importance of competency mapping while 17% of organizations still has not emphasized on critical gap analysis.

**Table 5. Feedback towards Competency Mapping & Training need identification**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	0	0.00
2	Disagree	4	4.35
3	Neutral	9	9.78
4	Agree	44	47.83
5	Strongly Agree	35	38.04
	Total	92	100.00

Whether competency gap analysis was always done to identify training needs by organization, findings revealed that 38% of employees are strongly agreed,

followed by 48% of employees agreed with this statement & 10% of employees are not aware about it & only 4% of employees are disagree with it. This

inferred that majority companies are giving stress on critical gap analysis to identify training needs. With globalization organizations are undergoing rapid

changes so skills & competencies required & critical gap analysis is needed to keep them in competitive edge.

**Table 6. Feedback towards Talent Acquisition & Employer Branding**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	0	0.00
2	Disagree	11	11.96
3	Neutral	21	22.83
4	Agree	52	56.52
5	Strongly Agree	8	8.70
	Total	92	100.00

Findings for the talent acquisition role in talent retention shows that organizations implementing employer branding, 9% of employees are strongly

agree on that point followed by 57% agreed but only few 12% are disagreed followed by 23% as neutral one with the same.

**Table 7. Opinion towards Retaining and hiring talent**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	0	0.00
2	Disagree	13	14.13
3	Neutral	19	20.65
4	Agree	38	41.30
5	Strongly Agree	22	23.91
	Total	92	100.00

findings revealed that 24 % of employees are strongly agreed on that point followed by 41 % are of employees are agreed, 20 % of employees are not

aware, 14 % of employees are not agreed on that statement. So, few organizations still need to retain and hire talented/high potential employees.

**Table 8. Feedback towards Learning and Development Practices**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	2	2.17
2	Disagree	5	5.43
3	Neutral	12	13.04
4	Agree	37	40.22
5	Strongly Agree	36	39.13
	Total	92	100.00

The study sought to find out whether companies in Marathwada region identified. Findings revealed that 39% of employees are strongly agreed that company identifies employees who need training &

development before conduction of training, followed by 40% agreed with that, followed by 13% of employees are neutral, 5 % are disagreed & only 2% of employees contrasted the same.

**Table 9. Employees opinion about Performance Management**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	0	0.00
2	Disagree	2	2.17
3	Neutral	5	5.43
4	Agree	68	73.91
5	Strongly Agree	17	18.48
	Total	92	100.00

The one of the objectives of study to find out the effect of performance & career management on employee retention, to achieve the same respondents differ in their level of agreement on five-point Likert scale, respondents differ in their responses as 18%

are strongly agreed on performance review focuses on evaluation of competencies of employees, followed by 74% are agreed, 5% are neither agreed nor disagreed & only 2% are disagreed with the same.

**Table 10. Employee's opinion about Succession Planning & Leadership Development by Organization**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	2	2.17

2	Disagree	8	8.70
3	Neutral	12	13.04
4	Agree	42	45.65
5	Strongly Agree	28	30.43
	Total	92	100.00

The study sought to find out companies had established succession planning and leadership development in their organization. Findings depicted that 30% of employees are strongly agreed that their

company is well prepared for future leaders, followed by 45 % are agreed on it, 13% are neither agreed nor disagreed, 9% are disagreed and 2% are strongly disagreed or contrasted the same.

**Table 11. Employees opinion about features included in Succession plan Organization**

Sr.No	Options	Frequency	Percentage(%)
a	Skills assessment	80	86.96
b	Leadership development plan	49	53.26
c	Performance Management	77	83.70
d	Other	5	5.43

Pictorial representation shows that 87 % of employees of companies are saying that skill assessment is included in features of succession plan, followed by only 53 % employees agreed that leadership development plan is focus, 83% said that focus is on performance management in succession plan, only 13 % are of opined that companies focus on leadership development while 5 % of employees

said that company is having some other plan. So, it can be inferred that very few companies are having formal succession plan and focus on future leadership development of successors. Organizations must focus on succession planning which supports organizational stability and sustainability.

**Table 12. Employees opinion about Compensation & Rewards System of Organization**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	0	0.00
2	Disagree	6	6.52
3	Neutral	12	13.04
4	Agree	64	69.57
5	Strongly Agree	10	10.87
	Total	92	100.00

The present study also focused on how the compensation and rewards factors and administered in companies. Respondent's level of agreement shows that compensation is reflection of their value

in the organization, 10 % are strongly agreed with it, followed by 69 % are agreed, 13 % are neither agreed nor disagreed and only 6 % are disagreed with it.

**Table 13. Employee's opinion towards Pay for Performance options offered by company**

Sr.No	Options	Frequency	Percentage(%)
a	Merit increase/ grade pay	90	97.83
b	Gain sharing/profit sharing	29	31.52
c	Bonuses	44	47.83
d	Stock options	15	16.30
e	incentives	45	48.91
f	Other	0	0

From the above table it is can be concluded that companies which includes merit increase is popular feature in pay for performance, followed by bonuses/increment, incentives, gain sharing, stock

options and other features. It can be concluded that still companies must focus on stock options, gain sharing features to motivate employees for effective performance.

**Table 14. Employee Engagement /Commitment:**

Sr.No	Options	Frequency	Percentage (%)
1	Strongly Disagree	0	0
2	Disagree	0	0
3	Neutral	11	11.96
4	Agree	45	48.91
5	Strongly Agree	36	39.13

	Total	92	100.00
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One of the objectives of the study sought to establish the effects of employee engagement on talent retention to achieve this respondent were requested to indicate their level of agreement, findings revealed that majority 39% of employees

are strongly agreed that company invest in employee development, followed by 49% are agreed, 12% are neutral. So, they must focus on employee engagement surveys which lead to improve company's efficiency.

**Table 15. Organization's ways to collect employee feedback:**

Sr.No	Options	Frequency	Percentage(%)
a	Exit Interviews	84	91.30
b	Employee Engagement/feedback surveys	55	59.78
c	Employee opinion surveys	21	22.83
d	Post Training Surveys	70	76.09
e	Suggestion boxes	36	39.13
f	Other	1	1.09

Graphical representation shows organizations way to collect employee feedback among all, Exit Interviews surveys is popular, followed by employee opinion surveys, suggestion boxes & employee engagement surveys. So, it can be concluded that majority organizations or companies

are not using employee engagement surveys to check employee engagement level or satisfaction method to collect feedback. So, they must focus on employee engagement surveys which lead to improve company's efficiency.

**Table 16. Companies with talent management practices**

Sr.No	Options	Frequency	Percentage (%)
a	Competency Mapping /Critical Gap Analysis 8) Applicant Tracking	92	100.00
b	Talent Acquisition/Sourcing of Talent	69	75.00
c	Learning & development	92	100.00
d	Succession & Leadership Development	74	80.43
e	Performance & Career management	86	93.48
f	Compensation & Rewards Mechanism	92	100.00
g	Automated Talent management System /Software	54	58.70
h	Applicant Tracking System	68	73.91
i	HR Analytics	58	63.04
j	Digital HR	61	66.30

Pictorial representation depicts picture of companies with talent management practices in comparison with best world class talent management practices which includes Competency mapping, Learning & development is common practice in all

organizations, but companies are lagging in terms of implementation or use of automated talent management software, followed by HR Data Analytics, Digital HR, ATS and Talent Acquisition & Succession Planning.

**Table 17. Effectiveness of talent management practices in companies**

Sr.No	Options	Frequency	Percentage(%)
1	Very High	0	0.00
2	High	6	6.52
3	Moderate	58	63.04
4	Low	28	30.43
5	Very Low	0	0.00
	Total	92	100.00

Graphical presentation shows effectiveness of talent management practices in organizations, which includes companies with moderate effectiveness are 63% and companies with low effectiveness are 30%. So no company is with very high effective

implementation of talent management practices, so there is need of implementation of world best class talent management practices to survive in global competitive era.

**Table 18. Employee /Talent Retention:**

Sr.No	Options	Frequency	Percentage(%)
1	Strongly Disagree	0	0.00

2	Disagree	0	0.00
3	Neutral	9	9.78
4	Agree	51	55.43
5	Strongly Agree	32	34.78
	Total	92	100.00

Effective talent management practices whether drives employee retention responses are 35 % are strongly agreed with it, followed by 55 % are agreed, 10% neutral about the same. It can be inferred that still companies focus on employer branding as a tool to attract and retain talent, administration of compensation system and PMS to increase productivity of employees and motivate them. While attention on implementation of effective talent management practices is necessary

to drive employee retention.

**Summary of Hypotheses Testing**

H1: There is significant relationship between Talent Management and Employee Retention

H0: There is no significant relationship between Talent Management and Employee Retention

Based on the hypothesis testing, it was found that there is significant relationship between Talent Management and Employee Retention

**Table 19. Cross Tabulation Results**

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
QD5 * QC9(1)	92	100.0%	0	0.0%	92	100.0%

Source: The Author

**Table 20. Cross Tabulation Results**

QD5 * QC9(1) Crosstabulation				
Count				
		QC9(1)		Total
		Low	Moderate	
QD5	Neutral	0	2	2
	Agree	42	16	58
	Strongly Agree	29	3	32
Total		71	21	92

Source: The Author

**Table 21. Chi-Square Test Results**

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.795a	2	0.005
Likelihood Ratio	10.602	2	0.005
Linear-by-Linear Association	7.929	1	0.005
N of Valid Cases	92		

Source: The Author

From the above results it can be concluded that as Probability value is below 0.05, null hypothesis can be declined and alternative hypothesis i.e., there is significant relationship between talent management and employee retention is proved.

**Results and Discussions**

The existing practices of large scale and MNC's to manage the high potential employees are not still effective one. They are still having conventional approach of talent attraction & management also. While few industries are having



effective HR functions, and few MNCs also have effective & innovative talent management practices. It is observed and based on findings seen that the existing TM practices used by industries are not strong enough to succeed in market.

There are various important factors of talent management which effect on employee or talent retention in any organization. In MNC's and large-scale industries of Marathwada region it is seen that factor Performance Management, employee engagement and Compensation and Rewards had the major significant impact on employee retention with higher percentage based on opinion of employees and influence more & drives employees' retention as compared to other factors. While the Learning and development, succession planning & employee engagement have the higher chances of increasing employee retention. Companies are struggling to retain talent or high performers in high performance environment. So, in industries it is seen that they have to focus on employee cost, HR analytics, Succession planning, building talent pool, Performance & career management, Employee engagement, compensation and rewards mechanism & tailored down their retention strategies at individual level to gain sustainable competitive advantage.

#### **Managerial Implications**

There is limited research has been done on talent management. These research findings will help organizations, Leaders, Managers, HR, to identify high potential employees and managing the talent. Talent management software should be reinvented for mobile devices. Use of ATS, HR data analytics, Talent Management software's like IMS talent platform, Birdog talent, Performance pro, my- staffing pro, Greenhouse, Threads culture should be incorporated in companies of Marathwada region for effective implementation of world best class talent management practices.

The research relevant to all business organizations especially to large scale and MNC's as it provides insights and methodology for assessing effectiveness of talent management practices and whether it leads to employee retention. The study has identified competency mapping, talent acquisition, learning and development, performance and career management, succession and leadership development, employee engagement has been critical constituents of talent management which play major role in retaining high potential or talented employees. This research has shown that employee retention or talent retention can be ascertained or depend upon the effectiveness of talent management practices in that organization.

#### **Limitations of the study**

This paper is relied on small sample size and (nonprobability) sampling method with the sample size-hundred. So, a large no of sample size will give more results and address this constraint. The study also experienced or initial slow response from the respondents who were mainly senior executives and managerial level employees of large scale and MNC's industries in Marathwada region, but this was mitigated by having constant follow up. The study only aims at or limited to understanding of effectiveness of Talent management practices and whether it leads to employee retention only.

#### **Conclusion**

Due to globalization, there is increased competition among organizations, and it has created the window of new opportunities for the workforce. Failing to retain key talent in companies is very expensive as cost associated with high performers' departure from organization. Effective talent management strategies can facilitate development of employees, enhance service delivery, and helps companies of Marathwada region to become high performance organization. Therefore, Talent Management is the only key for sustainable development of an organization.

#### **Future Research Potential:**

The scope of the study can be further increased and enriched to include more variables under the theoretical in future studies. The sample can be bigger and broad based to increase the representativeness of the study. Further studies and research should include managers drawn from various management levels like, junior, middle, top level management. The scope of the study can be further broadened i.e., impact of talent management on organizational performance, excellence. Future researchers may study the impact of Talent management on Organization's culture, productivity etc.

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## **Ecotourism: A Way of Sustainable Tourism Development**

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### **Abstract**

Tourism is an important instrument for economic development and employment generation. Globally the long-term sustainability of tourism as a means of development is increasingly being questioned, mainly because of its adverse effects on the environment, fast depletion of natural resources and increase man-made and natural disasters etc. As such, the relevance of environment-friendly strategies for long-term sustainability of tourism initiatives need not be overemphasized. For sustainable tourism development in India ecotourism is best option. Taking into consideration this paper is emphasize on the concept of ecotourism and its importance for sustainable tourism development and to suggest To suggest strategies for tourism development in India, with due respect to the long-term sustainability.

**Keywords:** - Tourism, development, sustainability, environment, ecotourism, initiatives etc

### **Introduction**

In India Tourism is fast emerging as a sector. It helps for economic development of nations. India has certain unique features that make it especially suited for taking maximum advantage out of tourism promotion. However, India's distinctiveness in respect of attracting the world as one of the most sought after tourism destinations lies primarily in its very rich cultural heritage, presence of so many numbers of historical places including world wonders like the Taj Mahal, very vast coastal areas and hillocks that are exceedingly serene. Because of these reasons, from time immemorial India has been a land of bounty and prosperity, a nation with vibrant colours with people who are joyous and tolerant. Further, geographically also there are certain peculiarities that are favourable to India which make this country stand out distinctly from the rest of the world.

### **Objective**

1. To understand the concept of Ecotourism
2. To analyse importance of ecotourism for sustainable tourism development
3. To suggest strategies for tourism development in India, with due respect to the long-term sustainability

### **Concept Of Ecotourism**

The International Ecotourism Society defines ecotourism as "responsible travel that conserves the environment and sustains the well being of the local people." A tourism programme that is nature based, ecologically sustainable, environmentally educative and locally beneficial and generates tourist satisfaction can be called ecotourism.

### **Goals Of Eco-Tourism**

Following are main goal of Eco-Tourism

1. To keep biological variety and maintain ecological systems

2. To develop the material and non-material well being of communities
3. To make certain cultural integrity and social cohesion of communities

### **Importance Of Ecotourism**

The importance of ecotourism are as follows:

1. Its principal aim is benefiting from nature, landscape or specific species (eg. watching lions, elephants, whales etc.)
2. Ecotourism seeks to make the visitor aware of the protective, productive and regulatory functions of the wildlife.
3. It involves low visitor impact and should contribute to the well-being of local population.
4. It involves a purposeful travel to natural areas to understand the cultural and natural history of environment.
5. Ecotourism involves sharing of the responsibility by both travelers and service providers.
6. It may involve travel to any area of nature for admiring and enjoying the bio-diversity, natural landscapes and cultural and social heritage of the area.
7. It underlines the sustainability of tourism, ie. The needs of today's visitors should not be met at the expense of future generations.
8. It is a very powerful means to preserve and develop the biodiversity.

### **Facets Of Indian Ecotourism**

Ecotourism in India has got a number of facets. These include, inter alia, they are as following:

**Rural Tourism:** Indian society is characterized by massive diversity and distinction between urban lifestyle and rural lifestyle. There is incredible demand for the above kind of tourism settings – both domestic and foreign. Typically, such a setting could be a recreated village environment on the outskirts of an urban area. Some variants of the

above model are already existing naturally, like, Chokhi Dhani on the outskirts of Jaipur.

**Health Tourism:** This type of tourism involves a wide range of services ranging from the 'The Art of Living' to the most genuine and original forms of yoga, meditation and Ayurveda. This should ideally be conducted in the ambience of the ocean or river and the backdrop of lush forests. Of late, many prosperous and health conscious foreigners, mostly from the western countries, are growingly being attracted towards this type of tourism.

**Ethnic Tourism:** This is another advantage of India to showcase the local culture, customs and heritage. For instance, Surajkund Crafts Mela held at Surajkund (Haryana).

**Nature Tourism:** Large number of virgin territories available in India provides the country with good scope for nature tourism, particularly if adequate investment is made in special infrastructure, so that it appeals to the appropriate special interest groups. The presence of the great Himalayas, deserts, extensive green plains, sea, lakes etc. is the advantage to India in this regard.

**Religious Tourism:** As India is home to many religions of the world, its importance as a well-known destination for religious tourism need not be overemphasized. The most significant religious tourism destinations include, Bodh Gaya (Buddhists), Hardwar / Rishikesh, Varanasi, Ujjain etc. (Hindus), Amrithsar (Sikhs), Ajmer (Muslims) etc.

#### **Medical Tourism:**

This kind of tourism is fast picking up in India and its growth potential is huge, primarily because of the quite low cost of medical facilities in India compared with other nations. India has got a potential to attract 1 million tourists per annum which in turn would translate into USD 5 Billion to the economy.

#### **Adventure Tourism:**

Adventure tourism is often targeted at special interest groups and it involves travel to remotely inhabited places that are far removed from urban settings. Accordingly, it is often clubbed with nature tourism. Because of the very nature of adventure tourism, it is essential to develop adequate travel and transportation infrastructure to develop this kind of tourism.

**Wild Tourism:** This involves, as the name suggests travel to destinations wherein wild animals, interiors of forests etc. is involved. For instance, Thekkadi (Kerala) offers opportunities to closely observe elephants and other wild animals in their natural surroundings by traveling through boats along the river flowing across such forests.

### **Strategies For Eco-Tourism Development In India**

The following strategies are important for sustainable tourism development.

#### **Enhanced Level of Services and Utilities to the Tourists**

Better services need to be provided to the international tourists, who include inter alia, readily accessible information kiosks, information guides / bulletins, clean public utilities (sanitation, drainage etc.), hassle-free arrivals, improved hygienic conditions in tourism sites and surroundings, clean air ports and railway stations and so on.

#### **Easier Entry/Immigration Facilities are Vital**

The norms prevailing in India being rather procedural, the same need to be overhauled based on international best practices. That is to say, either a (i) Visa-Free situation, or (ii) Visa-on-Arrival situation need to be ensured, in order to attract more foreign tourism.

#### **Private Sector Participation through PPP (Public-Private Partnership) Model**

Participation of private sector appears to be essential in the Indian scenario looking into the resource constraints of the Government. The Government may play the roles of both an enabler and regulator. Firstly, as an enabler / facilitator – who provides the licenses to private agencies who fulfill the norms laid by the government and also agrees to comply with pre-fixed norms of service quality, use of natural resources, pollution control norms etc. Secondly, as a regulator the government ensures strict adherence to the pollution control, use of resources, service quality etc. by the private agencies and takes remedial / corrective action in case of defaults.

#### **Better Infrastructure and Capacity Building amongst the Local Community**

Better infrastructure facilities, like, road lines, air ports, accommodation facilities, drainage and sanitation facilities etc. need to be created with immediately for faster tourism development. India has to go a long way in this regard. Apart from infrastructure creation as above, a holistic and integrated approach would call for considerable amount of capacity building amongst the local community to manage and operate the tourism sector.

#### **ICT Initiatives in Tourism for Enhanced Productivity and Service Quality**

As in any other field, in tourism also ICT implementation can dramatically improve operational efficiency as well as improve the quality of service. Reliable information regarding prominent tourism locations, connectivity through rail, road and airlines be provided at various prime tourist



locations for the benefit of the tourists. This in turn would reduce the hardships of the tourists and hence improve the service quality.

#### **Complete Co-operation and Support from Local Populace**

Last, but not the least, full co-operation and support from the local population need to be ensured for any ecotourism initiative. For this their representation in all policy making forums is absolutely essential. Needless to mention tourism policies sans local support would not be sustainable in the long run. Moreover resentment or hostility of the localities may alienate the tourists also.

#### **Special Economic Zone (SEZ) Status and Tax Benefits for Tourism Projects**

In view of the immense potential of tourism for economic development of an emerging economy like India, conferment of SEZ status to tourism industry will prompt many investors to invest in tourism projects. Here, it must be ensured that only ecotourism projects should be encouraged.

#### **Facilities for Training Manpower and Capacity Building for Providers**

Capacity building for service providers (CBSP) is of utmost importance for long-term sustainability and enhanced competitiveness of tourism services. Similarly, there should be permanent mechanism for training and developing manpower of international quality. This in turn necessitates establishment of specialized training institutes in tourism, on the pattern of IIMs, IITs, etc.

#### **Conclusion**

In India there has been increased thrust on tourism development. Tourism has got outstanding prospects for promotion of rapid economic development. The excessive burden on the nature beyond its carrying capacity adversely affecting its ecological balance. The growing relevance of the need for adoption of ecotourism in its true letter and spirit, rather than simply from the point of view of compliance with regulatory stipulations or norms. This in turn necessitates a concerted action from the part of all concerned, for the cause of sustainable tourism development. Above all, in view of the resource constraints of the government in respect of developing countries like in India private sector participation seems imminent, thus underlining the need for a PPP approach towards a holistic, integrated and sustainable tourism development.

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## **A Study of Routing Protocol with Byzantine Robustness**

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### **Abstract**

We present a routing protocol with Byzantine robustness and detection. The protocol utilizes a topological map and a packet forwarding mechanism with fault detection. The correctness of the protocol is based on authentication of data and control packets. We also present how such authentication can be done efficiently using Message Authentication Codes.

**Keywords:** *Byzantine robustness, Topological, Fault detection, Message Authentication Codes.*

### **Introduction**

We consider the problem of routing in a highly adversarial environment where the adversary has penetrated in the routing infrastructure, i.e. controls one or more routers. Such adversary can cause network-wide disruption by, for example, injecting false or confusing routing control information into the network. Even if routers utilize a topological map rather than performing topology (or route) discovery, the adversary can cause network-wide disruption by making arbitrary routing decisions or congesting the routers by flooding the network with spurious packets. It can also modify, replay or simply discard packets coming from other routers. Our goal is to mitigate the impact of such adversary. We present a protocol that is able to route packets from source to destination, provided that a non-faulty path exists between them, where a fault can be either malicious or the outcome of an impairment in a link or router. The protocol is efficient, in that it routes over a single path, rather than several, can support links of bandwidth on the order of Gbps at low incremental cost, has low processing requirements on both data and control packets, as it relies on Message Authentication Codes for authentication, and detects faults fast, as faults are detected on a per packet basis, rather than, for example, being detected from a periodic fault detection mechanism. The protocol is directly applicable to existing infrastructure networks of moderate size on the order of 50-100 routers.

It constitutes a framework, however, that can be applied to larger networks or wireless ad hoc ones.

### **RELATED WORK**

Perlman [11] classifies network failures into two types: (i) simple and (ii) Byzantine. A simple failure is a failure whereby some node(s) and/or link(s) become simply inoperative, whereas in a Byzantine failure some node(s) and/or link(s) become faulty, yet they, and possibly the network, continue to operate, but incorrectly. We say that a routing protocol is Byzantine robust if it is capable of delivering any packet from its source to its

destination as long as a non-faulty path exists between them. We also say that a routing protocol has Byzantine detection if faulty network components can be identified. Perlman proposed two types of secure routing protocols. The first type is based on use of (a) a flooding-based routing protocol, (b) reserved buffers, and (c) digital signatures. Flooding-based routing ensures that a packet will traverse every link and hence reach its intended destination, as long as a non-faulty path exists. Reserved buffers, together with digital signatures, ensure that packets will not be dropped because of congestion of a node by excessive trace of packets (which may arise, for instance, in a DoS attack): digital signatures authenticate the source of each packet, and each buffer should be allocated to accommodate a packet from its intended source. Thus, this routing protocol of Perlman is Byzantine robust in the sense defined above. The main deficiencies of this protocol are the excessive communication overhead, due to flooding, the excessive processing overhead, due to digital signatures, and the lack of Byzantine detection.

The second type of secure routing protocol by Perlman is based on use of (a) a link state routing protocol, (b) reserved buffers, and (c) digital signatures. The reserved buffer and digital signatures serve the same purpose as in the first protocol. A basic idea of link-state routing is that each router first discovers its neighbors and the state of their incident links, and then broadcasts this information to all other routers in the network, using link state advertisement (LSA) packets. Unlike the flooding-based routing protocol, all routers now have a topological map, i.e., explicit knowledge of the network topology. If we assume that there will be no more than  $k$  failures in the network, then forwarding a packet over  $k + 1$  disjoint routes should guarantee successful delivery of the packet. Note, however, that this routing protocol is not Byzantine robust: the existence of a non-faulty path does not imply existence of  $k + 1$  disjoint routes. The disadvantage of this protocol is its processing overhead, its communication

overhead (routing each packet over several paths) and the weak Byzantine detection (identification of faulty paths).

Herzberg and Kutten [5] have proposed the combined use of acknowledgements, timeouts and fault announcements, to detect packet forwarding faults and have recognized its potential to detect Byzantine faults. They present one communication optimal and one time optimal protocol as well as protocols that trade-off communication and time optimality. The protocols are presented in an abstract model, a realization of which is our routing protocol of Section 3.

Herzberg and Kutten leave the construction of a routing protocol from their fault detection protocols an open problem (We use the term routing protocol in its broad sense, to refer to the function of delivering packets from source to destination). For example they do not consider issues such as authentication mechanisms, reserved buffers and sequence numbers. Our routing protocol could use any such fault detection protocols. However, we note that both communication and time optimal fault detection protocols have the same worst case fault detection time in our routing protocol, triggered by an adversary that is dropping destination ACKs rather than packets. Since the source cannot distinguish whether the packet or the ACK was dropped, from a routing protocol perspective the same packet may have to be retransmitted. We therefore argue that time complexity should be addressed at the routing protocol level rather than with the fault detection mechanism alone. The importance of considering the routing protocol is also argued by the fact that Herzberg and Kutten imply that fault announcements should have global significance. In our routing protocol fault announcements should only be relevant to the source as faulty sources can trigger fault announcements for non-faulty links. Bradley et al. [3] propose a protocol for detecting and avoiding routers that are dropping or misrouting packets. It is based on (a) link state routing, and (b) the “conservation of flow” principle. They assume that there is at least one good neighbor to an adversarial router that may drop packets. The conservation of flow can be tested if we let the routers count the number of bytes which enter and leave their interfaces and they announce this information periodically. When a router detects that a neighbor router is misbehaving, it invalidates the link to this router. Protection against traditional DoS in which misbehaving routers congest the network is not considered. The fault detection mechanism is triggered periodically, which results in delayed detection of faults. Awerbuch et al. [2] propose a protocol that detects packet forwarding faults and attempts to route around them. The protocol uses a

probing technique and acknowledgements not only by the destination but also by intermediate nodes. The additional overhead of several ACK’s for every packet is not justified in the paper. Protection against traditional DoS in which misbehaving routers congest the network is also not considered. An interesting feature of this protocol is that the fault detection mechanism is enabled only if throughput is sufficiently low. Marti et al. [7] propose a protocol for detecting and avoiding routers that are dropping or modifying packets in a mobile ad hoc network (MANET). It is based on the Dynamic Source Routing (DSR) protocol. In a MANET, neighbor routers share the communication medium, therefore routers pirating in promiscuous mode can verify whether their neighbor routers drop or modify packets. In [7], detection of such misbehavior is followed by an announcement of the misbehaving router. This protocol is vulnerable, among other things, to collusion and false misbehavior reports.

Other work in secure routing [4, 10, 8, 6, 13, 14] is about protecting topology (route) discovery, that although important is not the focus of this paper.

### **The Protocol**

In this section we present a routing protocol with Byzantine robustness and detection. Byzantine robustness means that the protocol routes packets from source to destination as long as a non-faulty path exists. Byzantine detection means that the protocol identifies faulty links. We first give a definition of what constitutes a faulty component and then justify this definition.

A faulty node is a node that:

<sup>2</sup> does not follow our protocol, or

<sup>2</sup> can be impersonated by another node.

The first part of the definition captures a node that is controlled by an adversary or executes buggy code. The second part of the definition is not obvious: we associate the notion of faulty with that of malicious or harmful but in this case, the behavior of the faulty node does involve any malice. The faulty node can only be impersonated if, for example, its keys have been compromised. We cannot guarantee communication with a faulty node like this.

A faulty link is a link that:

<sup>2</sup> drops packets or

<sup>2</sup> is incident to a faulty node.

The first part of the definition is about links that have an impaired underlying communication system.

Regarding the second part of the definition, we need to observe that a link that is incident to a faulty node can only route packets either from or to this node. If the faulty node has crashed, for example, then packets cannot be routed in either direction of the

link. If the faulty node is a subverted one, then we would also like to avoid routing through this node, therefore identifying its incident links as faulty is equivalent from a routing robustness perspective to identifying this node as faulty. For performance reasons we would have liked to be able to identify faulty routers. However, we cannot tell with certainty whether a link or the downstream router is faulty, although we do not preclude certain cases where this can happen. Another reason is that a faulty router can invalidate its incident link without provision from the protocol. Therefore, if a link is detected to be faulty by our protocol, then one or more of the following statements are true: <sup>2</sup> The upstream router is faulty. <sup>2</sup> The underlying physical communication system is faulty. <sup>2</sup> The downstream router is faulty. The protocol can be seen as a combination of several components, each of which is important for the protocol's correctness. These components are:

1. source routing,
2. destination acknowledgements,
3. timeouts,
4. fault announcements,
5. authentication,
6. reserved buffers,
7. sequence numbers, and
8. FIFO scheduling.

### **Overview of Operation**

When the source router receives a packet, it first appends a source route to the packet. The source should therefore be able to obtain such a route. This can be ensured if sources are manually configured with a topological map of the network or if routers perform topology discovery by "link state routing", for example. The source, then, appends a new sequence number to the packet, larger than any of the sequence numbers that this source has used before. The source also appends an authentication tag to the packet. The purpose of this tag is to authenticate the packet to every downstream router. Finally the source sets a timeout to receive either a destination ACK or a fault announcement (FA) from a downstream router, for this packet, and forwards the packet to the first such router. When an intermediate router receives a data packet, it verifies the authenticity of the packet and makes sure that its sequence number is larger than the sequence numbers that this router has previously seen from the packet's source. If any of the checks fails, then the packet is dropped. If the checks succeed, the packet is scheduled for transmission in the appropriate outgoing link. When the packet is transmitted, the router sets a timeout to receive either an ACK or an FA for this packet. When the destination receives a data packet it verifies the authenticity of the packet and makes sure that its

sequence number is larger than the sequence numbers that it has previously seen from the packet's source. If any of the checks fails, then the packet is dropped. If the checks succeed, it delivers the packet (either to a higher level protocol or an attached user) and schedules an ACK for transmission along the reverse of the path that the packet traversed. The ACK rejects the sequence number of the packet. The destination also appends an authentication tag to the ACK whose purpose is to authenticate it to all upstream routers. If the timeout at an intermediate router res, it schedules for transmission to the upstream path an FA for the first downstream link. The FA rejects the sequence number of the packet and also bears an authentication tag, for authentication to the upstream routers. When an intermediate router receives an ACK, it verifies its authenticity and that a timeout is pending for the corresponding data packet. If the ACK is not authentic or a timeout is not pending, it drops the ACK. Otherwise it cancels the timeout and further forwards the ACK. When an intermediate router receives an FA, it verifies its authenticity, it verifies that a timeout is pending for the corresponding data packet and that the link reported in the FA is the first downstream to the node the generated it. If the FA is not authentic, a timeout is not pending, or the link is not the downstream to the router reporting it, then it drops the FA. Otherwise, it cancels the timeout and further forwards the FA. If the timeout at the source ...res, then it deletes the first downstream link from its topological map. It then calculates a new path to the destination in this new map and reprocesses the "failed" packet as if it were a new packet. If the source receives an ACK, then it assumes successful delivery of the packet. If the source receives an authentic FA, then it deletes the link in the FA, provided that this is the downstream link of the router that generated the FA. It then calculates a new path to the destination in this new map and reprocesses the "failed" packet as if it were a new packet.

### **Elaborating on Individual Components**

We assume that each link has one a-priori reserved buffer for every source router in the network. This ensures that packets are never dropped because of congestion. If we allowed packets to be dropped because of lack of available buffer space, then FAs would also be pertinent to congested, rather than inherently faulty, links. Reserved buffers also protect against traditional DoS in which malicious sources flood the network with spurious packets. Reserved buffers are claimed through authentication and sequence numbers. Authentication ensures that the reserved buffer is allocated to its intended source. Monotonically increasing non-wrapping sequence numbers

safeguard against replay. In a replay attack, an intermediate router stores authentic packets and introduces them at a later time into the network in order to “take out” new packets. In our protocol, new packets have larger sequence numbers and priority is given to packets with larger sequence numbers. ACKs provide feedback on whether a packet was successfully delivered. Timeouts detect delivery failures. The combined use of source routing, ACKs, authentication, reserved buffers, FIFO scheduling, monotonically increasing non-wrapping sequence numbers and a timeout at the source only, is sufficient to identify whether a path is faulty. Timeouts at every intermediate router, in combination with FAs, provide feedback on faulty links as well. This is helpful for network management purposes and also aids the route selection process. Timeouts are set as the worst-case round trip time to the destination. With source routing the worst-case round trip time to the destination is known to the source and every intermediate router. We also note that FAs are only relevant to the source of a data packet and are not to be interpreted by intermediate routers. The reason is that faulty sources can trigger FAs for non-faulty links, by routing packets simultaneously in overlapping routes. Another requirement for the correctness of the protocol is that the packet processing speed (which mainly consists of verifying and generating authentication tags) should bind the link bandwidth. This is further discussed in the following section.

#### **Authentications**

Using digital signatures is the most straightforward authentication mechanism. The computational overhead associated with digital signatures is prohibitive however, especially since authentication is required on a per-packet basis. Our protocol employs Message Authentication Codes (MACs), which provide authentication for pairs of routers. Therefore, the source of a data or control packet has to authenticate it to every downstream router separately. The authentication tag bears a special structure to ensure that faulty routers cannot trigger FAs for non-faulty links. Specifically, given a path  $\langle s; n_1; \dots; n_i; n_{i+1}; \dots; t \rangle$  the computation of the MAC for node  $n_i$  receives as input both the message and the MACs for nodes  $n_{i+1}; \dots; t$ . MACs are therefore computed sequentially from  $t$  to  $n_1$ . If the MAC for each node received as input the message only, then if  $n_1$ , for example, tampered with the MAC of  $n_{i+1}$ , then  $n_{i+1}$  would have dropped the packet, as not authentic, and  $n_i$  would have generated an FA for link  $(n_i; n_{i+1})$ , which is not faulty. Protocol correctness requires the processing speed to bound link bandwidth; otherwise packets would be dropped

before they are authenticated. Resources would therefore be denied to those packets, and FAs would be triggered for non-faulty links. An important parameter of the protocol is, therefore, the link bandwidth that it can support. If digital signatures were employed, then at most a few Mbps could be supported (at a reasonable cost). MACs allow the protocol to support bandwidth on the order of Gbps. Packet processing mainly consists of verifying the authenticity of the packet and generating either an FA or an ACK. (FAs are generated upon reception of data packets and scheduled for transmission at a later time, if necessary.) If we restrict the maximum permissible length to 10 hops, then at most 11 MAC computations are required. Bandwidth is then calculated by setting the time to compute 11 MACs equal to the transmission time of one packet. A straightforward calculation using performance measurements for the UMAC [1] reveals that a moderate speed PC can support Gbps links. The incremental cost of adding such a processor to each (direction of a) link is small if compared to the cost of a Gbps router.

#### **Future Works**

The protocol can be extended to accommodate multiple outstanding packets per route, so as to fill the pipes and increase throughput. Performance would also improve by a multi-tier mechanism, with several classes of packets. The protocol presented in this paper will be used as the top-tier protection mechanism for high priority packets and to detect faulty links. At the lower levels it would be beneficial from a performance perspective to consider protected packets without fault detection (to reduce the overhead of generating FAs) and unprotected packets. Finally, we plan to develop a protocol to isolate faulty routers, by blocking their traffic. This task is non-trivial as the fault detection mechanism identifies faulty links rather than routers.

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## “Environment Protection and Sustainable Development Need of Hours”

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### **Abstract:**

*Environment and sustainable development are closely related with each other. Therefore, the environment protection is required for sustainable development. The Industrial pollution, degradation of forests, depletion of ozone layer, the greenhouse gases results in global warming and climate change which will have an adverse impact on environment. There is a need for conservation of biodiversity, protection of wetlands and prevention of environmental pollution, promotion of ecological balance which enables sustainable development. This present research paper examines the concept of sustainable development, causes of environment degradation, effects of environment degradation and initiatives taken towards sustainable development.*

**Key Words:** *Biodiversity, Ozone Depletion, Green Tribunal, Sustainable Development, Climate Change, Agrarian Economy, Environmental Pollution, Biological Resources.*

### **Introduction:**

Indian economy is not only the fifth largest in the world, but one of the fastest growing economy and third-largest emitter of greenhouse gases on the planet, and faces many environmental challenges and opportunities driven by rapid urbanization, electrification, and manufacturing growth. India being a growing economy has seen extensive industrialisation and development in recent past, which resulted in hostile impact on the environment. In this concern quote of Gandhiji is more perfect that is "Earth provides enough to satisfy every man's needs, but not every man's greed." Human should not exploit the natural resources for their greediness. While economic development should not be allowed to take place at the cost of ecology, hence the necessity must to preserve ecology. On the other hand environment should not hamper economic developments. Hence, importance has been given both to development and environment and the expedition is to maintain a fine balance between environment and economic development. In this concern Agenda 2030 for Sustainable Development and 17 Sustainable Development Goals (SDG's) will play an vital role for sure.

### **Objectives Of The Study:**

- 1) To Understand the concept of Sustainable Development
- 2) To study the Environmental issues.
- 3) To state the measures to protect environment and Sustainable Development.

### **Research Methodology:**

This present research is basically analytical and descriptive in nature, in this present research an attempt has been made to examine the issues related to environment, to understand the concept of sustainable development and state few measures to protect environment and Sustainable Development. This present study is completely based on secondary

data sources, i.e. reference books, research journals, magazines, research papers, reports and websites etc.

### **Concept Of Sustainable Development:**

The principle of Sustainable Development has most commonly been defined as development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. It contains two key concepts: Although the concept of 'Sustainable Development' was discussed in the Stockholm Declaration of 1972, more focus was given for Sustainable Development in 'Bruntland Commission Report (1987)' wherein an effort was made to link economic development and environment protection. In 1992, Rio Declaration on Environment and Development codified the principle of Sustainable Development. Environmental sustainability implies meeting our current needs without jeopardizing the right and the ability of future generations to meet theirs. The concept of Sustainable Development was emphasised by the United Nations Conference on Environment and Development (UNCED), which defined it as: 'Development that meets the need of the present generation without compromising the ability of the future generation to meet their own needs'. Sustainable Development tries to maintain a balance between development and the environment. The key features of sustainable development include increase in per capita income, wise use of natural resources, preserving the resources for future generations; it promotes inter-generational equity, i.e. better quality of life for present as well as future generations.

### **Meaning Environment:**

The term 'environment' refers to the natural setting in which we live, which is imparted to us by our ancestors. It incorporates the interaction between biotic (the living components, including plants,

animals, birds, etc.) and abiotic components (land, air, water, etc.) that co-exist to form this natural-setting.

**Environmental Issues In India:**

However, the developmental activities in India have resulted in pressure on its scarce natural resources, besides creating impacts on human health and well-being. Environmental or ecological issues are issues created by human activities that harm the environment or nature. Air pollution, water contamination, soil erosion, deforestation and wildlife extinction are some of the most pressing environmental concerns of India. The significance issues identified are land degradation, biodiversity loss, air pollution, management of fresh water and solid waste management. In India, factors like rapid growth of population, urbanization, industrialization, and poverty, among others are responsible for harming the environment. Some of the severe environmental issues prevalent in India are.

**Global warming & Growing Water Scarcity:**

Global warming is a gradual increase in the average temperature of the earth's lower atmosphere as a result of the increase in greenhouse gases, burning of coal and petroleum products (sources of carbon dioxide, methane, nitrous oxide, ozone); deforestation use of fossil fuels. During the past century, the atmospheric temperature has risen by 1.1°F (0.6°C) and sea level has risen several inches resulting in coastal flooding; extinction of species as ecological positions disappear; more frequent tropical storms; and an increased incidence of tropical diseases. Due to global warming, the monsoon pattern is changing and causing floods and drought.

**Ozone Depletion:**

Ozone depletion refers to the phenomenon of reductions in the amount of ozone in the stratosphere. As a result of depletion of the ozone layer, more ultraviolet (UV) radiation comes to Earth and causes damage to living organisms. UV radiation seems responsible for skin cancer in humans; it also lowers production of phytoplankton and thus affects other aquatic organisms.

**Depletion of Resources (land, air, water)**

Usage of Non-renewable resources such as fossil fuel and petroleum cause most environmental problems in both ways pollution and resource depletion. The rapid decline of groundwater especially in Punjab, Haryana, Uttar Pradesh, and Tamil Nadu. Aquifer which is accumulated over a thousand of the year is flattened in a few decades. Diversion of river water causing irreversible damage to the ecology. Topsoil built-in thousands of years are destroyed due to erosion. Biodiversity habitats

such as forests, grassland, wetlands are rapidly depleting leads to biodiversity losses.

**Pollution:**

Air pollution is a major problem in urban areas causing respiratory, illness, and death. Major sources of air pollutions are industries, automobiles, domestic use of woods, and coal. As per the Health Ministry report, indoor pollutions are causing approx 6 lakh death in India. Water and soil pollution also increasing due to domestic sewage, runoff from farms, and usage of synthetic fertilizer and pesticides.

**Genetically Modified organism:**

The new technology of gene splicing allows science to import genes from one species to another. For example, GM seeds of cotton are resistant to Bollworm as a major pest. There is little known of long terms effects of GM on the environment.

**MEASURES FOR ENVIRONMENTAL PROTECTION & SUSTAINABLE DEVELOPMENT:**

**Sustainable Development Goals (SDG's) :**

As an affirmative action towards tackling the global environmental crisis that involves global warming, climate change, and ozone layer depletion, the United Nations adopted 17 Sustainable Development Goals (SDG) and 169 targets as part of the United Nations 2030 Agenda. The 17 Sustainable Development Goals (SDGs) to transform our world are:

SDG 1: No Poverty - End poverty in all its forms, everywhere.

SDG 2: Zero Hunger - End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

SDG 3: Good Health and Well-being - Ensure healthy lives and promote well-being for all.

SDG 4: Quality Education - Ensure inclusive and equitable quality education for all.

SDG 5: Gender Equality - Achieve gender equality and empower all women and girls.

SDG 6: Clean Water and Sanitation - protecting and restoring freshwater ecosystems.

SDG 7: Affordable and Clean Energy - improving energy efficiency and increasing the use of renewables in their countries and cities

SDG 8: Decent Work and Economic Growth - decoupling economic growth from resource depletion and environmental degradation

SDG 9: Industry, Innovation and Infrastructure - Build robust infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

SDG 10: Reduced Inequality - supporting the development of low-emission, resilient, resource-efficient urban areas

SDG 11: Sustainable Cities and Communities – Make cities and human settlements inclusive, safe, resilient, and sustainable.

SDG 12: Responsible Consumption and Production - supporting the switch to resource-efficient, non-polluting production and consumption

SDG 13: Climate Action - Take urgent action to combat climate change and its impacts.

SDG 14: Life Below Water - supporting the move to sustainable blue economies and combating marine pollution in all its forms

SDG 15: Life on Land - protecting and restoring the world's wildlife and ecosystems, and promoting the sustainable use of natural resources

SDG 16: Peace and Justice Strong Institutions-enabling countries and communities to develop and enforce effective laws to combat environmental crimes

SDG 17: Partnerships to achieve the Goal - Strengthen the means of implementation and revitalize the global partnership for sustainable development.

#### **Low Carbon Cities :**

Supported four leading Chinese cities to advance low carbon initiatives, reduce GHG emissions and offer plans to peak them in advance of China's national commitment. Strengthened local leaders' ability to implement practical, proven low carbon development activities, including GHG inventory management systems and early peaking roadmaps. Online monitoring of industrial pollution through 24x7 Continuous Emission/ Effluent has been established in over 2300 industries of 17 categories. Coastal Zone Management has been made transparent and free from subjectivity. Pollution prevention and control is on top of the Ministry's agenda.

#### **Use of Non-conventional Sources of Energy:**

India, as you know, is hugely dependent on thermal and hydro power plants to meet its power needs. Both of these have adverse environmental impacts. Thermal power plants emit large quantities of carbon dioxide and also produces fly ash can cause pollution of water bodies, land and other components of the environment. Hydroelectric projects inundate forests and interfere with the natural flow of water in catchment areas and the river basins. Wind power and solar rays are good examples of conventional.

#### **LPG, Gobar Gas in Rural Areas:**

Households in rural areas generally use wood, dung cake or other biomass as fuel. This practice has several adverse implications like deforestation, reduction in green cover, wastage of cattle dung and air pollution. To rectify the situation, subsidised LPG is being provided. In addition, gobar gas plants are being provided through easy loans and subsidy. That helps to reduces household pollution and will minimised energy wastage.

#### **CNG in Urban Areas:**

In Delhi, the use of Compressed Natural Gas (CNG) as fuel in public transport system has significantly lowered air pollution and the air has become cleaner. In the last few years many other Indian cities also began to use CNG.

#### **Wind Power:**

In areas where speed of wind is usually high, wind mills can provide electricity without any adverse impact on the environment. Wind turbines move with the wind and electricity is generated. In mountainous regions a large percentage of such streams are persistent. Mini-hydel plants use the energy of such streams to generate electricity which can be used locally.

#### **Solar Power through Photovoltaic Cells:**

India is naturally endowed with a large quantity of solar energy in the form of sunlight. With the help of photovoltaic cells, solar energy can be converted into electricity. This technique is also totally free from pollution. In recent years India is taking efforts to increase the power generation through solar.

#### **Combating Climate Change :**

Climate change is a global phenomenon, which transcends national boundaries. Emissions anywhere affect people everywhere and hence it's a global issue, which requires global solution. International cooperation between all nations is required to help developing nations become green or low-carbon economies. The rich nations, such as USA (one of the most polluting nations, having the largest per capita carbon emission) must help developing nations in moving towards low-carbon economies and by way of exporting technical know-how to developing nations.. In order to address climate change, countries adopted the Paris Agreement at Conference of the Parties (COP 21) held in Paris on 12 Dec. 2015. In the agreement, all countries have agreed to work to limit the global rise in temperature rise to well below 2 degrees Celsius pre-industrial levels, and moreover, strive to lower it to 1.5 degrees Celsius. The Paris Agreement was adopted by 185 nations. In order to maintain a balance between development and environment, the principle of Sustainable Development which encompasses the 'Precautionary Principle' must be followed while envisaging a project. With new

business tools, new materials, and new approaches, it is expected to innovate methods to reduce waste.

#### **Embedding sustainability in government**

The government's 2011 vision for sustainable development set an ambition to 'mainstream' sustainable development into all aspects of government activity including policies and policymaking, procurement, and estates management. Since 2015 (when the United Nations, along with other countries, adopted the SDGs) the Indian government has launched several flagship programs that are at the heart of SDGs. Some of these include Swachh Bharat mission, Digital India, etc. Green Skill Development Programme, Namami Gange Programme, National Mission for Green India, the Eco-Sensitive Zones (ESZ) etc. these all have favourable changes reading Conservation of Natural Resources & Eco-systems. As per reports of Forest Survey of India (FSI), there has been considerable increase in forest cover in last four year. An increase of 7,843 km<sup>2</sup> of forest and tree cover is recorded as per the FSI report of 2017 compared to that of 2015. Accordingly, the forest and tree cover in the country has reached 24.39% of geographic area.

#### **Conclusion:**

The environment is at the core of each one of the Sustainable Development Goals. Economic development, which aimed at increasing the production of goods and services to meet the needs of a rising population, puts greater pressure on the environment. Sustainable development aims at promoting the kind of development that minimises environmental problems and meets the needs of the present generation without compromising the ability of the future generation to meet their own needs. Yet the solutions to pollution, climate change and biodiversity loss - critical to achieving the goals, are entirely in our hands. In order to maintain a balance between development and environment, the principle of Sustainable Development which encompasses the 'Precautionary Principle' must be followed while envisaging a project. While leaving no one behind, we must increase financing, scale up proven solutions and invest in innovation.

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**समाजाचे शाश्वत विकास**

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**गोषवारा :**

पूर्व आधुनिक काळात नैसर्गिक साधनसंपत्तीचा अमाप साठा अस्तित्वात होता. मात्र जसजशी लोकसंख्या वाढत गेली, तंत्रज्ञानाच्या प्रगती बरोबर मनुष्याच्या उपभोग घेण्याचा स्तरही उंचावत गेला आहे. मनुष्य स्वतःच्या गरजा पूर्ण करण्याच्या नादात जास्तीत जास्त कृत्रिम संसाधनाचा वापर करून नैसर्गिक पर्यावरणच दूषित करू लागला. तो हळूहळू निसर्गापासून दूर होऊ लागला. आर्थिक उद्दिष्टे, विकास साध्य करण्याच्या धावपळीत पर्यावरणाचा विनाश होत आहे, पर्यावरणाची अवनती, त्याचे पतन, पर्यावरणाचा न्हास होत चालला आहे. याकडे मानवाचे पूर्णतः दुर्लक्ष झाले आहे. भांडवलशाही अर्थव्यवस्थेत भांडवलदाराच्या लालसेपोटी, उत्पादन वाढीच्या हव्यासापुढे नैसर्गिक साधन संपत्तीचा अफाट प्रमाणात वापर वाढला आहे आणि इथूनच निसर्गाच्या अवनतीला सुरुवात झाली. ही स्थिती धोक्याची घंटा याकडे इशारा करत आहे. या धोक्याच्या स्थितीपासून पर्यावरणाचे संरक्षण करण्यासाठी शाश्वत विकासाची संकल्पना अतिशय महत्वाची ठरली आहे. मनुष्य आणि निसर्गाचे तुटलेले संबंध पुन्हा जोडणे, निसर्गातील छोट्या-छोट्या वस्तुतील गुणांची ओळख, व्यक्तिगत उत्तरदायित्व, सामाजिक उत्तरदायित्व त्याचसोबत मनुष्याला निसर्गाबरोबर जगण्याची अभिलाषा निर्माण करण्याची गरज आहे. त्यासाठीच आधुनिक जागतिक व्यवस्थेमध्ये पर्यावरणीय सुरक्षा आणि शाश्वत विकासाचा केंद्र स्थानी आला आहे. मानव जातीच्या शांततापूर्ण आणि शाश्वत, टिकाऊ व चिरकाल विकासासाठी पर्यावरण संरक्षणाची अत्यंत गरज आहे. शाश्वत विकास ही बहुआयामी व परस्परवालंबी संकल्पना आहे. या संकल्पनेत वर्तमानकाळातील पिढीबरोबरच भविष्यातील पिढीचा विचार करण्यात येते. ही संकल्पना नैसर्गिक साधनसंपत्तीचा विवेक बुध्दीने व दुरदृष्टीने वापर करण्यावर अधिक भर देते.

**बीज शब्द :** शाश्वत, पर्यावरण, साधनसंपत्ती, विकास, मानव, निसर्ग

**प्रस्तावना:**

शाश्वत विकास हा आधुनिक काळातील सर्वात महत्वाचा व जागतिक स्तरावर दखल घेतला जाणारा विषय आहे. शाश्वत विकासावर जर वेळीच उपाययोजना व अमलबजावणी केली नाही तर त्याचे गंभीर परिणाम भविष्यात येणाऱ्या पिढीला भोगावे लागतील.

शाश्वत विकासात आर्थिक विकास आणि पर्यावरण यांचा योग्य मेळ घालावा लागेल. सध्या वाढते प्रदुषण जागतिक हवामान बदल, लोकसंख्या वाढ, जागतिक तापमान वाढ व पर्यावरणाच्या न्हासामुळे शाश्वत विकासाला अत्यंत महत्व प्राप्त झाले आहे. विकास हा मानवी समाजाचा स्थायी भाव आहे. आदिम काळापासून मानवी समाज सातत्याने विकास करत आला आहे. आपण आज दिवसेंदिवस प्रत्येक क्षेत्रात विकास करत आहे. हा विकास करतांना मात्र आपण पर्यावरणाकडे दुर्लक्ष करीत आहोत. आपले आजचे वर्तन हे खचितच आपल्याला शोभनीय नाही. आपण आधुनिक काळात वावरतांना वैज्ञानिक प्रगतीच्या कितीही गप्पा मारल्या तरी आपण नाकारू शकत नाही, की ज्याला आपण प्रगती किंवा विकास म्हणत आहोत ती तर वास्तवात अधोगती आहे. एक नैसर्गिक सजीव म्हणून जीवन जगण्याचा आपला हक्क आपणच हरवून बसलो आहोत. दिवसेंदिवस आपले जगणे अधिकाधिक कृत्रिम बनत आहे. आज आपल्याला जी प्रगती शाश्वत वाटत होती ती आज अनावश्यक वाटत आहे. आम्हाला फक्त तात्पुरत्या विकासाशी मतलब आहे. दिर्घकालीन

शाश्वत विकास क्षेत्रात हवाय कुणाला अशी विचारसारणी आधुनिक काळातील मानव समाजाची (1987 मध्ये पर्यावरण व विकास यावरील जागतिक (ब्रुटलॅंड) समितीने प्रथमच शाश्वत विकास (चिरकाल) टिकणारा विकास हि संकल्पना वापरली आहे. सन १९९९-२००० मधील जागतिक विकास अहवालात यावर अधिक भर देण्यात आला. हि संकल्पना पर्यावरणाच्या विशेष संदर्भात ओळखली जाते. त्यामुळे पर्यावरण अर्थशास्त्र ही नवीन कल्पना ची निर्मिती झाली आहे. शाश्वत विकास ही संकल्पना दिर्घकालीन, भविष्याभिमुख, बळकट व फलदायी विकास असून ज्याचा संबंध चालू व भावी पिढ्यांशी जोडला जातो.) झाली आहे. आणि त्यामुळेच निसर्गामध्ये असंतुलन निर्माण होऊन पर्यावरणाचा न्हास होण्याची स्थिती निर्माण झाली आहे. म्हणूनच शाश्वत विकासाचा विचार करण्याची वेळ आता आली आहे.

**शाश्वत विकासाची संकल्पना:**

अन्न, वस्त्र, निवारा, शिक्षण व आरोग्य या मानवाच्या मूलभूत गरजा असून त्या गरजा पूर्ण करणारा विकास म्हणजे शाश्वत विकास होय. शाश्वत विकासात चैनीच्या गरजा अंतर्भूत नसून शाश्वत विकासाची संकल्पना व्यापक असून त्यात सर्व व्यक्तींच्या कल्याणाची कल्पना अभिप्रेत आहे. १९८० मध्ये इंटरनॅशनल युनियन फॉर कॉन्झर्व्हेशन ऑफ नेचरने जागतिक संवर्धन धोरण प्रकाशित केले. ज्यामध्ये जागतिक प्राधान्य म्हणून शाश्वत विकासाचा पहिला



संदर्भ समाविष्ट होता आणि शाश्वत विकास हा शब्दप्रयोग सादर केला. दोन वर्षांनंतर युनायटेड नेशन्स वर्ल्ड चार्टर फॉर नेचरने संवर्धनाची पाच तत्वे मांडली ज्याद्वारे निसर्गावर परिणाम करणाऱ्या मानवी वर्तनाचे मार्गदर्शन आणि न्याय केला जातो. १९९२ मध्ये पर्यावरण आणि विकासावरील संयुक्त राष्ट्र परिषदेने पृथ्वी चार्टर प्रकाशित केले. जे २१ व्या शतकात न्याय शाश्वत आणि शांततापूर्ण जागतिक समाजाच्या उभारणीची रूपरेषा देते. कृती योजना अजेंडा २१ ही शाश्वत विकासासाठी माहिती, एकात्मता आणि सहभाग हे प्रमुख बिल्डिंग ब्लॉक्स म्हणून ओळखले जातात. ज्यामुळे देशांना या परस्परवलंबी स्तंभाना ओळखणारा विकास साध्य करण्यात मदत होते. शिवाय अजेंडा २१ यावर भर देतो की, शाश्वत विकास साध्य करण्यासाठी निर्णय घेण्यामध्ये व्यापक लोकसहभाग ही मुलभूत पूर्व अट आहे.

**व्याख्या:**

**जागतिक पर्यावरण आणि विकास आयोग, आमचे समान भविष्य (१९८७)**

शाश्वत विकास म्हणजे भविष्यातील पिढ्यांच्या स्वतःच्या गरजा पूर्ण करण्याच्या क्षमतेशी तडजोड न करता वर्तमान पूर्ण करणारा विकास त्यात दोन मुख्य संकल्पना आहेत.

१) गरजा ही संकल्पना, विशेषतः जगातील गरिबांच्या अत्यावश्यक गरजा, ज्याला प्राधान्य दिले.

२) वर्तमान आणि भविष्यातील गरजा पूर्ण करण्याच्या पर्यावरणाच्या क्षमतेवर तंत्रज्ञान आणि

सामाजिक संस्थेच्या राज्याद्वारे लादलेल्या मर्यादांची कल्पना.

**शाश्वत विकासाची उद्दिष्टे :**

संयुक्त राष्ट्रांच्या ६० वर्षांच्या कार्यकाळात सर्वात जास्त देशांनी मान्यता दिलेला हा कार्यक्रम आहे. ही उद्दिष्टे स्वीकारतांना “Living no one behind” (कोणीच मागे राहता कामा नये) या तत्वाचा स्वीकार करण्यात आला आहे. मानवी आयुष्याच्या सर्व अंगांचा विचार करून तसेच पृथ्वीवरील विविध प्राणिमात्र आणि निसर्ग यांच्या संरक्षणासाठीचे महत्व लक्षात घेऊन या उद्दिष्टांची रचना करण्यात आली आहे.

- मानवी विकास विभागात २०३० पर्यंत गरिबी पूर्णपणे संपवणे, एकही व्यक्ती भुकेली राहणार नाही. याची व्यवस्था करणे, सर्वांना चांगले आरोग्य तसेच गुणवत्तापूर्वक आयुष्य मिळावे. सर्व प्रकारची विषमता दूर करणे, सर्वांना शुध्द पाणी व स्वच्छता मिळेल ही उद्दिष्टे सांगितली आहेत.
- पृथ्वी रक्षणासाठी हवामान बदलाचे परिमाण कमी करणे, जमिनीतील व पाण्यातील जीवनाचे संरक्षण, स्वच्छ उर्जेचा वापर वाढवणे, मानवी उपभोगामध्ये संयम आणणे या उद्दिष्टांचा समावेश करण्यात आला आहे.
- समृद्धीसाठी उर्जेचा शाश्वत पुरवठा, आर्थिक विकासाच्या जोडीला सगळ्यांना सन्मानजनक काम मिळणे, उद्योगामध्ये शाश्वत तत्वांचा वापर,

पर्यावरणाची हानी न होता समाजाला गरजेच्या पायाभूत सुविधा तयार करणे आणि शहरातील व्यवस्था शाश्वत बनवण्यासाठी विशेष लक्ष देणे या उद्दिष्टांचा समावेश केलेला आहे.

- शांतता, न्याय व त्यासाठी गरजेच्या संस्थात्मक रचना हे सुध्दा एक महत्वाचे उद्दिष्ट ठेवले आहे.
- उद्दिष्टामध्ये जागतिक भागीदारी तयार करणे हे महत्तवाचे उद्दिष्ट आहे. यामध्ये वैज्ञानिक माहितीची तंत्रज्ञानाच्या आदानप्रदानासाठी, आर्थिक मदतीच्या सतत पुरवठ्यासाठी, व्यापारामधील विकसनशील देशांचा वाटा वाढवण्यासाठी भागीदारी तयार करणे हे अपेक्षित आहे.

अश्याप्रकारे शाश्वत विकासाच्या उद्दिष्टांना मानवविकास, पृथ्वीरक्षण, समृद्धी, जागतिक शांतता आणि जागतिक भागीदारी अशा पाच प्रमुख भागात विभागण्यात आलेली आहे.

**उद्दिष्टपूर्तीची लक्ष्ये:**

कोणतेही उद्दिष्टे साध्य करण्यासाठी काही निश्चित लक्ष्य ठेवणे गरजेचे असते. प्रत्येक देशाने आपले उद्दिष्ट साध्य करण्यासाठी लक्ष्यांक ठरवायचे असतात. हे लक्ष्यांक ठरवतांना ते मोजता येतील अशा पध्दतीने ठरवायचे आहेत जेणेकरून आपण किती टक्के उद्दिष्ट साध्य केले आहेत. वरील प्रत्येक उद्दिष्टासाठी विविध प्रकारचे लक्ष्य ठेवले आहेत. अशी एकूण १६९ लक्ष्ये निश्चित करण्यात आली आहे. जसे की, गरीबी निर्मुलनाचा विचार जागतिक स्तरावर अत्यंत गरीबी पूर्णपणे संपवण्याचे लक्ष्य ठेवले आहे. तसेच आताच्या गरीब लोकांपैकी किमान ५० टक्के लोक सर्व प्रकारच्या गरीबीपासून मुक्त होतील असे लक्ष्य ठेवले आहे. भूक मिटवणे या उद्दिष्टाचा विचार करताना छोट्या शेतकऱ्यांचे उत्पादन आणि उत्पन्न दुप्पट करणे असे लक्ष्य ठेवले आहे. अश्या प्रकारे सर्व उद्दिष्टासाठी मोजता येतील अशी लक्ष्ये निश्चित केली आहेत. तसेच यासाठी विविध स्तरांवर निश्चित प्रयत्न करावे लागतात. यासाठी विविध स्तरांवर निश्चित प्रयत्न करावे लागतात यासाठी देशांची सरकारे, तेथील स्वयंसेवी संस्था, उद्योग क्षेत्र आणि सर्वसामान्य नागरिक या सगळ्यांचेच शाश्वत विकासाचे उद्दिष्टांचे लक्ष्य पूर्ण करण्यामध्ये महत्वाचे योगदान ठरेल.

**शाश्वत विकासाचे उद्दिष्टांची पूर्ती करण्यासाठी करण्यात आलेले प्रयत्न :**

- शाश्वत विकासासाठी निश्चित केलेली ध्येये साध्य करण्यासाठी केवळ उद्दिष्टपूर्तीवर भर न देता गुणवत्तेला अधिक महत्व द्यावे. समाजाच्या सर्वांगीण विकासाचे मॉडेल तयार करतांना सर्वच घटकांना विकासाची समान संधी देणारा आराखडा नियोजन अधिकाऱ्यांनी तयार करण्यात यावा.
- संयुक्त राष्ट्रसंघाने निश्चित केलेले शाश्वत विकासाचे ध्येय साध्य करण्यासाठी समाजाच्या सर्वच घटकांचा विकास होणे गरजेचे आहे. ही ध्येय साध्य झाल्यानंतर भारतीय राज्यघटनेच्या उद्देशित उल्लेखित समता, बंधुता निर्माण होण्यास मदत होईल. त्यामुळे केंद्र व राज्य शासनाच्या योजनांची

- अमलबजावणी करण्यासाठी सर्व विभागातील लोकांनी एकत्रित येऊन काम करण्याची आवश्यकता आहे. त्याशिवाय शाश्वत विकास होणार नाही.
3. दारिद्र्य निर्मुलनासारखे ध्येय गाठण्यासाठी विविध संकल्पना राबवल्या लागतील. त्यामध्ये शिक्षण हा महत्वाचा घटक आहे. तसेच इतर ध्येय साध्य करण्यासाठी प्रत्येक विभाग कार्य कश्याप्रकारे करतील याची योजना आखायला हवी. क्षेत्रीय स्तरावर देणारे अनुभव, अडचणी याविषयी कार्यशाळेत मंथन करण्यात यावे.
  4. शाश्वत विकासाची ध्येय साध्य करतांना कोरोना महामारीनंतर झालेल्या सामाजिक बदलांची नोंद घेणे आवश्यक आहे. या महामारीमुळे विचारांची दिशा आणि जगण्याचा अजेंडा बदलला असून आरोग्याचा विषय प्राधान्यक्रमावर आला आहे. कोरोनामुळे जगभरात मोठया प्रमाणात आर्थिक नुकसान तर झालेच आहे. सोबतच सामाजिक, शैक्षणिक, सांस्कृतिक हानीही झाली आहे. समाजातील ज्या घटकांच्या शाश्वत विकासाचे ध्येय निश्चित करण्यात आलेले आहे तोच वर्ग अधिकच बाधित झाला आहे.त्यांच्या विकासासाठी अधिक सूक्ष्म नियोजन आणि कृतिशीलता आवश्यक आहे.
  5. भारत हा हवामानविषयक अनेक सक्रिय उपक्रम राबवित आहे. त्यात हवामान बदलावरील राष्ट्रीय कृती योजना, जवाहरलाल नेहरू राष्ट्रीय सौर अभियान, हवामान बदल कृती योजना,हवामान बदलावरील राष्ट्रीय अनुकूलन निधी तसेच भारतात इलेक्ट्रीक वाहनांचे वापर सक्तीचे करणे गरजेचे आहे.
  6. गावाच्या शाश्वत विकासाचा विचार करतांना गावाच्या संसाधनाची जी माहिती आहे त्याचा प्रथम विचार करावा लागेल. सध्या उपलब्ध असलेली जमीन,पाणी, वने यांना सुरक्षित ठेवून त्यांची गुणवत्ता म्हणजेच जमिनीची उत्पादकता, पाण्याची उत्पादकता आणि उपलब्ध वनक्षेत्र याबाबत दक्ष राहून त्यांची पुढील पिढ्यांसाठी जपणूक करणे महत्वाचे आहे. त्यांच्या उपयोगीतेत व गुणवत्तेत सुधारणा करण्याचे उपाययोजना, सौर,पवन व जैविक ऊर्जेचा उपयोग वाढविणे यामुळे गावाच्या शाश्वत विकासाचा विचार करता येईल.

अश्या अनेक प्रकारे समाजाचा शाश्वत विकास करता येईल. शाश्वत विकास करणे आज काळाची गरज ठरली आहे. जर समाजाचा शाश्वत विकास या संदर्भात आजही सजगता दाखविले नाही तर येणाऱ्या भावी पिढीला याची फार मोठी किंमत मोजावी लागेल आणि हे एक दारूण सत्य आहे. म्हणून शाश्वत विकासाबाबत सतत, प्रामाणिकपणे,एक जबाबदार नागरिक म्हणून प्रयत्नशील असणे महत्वाचे आहे.

#### **निष्कर्ष :**

गेल्या २०० वर्षात जागतिक अर्थव्यवस्था सहापटीने वाढली आहे. औद्योगिक क्रांतीने सर्वच देशांना व्यापुन टाकले आहे. औद्योगिक क्रांतीच्या लाभ घेतलेल्या देशांमध्ये तर ती १०पटीने वाढली आहे. त्या—त्या

देशांच्या राहणीमानात,आरोग्य सेवेत खूपच बदल झाले. पण या विकासासाठी त्या—त्या देशाने फार मोठी सामाजिक किंमत मोजली आहे. कोणत्याही अविचाराने किंवा नियोजनाशिवाय झालेला अनियंत्रित विकास हा शाश्वत विकास ठरत नाही तर फायदयापेक्षा काही काळाने तो अधिक हानीकारकसुध्दा ठरू लागतो आणि मानवाचा इतिहास तर हेच सांगत आला आहे, कोणत्याही अर्थव्यवस्थेचे प्रचंड वाढ होत असतांना त्या व्यवस्थेतील समाज निसर्ग व विकास यांची योग्य सांगड घातली गेली नाही तर त्या अर्थव्यवस्थेचा पुर्ण नाश होतो. विकासाबरोबर आजूबाजूचा निसर्ग, वातावरण व समाजाचे सशक्तीकरण दुर्लक्ष झाले तर समाजाचा शाश्वत विकास कसा होईल. याकडे मानवी समाजाने लक्ष दयायला हवे.

शाश्वत विकासाची सामाजिक किंमत ही कमीत कमी नुकसानीत करायची असेल तर अर्थव्यवस्थेने तीन स्तंभाची काळजी घेणे आवश्यक आहे. ते तीन स्तंभ म्हणजे, निसर्ग,समाज आणि अर्थव्यवस्था आणि या तीन स्तंभावर उभा असणारा शाश्वत विकासाचा डोलारा मानवाला सांभाळता येईल. हवामानातील बदल, विकासासाठी होणारी झाडांची कत्तले, व त्यामुळे जंगलाची झालेली वाळवटे,प्रदुषण या सर्वच चिंतांच्या चर्चा जगभरात हिरहिराने सुरू असल्याचे ऐकू येते. कोणत्याही अर्थव्यवस्थेला नैसर्गिक संपत्तीची गरज असली तरी मानव ज्या गतीने ती संपत्ती ओरबाडत आहे ते पाहता शेवटी निसर्ग थकेल व हात वर करील. म्हणून विकास साधतांना निसर्गाकडून हावरटपणे त्यांची संपत्ती न ओरबाडता ती नियोजनबद्ध पध्दतीने काढावी. काढलेल्या संपत्तीचा पुर्नवापर करण्याच्या पध्दती अमलात आणाल्यात. कोळसा, खनिज तेल अशा इंधनाना लवकरात लवकर पर्याय शोधून काढायला हवा म्हणजे शाश्वत विकासाचा खांब टिकून राहिल.

भारत आर्थिक विकासाच्या ज्या टप्प्यावर आहे. तेथे या शाश्वत विकासाची चर्चा संयुक्तीक व महत्वाची आहे. “सब का विकास सब के साथ” “गरीबी हटाव” अशा घोषणा आपण बऱ्याच वर्षांपासून ऐकत आहोत व प्रत्यक्षात मात्र कोणाची गरिबी हटत हे आपण सर्वच जाणून आहोत. निसर्ग, समाज व आर्थिक विकास यात समतोल राखणे ही एकप्रकारे तारेवरची कसरतच आहे. सोबतच भारतीय समाजाचे आरोग्य टिकवणाऱ्या **स्वच्छ भारत** मोहिम यासारख्या घोषणा ही महत्तवाच्या आहेत. भारतातील विकासाचा फायदा जोपर्यंत सर्व समाजघटकांमध्ये पोहोचत नाही तोपर्यंत समाजाला शाश्वत विकास मिळणार नाही. स्वातंत्र्यपूर्व काळापासून आदिवासी, त्याचे दारिद्र्य पारधी समाजाकडे झालेले दुर्लक्ष, विकासाकरीता त्यांची घेतलेली जमीन यामुळे दाहकपणे वाढत गेली व त्यातूनच नक्षलवादाचे राक्षस उभे राहिले आहे. समाजातील काही थोडया लोकांची श्रीमंतीची हाव व त्याचे ओंगळवाणे दर्शन व त्यामुळे येणारा माज या सर्वच गोष्टी शाश्वत विकासाला अत्यंत हानिकारक आहेत. झाडे तोडले तर नवीन झाडे लावून वाढवू, पावसाळी पाण्याची जमिनीत साठवण करू अशा छोटया छोटया अपेक्षांची पूर्ती करून निसर्गात

समतोल साधण्याचा आपण नक्कीच प्रयत्न करू शकतो. अल्बर्ट आइन्स्टाइनने म्हटल्याप्रमाणे पूर्वी निर्माण केलेले प्रश्न सोडवण्यासाठी आता आपण पूर्वीसारखे विचार करून चालणार नाही तर ते आज सोडवण्यासाठी उद्यासारखा विचार करणे गरजेचे आहे. मगच भारतात आवश्यक असलेला व पाहिजे तसा शाश्वत विकास येईल. अन्यथा समाजाच्या पुढच्या पिढ्यांना याची जबर किंमत मोजावी लागणार.

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## **Leadership of Khasi Women of Meghalaya: A Socio-Political Context**

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### **Abstract**

Background: Khasi women have a rich tradition and enjoyed social status and freedom in their community. Women are the leader of the family and make immense contributions to the socio-economic well-being of the community. Leadership in the family and service sectors is highly visible but there is less participation in the political sector. Therefore the current study is to explore the socio-political leadership of Khasi women in the East Khasi Hills District of Meghalaya. **Materials and Methods:** A mixed method study and sequential exploratory design were carried out in the current study. The respondents were from the Mawsynram and Shillong blocks of East Khasi Hills District. A total of 150 Khasi women filled out the google form questionnaire for quantitative data. For qualitative data, 10 respondents were interviewed. The questionnaire and Interview guide were focused on the family, social and political leadership of Khasi women. Quantitative data analysis was done through SPSS (Statistical Package of Social Sciences) for generating frequency whereas qualitative analysis was done through thematic analysis. **Results:** The quantitative results revealed that women rule in the family and society. They strongly agree on women should be given equal representation in local bodies. The qualitative finding depicts that women's leadership in family and service is high. The study also found that Khasi women have less participation in the political sector. The reasons are lack of awareness, opportunities, a traditional system, and poor interest. **Conclusion:** The overall findings show that women are involved in all kinds of family functioning, social service, and occupational sector. The women are well capable in their family functioning and service sector, and then they can be much capable in political leadership. The current study suggested that women's participation in politics will help to connect the issues in the family and service sectors. Therefore, need for empowering women in leadership in the Khasi community.

**Keywords:** Social, political, leadership, women, Khasi, mixed method, Meghalaya.

### **Introduction**

Gender equality is the 5<sup>th</sup> goal of the Sustainable Development Goals and its focuses on all women and girls empowerment. Women should be empowered in the economic and political sectors of society. The recent global data shows that women labour earn twenty per cent less than men and twenty-five per cent of women parliamentarians (UN, n.d.). Empowering women in all sectors is one of the social development aspects of society. Women empowerment denotes the social, economic, educational, political, and spiritual strength of women. In India, women empowerment is connected to the geographical area, socio-economic-educational-health, and so on (Shettar, 2015).

Women are facing a lot of issues in every region of India. Gender inequality and inequity are mostly seen in every region and especially among ethnic groups. A study found inequality among both genders found in Northeast India. Women are more disempowered and had poor status in this region. Meghalaya is one of the states of Northeast India that have gender equality found in terms of work,

literacy, and so on (Mahanta & Nayak, 2013). The matrilineal system is seen in the Meghalaya and traditional wealth transfer from mother to daughter. Therefore, gender equality is found in some sectors of society.

Khasi, Garo, and Jaintia are the three tribal communities in Meghalaya. Khasi is the largest tribal population in the state. The community is favourable to women and that will not be seen in other societies of India (Marbaniang, 1982). Khasi tribes are belonging to Christianity and they are following the matrilineal practice. Khasi women are involved in social institutions and they are enjoying social status and freedom. Women's participation is contributed to the socio-economic well-being of the community (Wahalg, 2015). A study stated that Northeast women are more independent and headed the family than in other parts of the country (Agarwal & Raj, 2020). Women had a great contribution to the workplace and lead to team building, empowerment, culture, and diversity (Mehta & Sharma, 2014). The positive support can help the women to smoothly perform their work-life

balance and leads to achieving goals in their life (Pranathi & Lathabhavan, 2021).

Leadership is one of the major factors for empowering women in society. Women lead character in their full, and part-time careers and family duties (Muslim & Wand, 2019). In the current scenario in India, women are participating and key decision-makers in the legislation. However, a large gender gap exists in political participation at the state and national levels (Mahanta & Nayak, 2013). According to a report by the Election Commission of India, women's participation in the parliament has not grown from a mere 10% in more than 75 years of Independence. The situation is more dismal in State legislatures where it is just 9% (Chaurasia, 2022). Women's participation in the local bodies is also considered purely symbolic while the actual power lies at the hands of the spouse. This view has been challenged by a study conducted by (Chattopadhyay and Duflo, 2004). The study concluded that villages with women in leadership positions focused more on redistributive justice, investing in public goods, and achieving greater economic growth (Gulati & Spencer, 2021).

The Khasi has a matrilineal culture and fewer women participation in political parties (Syeda, 2018). Some of the studies also revealed that women had less participation in politics (Plieladdalin Nongsiej, 2018; Wahalng, 2015). Therefore the current study is to explore the socio-political leadership of women in the Khasi Community of Meghalaya.

The socio-political leadership defined in the current study is leadership in the family, service, and political sectors. The majority of the Khasi women, lead their families and mentor the social service sectors in Meghalaya. The current study explores women's leadership in three sectors: family, service, and political sectors. **The objectives are;**

1. To assess the socio-demographic details of Khasi women.
2. To determine the perception of socio-political leadership of Khasi women.
3. To understand the perspective on socio-political leadership of Khasi women.

#### **Materials And Methods**

In Meghalaya, the majority of the population are tribals. The Khasi community is the largest tribe in Meghalaya. The current study was conducted in the East Khasi Hills District in Meghalaya. The majority of the Khasi communities are living in this district. The mixed-method study was carried out in the current study. Therefore the sequential exploratory design is been adopted for the study. The current study has a primary focus on

quantitative data and to support the quantitative data, qualitative data were included.

A total of 150 Khasi women were included in the quantitative data analysis. The google form questionnaire was administered among the Khasi women. The online link of the questionnaire was shared through different social media platforms during May 2022. The researcher conducted face-to-face interviews among 10 Khasi women in different parts of the current study area. There were two Khasi women from each sector: faculties, political party members, households, NGO workers, and self-help group members.

The respondents had permanent residence in the East-Khasi Hills District of Meghalaya and were in the age group between 18 to 60. The respondents have been limited to those who have married within the Khasi community. The tools used during the data collection are socio-demographic details, a questionnaire for respondents, and interview guides for the key informants. The quantitative data was stored in the google form and the interview session was audio recorded for qualitative analysis. The quantitative data were analyzed through SPSS and frequency distribution. Thematic analysis was used for analysing the qualitative data. The current study is a partial fulfilment of the first author's master of the social work programme at the Department of Social Work, School of Social Sciences, The Assam Kaziranga University.

#### **Results**

##### **Socio-demographic Details of Khasi Women**

In quantitative results, the mean age of the Khasi women was 33.32 (standard deviation - 11.56), and most of them are educated up to graduation and unmarried and self-employed. More than half of the Khasi women belong to nuclear families, stay in maternal residences, and have poor socioeconomic status. In the qualitative findings of the current study, the mean age was 37.40 (standard deviation – 7.63). The majority of them stay with their spouse, have education up to post-graduation, and are in matrilineal tradition.

##### **Perception of Socio-Political Leadership of Khasi Women**

Table 1 depicts the statements of the Khasi women. A majority of them state women are empowered and rule in their families. The majority of them agreed that women can lead the family along with their occupation. Another major finding revealed that society does not accept women's leadership. Women need equal representation in the government elected positions and also they should be equally allowed in Khasi Dorbar Shnong (locality /village Government) as equal stakeholders in a democracy.



**Table 1:** Perception of Socio-Political Leadership among Khasi Women (N=150).

<b>Khasi Women Perception</b>	<b>SD (%)</b>	<b>D (%)</b>	<b>A (%)</b>	<b>SA (%)</b>
Women's leadership is necessary for your community	3 (2)	8 (5.3)	50 (33)	89 (59.3)
Women are empowered in your family.	0 (00)	4 (2.7)	60 (40)	86 (57.3)
Women can rule the family.	0 (00)	3 (2)	61 (40.7)	86 (57.3)
Women can lead society.	0(00)	28 (6.7)	67 (53.3)	34 (40)
Women can lead the family along with their occupation.	1 (0.6)	4 (2.7)	81 (54)	64 (42.7)
The society you live in accepts women in leadership positions.	18 (12)	55 (36.7)	47 (31.3)	30 (20)
Women are adequately and equally represented in the government elected positions.	21 (40)	60 (40)	39 (26)	30 (20)
Women in political leadership are acceptable in your community.	17 (11.3)	45 (30)	51 (34)	37 (24.7)
Aware of female leaders in your society.	24 (16)	36 (24)	52 (34.7)	38 (25.3)
Women should be equally allowed in Khasi Dorbar Shnong (locality /village Government) as equal stakeholders in a democracy.	17 (11.3)	36 (24)	51 (34)	46 (30.7)

SD=Strongly Disagree; D=Disagree; A=Agree; SA=Strongly Agree.

**Perspective of Socio-Political Leadership of Khasi Women**

Themes and sub-themes findings were revealed based on qualitative data. The majority of the Khasi

women stated the theme 'involvement of women in politics' and they also responded to the other themes (table-2).

**Table 2:** Frequency of Khasi women in socio-political leadership (N=10).

<b>Theme</b>	<b>Sub-theme</b>	<b>N</b>
Women heading the Household	Following Tradition	7
	Managing the house	6
	Family support	7
Women heading the Service sector	Involvement in societal development	6
	Networking in social activities	7
Involvement of Women in Politics	Involvement in decision making	9
	Challenges and Opportunities	8

Themes and sub-themes are interpreted as follows;

**Theme 1:** Women heading the Household

**Sub-theme 1:** Following Tradition

Overall 5 out of 10 respondents responded to this theme. The following verbatim are connecting to the sub-theme.

*"I feel our traditional values are very unique and that's the reason in Khasi culture, women existence is the highest regard and respect for "ka-long kynthei" means "womanhood", when children own their mother's surname" - (Household - 1, 42 years, urban setting, undergraduate, married).*

*"In a traditional aspect, if you look into the history, the concept of clan and kingship came into the*

*hands of women, when men had left for the battlers and women were left to look after the households" - (Household - 2, 51 years, urban setting, undergraduate, widowed).*

**Sub-theme 2:** Managing the house

There were 6 out of 10 respondents who responded to this theme. The following verbatim are connecting to the sub-theme.

*"I have grown up seeing my mother, grandmother taking the last decisions in all the family matters"- (Social worker - 2, 26 years old, urban setting, postgraduate, single).*

*"I can say it starts from how beautifully women manage the household decisions and also taking*

important decisions in different matters” - (SHG member- 2, 33 years old, rural setting, high school pass out, married).

“My mother plays a key role in preparation, selection, administration, and organizing, every need of from young to an old member of the family. I am following her” - (Headed household – 1, 42 old, urban setting, undergraduate, married).

**Sub-theme 3:** Family support

Overall 6 out of 10 respondents responded to this theme. The following verbatim are connecting to the sub-theme.

“Even I am a headed household, I use to get support from the family members and a relative for functioning the family, my husband supports my decisions” - (Headed household, 51 years, urban setting, undergraduate, widowed).

“I am a primary decision-maker when it comes to decision making about savings or any responsibilities and my husband equally respects my decisions” - (Faculty member, 37 years, urban setting, postgraduate, married).

**Theme 2:** Women heading the Social activities

**Sub-theme 1:** Involvement in societal development

Out of 10 respondents, 6 respondents have responded to this theme. The following verbatim are connecting to the sub-theme.

“Yes! I am engaged in social work activities and with this, I feel very much empowered that there are various opportunities for women in public investment and service.”- (Social worker-2, 26 years, urban setting, post-graduate, single).

“In my village, a woman plays a key role in supporting their households and communities in achieving food and nutrition security, generating income, and improving rural livelihood and overall well-being.” - (SHG members-1, 36 years, rural, high school pass out, married).

**Sub-theme 2:** Networking in social activities

There are 5 out of 10 respondents who responded to this theme. The following verbatim are connecting to the sub-theme.

“I manage both guest house and restaurant in Mawlynnong village. I feel women handle wealth and household better than men”- (SHG members-1, 36 years, rural, high school pass out, married).

“I can see that within the society women have different roles to perform and yet women are active participants in the less formal or informal politics of Khasi. From my experience, I have seen that women are managing the social service activities such as awareness programmes and skill-based programmes for the development of the community.”- (Social worker-2, 26 years, urban setting, postgraduate, single).

**Theme 3:** Involvement of Women in Politics.

**Sub-theme 1:** Involvement in decision making.

Overall 9 out of 10 respondents responded to this theme. The following verbatim are connecting to the sub-theme.

“However the tussle between the two gender and their roles is different on political platforms. Women are consciously kept away from the decision-making positions” – (Faculty - 2, 28 years old, urban setting, postgraduate, married).

“Traditionally she is barred from participating in the political decision-making process. It is a taboo to see women in politics”. - (SHG members-1, 36 years, rural, high school passes out, married.).

“I can say in our party there is less number of participation and even if there are women than they are not been seen equal and given responsibility.”- (Political leader worker - 1, 46 years old, old, urban setting, and undergraduate, married).

**Sub-theme 2:** Challenges and Opportunities.

Overall 7 out of 10 respondents responded to this theme. The following verbatim are connecting to the sub-theme.

“Some women have a lack of confidence to join politics. Women’s participation in politics fully depends on the husbands’ attitude” - (Headed household-1, 42 years, urban, undergraduate, married).

“Women perceive politics as dangerous and dirty. Politics is still seen as a man’s world. I think men are more supportive of each other and will work actively to assist a male to success rather than a woman. It is tough for women to get the nomination from the party.”- (Faculty- 2, 28 years old, urban setting, postgraduate, married).

“Women do not see politics as a career choice; they see it as a combative area”. (Political leader worker-1, 39 years old, old, urban setting, undergraduate, married).

“Now the Khasi Hills Autonomous District Council has come up with the Khasi Hills Autonomous District Village (KHADC) and Town Development Council Bill, 2021 where women will be allowed to be part of parallel bodies but it won’t be easy bringing the amendment to participate.”- (Political leader worker - 2, 39 years old, old, urban setting, and undergraduate, married).

**Discussion**

According to World Economic Forum’s Global Gender Gap Report 2021 depicts that India has a rank of 140<sup>th</sup> among the 156 countries across the world. Economic participation and opportunity, educational attainment, health and survival, and political empowerment were the major areas for identifying the gender-based gaps and policies and practices needed for a gender-inclusive recovery in each country. The report says that India has a 62.5%

of gender gap (WEF, 2021). Gender inequality is mostly seen among ethnic groups and few states in Northeast India had gender equality in socioeconomic factors (Mahanta & Nayak, 2013). Khasi women of Meghalaya had more social status and freedom than men in the society.

The current study's quantitative results found that the women are well capable and actively participate in the family, social service, and occupational sectors. This indicates that women are much capable of role functioning and decision-making process. Studies also depict that Northeast women are independent and head their households (Agarwal & Raj, 2020). Women had a great contribution to the socio-economic well-being of a community (Wahalng, 2015). Political leadership is lacking among the women in the Khasi community. The findings show that the men occupied the political leadership, and the majority of the women are not interested and lacked awareness among women regarding the political spheres. Women's role in the village council does not exist (Singh, Yangzes, & Khosla, 2020).

The qualitative findings were revealed based on the themes like family, social and political leadership. The women are proud of their traditions and they are following the mother-centred approach. There are women-headed households in their community and they are involved in the nurturing, functioning, decision-making, and mediating roles in the family conflict. The Khasi community of Meghalaya is matriarchal on authority, inheritance, residence after marriage, and succession (De & Ghose, 2007). The women are managing the shops, NGOs, and other service sectors in their society. They are doing collaborative work, networking, relationships, and managing the organisation. The women lack opportunities in politics and the local system of their community is not engaging them. A study revealed that the women's participation in political rallies is very low and they gave fewer donations to political parties of Meghalaya. The majority of rural women have no awareness of the leaders or political parties (Mawkhroh & Patnaik, 2013). Studies also revealed that women had less participation in politics (Plieladdalin Nongsiej, 2018; Wahalng, 2015). In such matrilineal societies where power and decision making is vested in women, it is observed that the same power is not realised in formal and political settings. This difference in the household level and public sphere can be understood in terms of attitudes and access to resources for women. The attitude of the women themselves is restricting in terms of joining politics as it is largely viewed as a male bastion, many respondents shared the same. The risks and time required in the profession are high

and are thought not to be feasible for managing a family. As with other time-intensive jobs, women's entry into politics will be limited until there is a fair distribution of family duties and recognising of the agency of women to join a profession of their choice. The workplace attitudes towards women also need to change, to make this transition smooth. Often casual sexism guise as jokes which affect the confidence, sense of self, and purpose of women lawmakers. In terms of access to resources, mobility, finance, and networks become hindrances, as shared by some respondents. Men have been in politics for ages and have formed sustainable networks which do not allow easy entry for women. Building that kind of a support base or vote bank takes time for women. Also, access to transport and public spaces after a certain hour is made 'unsafe' for women which restricts networking capacities. It is also observed that women's access to important decision-making positions in political parties, business organisations, and trade unions is dismally low which serves as the backbone of electoral politics. They are confined to charity and women's organisations which serve as alternate sources of political clout. But conforms to the conventional image of restraining women to informal settings of power.

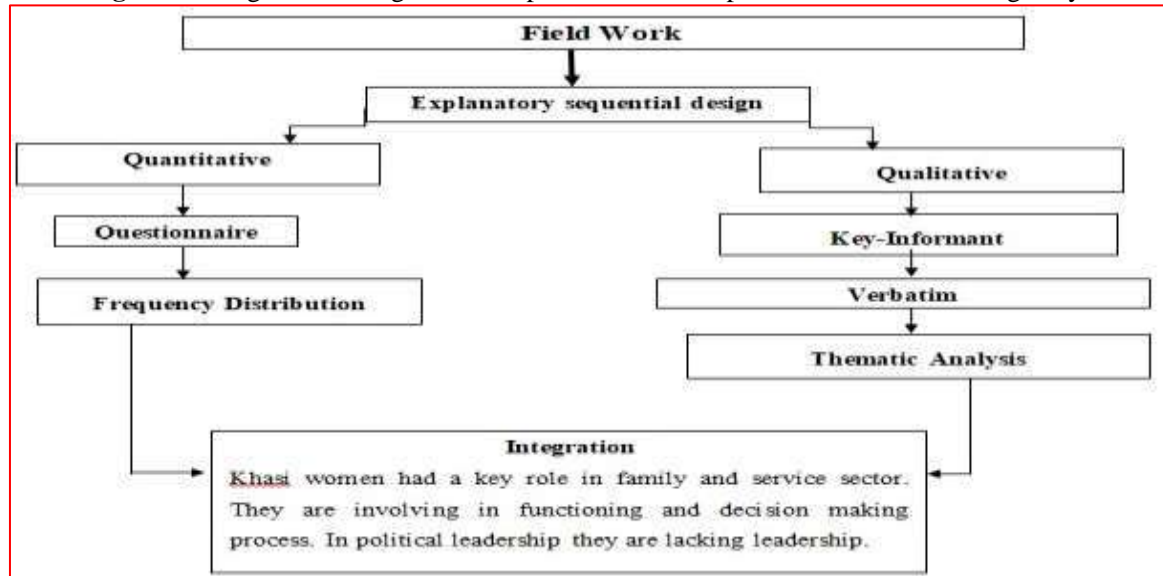
The integrated findings show that women are involved in all kinds of family functioning, social service, and occupational sector. Even though there were some levels of issues in the functioning of the family and service sector, they are managed with the support of their family members and co-workers. The women are well capable in their family functioning and service sector which can translate into capabilities in political leadership (figure 1). Therefore the current study suggested that women's participation in politics will help to connect the issues in the family and service sectors.

Women's representation in politics is important as only they can speak about their problems and suggest solutions. The intersectional identities of women also need to be considered while talking about representation in politics. Along this line, the 73rd Amendment to our Constitution in 1993 introduced the concept of 1/3rd reservation of seats for women. This has helped many rural women to come forth and participate in politics not only as candidates but also as voters. Though limitations in the political will to implement this clause, considerable success can be seen. However, the Women's Representation Bill for reservation of 30% seats for women in the legislative assemblies and Parliament has failed to become an Act (Tripathi, 2019). Such legislative reforms are necessary to drive social change and increase the

political participation of women and representation of their issues. It is beyond the scope of this paper to discuss all the factors holding back women from participating politically. The other limitations of the current study

are; that perception and perspective were only taken from one gender, focus group discussions were not included in the study, and no cross-cultural comparisons.

**Figure 1:** Integrated findings of Socio-political leadership of Khasi women of Meghalaya



**Conclusion**

The study concludes that there is a lack of representation of women in politics due to various reasons. Women are a major part of any particular community. Khasi women are leading their families and they are actively involved in service sectors. This indicates that they are sincere to their family and community. Women's representation in political leadership can help to sort out the issues in the family and service sectors in the community. Women's leadership will cover all three sectors and can empower the community. The implications of the study are empowering women's leadership through skill training, education and capacity building, and policy changes. There should be longitudinal and interventional studies based on leadership and relationship for empowering women in all sectors of society.

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**Promoting Artificial Intelligence in Education Empowers Students with Disabilities in 21<sup>st</sup>  
Century Inclusive Classroom Settings**

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**Abstract**

The current study explores promoting artificial intelligence (AI) in education empowers students with disabilities (SwDs) in 21st-century inclusive classroom settings. Due to the development of new technology, education sectors are changing. Mobile and other connected technology, including the internet, affect our lives. Experts, educators, and parents disagree regarding how much time children should spend in front of devices. The education sector might be significantly changed by new emerging technology. Creating strong AI that can defend its interests is possible as an outcome of an empowerment plan for the SwDs through education. By using this approach, SwDs could learn more and develop new skills. AI refers to the research and development of computers with similar sensory, linguistic, computational, cognitive, and emotional abilities to those of humans. The study of intelligence aims to discover and explain the universal principles that underlie all types of cognition, whether they occur in people, animals, or machines. The scientific objective of developing and constructing factory thinking throughout all fields of human existence directly impacts a few engineering goals. The development of intelligent agents, easier computer interaction, and hybrid systems that combine human and machine intelligence to get better results are all examples. AI is a computer science and engineering field aiming to model human intelligence and behaviour in artificial systems. AI is a fast-expanding field of technology that can drastically alter how we interact with one another. Innovative learning and teaching methods for SwDs have been generated using AI and are now being evaluated in many different contexts. This working paper was written to assist educational policymakers in getting ready for the possible effects of AI on SwDs. This paper is a collection of case studies on using artificial intelligence in inclusive classroom settings to provide all SwDs access to high-quality education. In addition to the apparent effects that AI and technology have on people's daily lives, they have also had a significant impact on the field of education, making it more accessible and inclusive for students with visual, hearing, mobility, and SwDs. Educational institutions that have embraced more inclusive teaching techniques have also profited from using AI. This study makes a first cut at examining how AI has adapted systems envisioned to empower SwDs in the 21st-century inclusive classroom settings.

**Keywords: Promoting, Artificial Intelligence, Education, Empowers, Students with Disabilities, 21st Century, and Inclusive Classroom Settings**

**Introduction**

A new generation of educational technologies that have the potential to significantly enhance education both in the classroom and across entire school systems have emerged as an outcome of AI. It has brought attention to the requirement for dependable technology that benefits individuals and society. Both those with SwDs and those without them can express their creativity thanks to technological platforms and tools. Microsoft has been able to empower SwDs thanks to the development of technology; for instance, it has offered learning tools that have assisted SwDs in learning more. As an outcome, AI has seen a more significant application. AI technology was developed to make complex computer tasks more accessible for people to complete (A. S. Drigas and R.-E. Ioannidou, 2012). Nearly every element

of society is seeing an impending and quick shift as an outcome of the development and use of AI, and the lifestyles of today's children are vastly different from those of their parents (Siraj, 2017). There will undoubtedly be many challenges along the way, not the least of which are moral ones, and the ground is sure to be rough (Walsh, 2017). Computers may never be able to replace people completely, yet they can undoubtedly benefit them by enhancing their working conditions. Emerging advances in AI may give SwDs more influence in teaching. The promotion of AI can create open-source tools and technologies that are more inclusive, reliable, and useful in many situations. The information base may be expanded and used more quickly and successfully through knowledge-sharing activities. Initiatives may be built atop existing networks and partnerships to

enhance already-available goods and services. The activities fostering international cooperation to raise the bar for AI product design and their integration and application in IE settings are examined in this section. We must ensure that our education and training align with the workplaces and societies shifting requirements to prepare people for the upcoming changes in their life (Tucker, 2017). AI and SwDs can develop by using schooling. AI in the classroom may benefit SwDs in learning, hearing, vision, and mobility. The study mentions AI as a possible resource for SwDs (Lynch M. Laabidi, M. Jemni, L. J. B. Ayed, H. B. Brahim, and A. B. Jemaa, 2013). AI has been used to provide continuous care for SwDs. Since AI, people can now utilize smartphone apps without clicking on them. Understanding our relationships with the idea of intelligence will help us succeed (Luckin, 2017). To combine formal, non-formal, and informal learning contexts and support, especially across reskilling and up-skilling, it is equally vital to consider the power of AI for discovering and curating curriculum information across languages and platforms. It is essential to consider the potential of AI tools for "human-to-machine cooperation" to support teachers' high-skill pedagogical duties in a variety of learning environments, even though it is true that machines cannot replace humans and that human interaction between teachers and SwDs should remain at the centre of education. Some programs employ methods to improve SwDs learning outcomes and provide teachers with the resources they need for their professional development and the provision of top-notch technology education in an inclusive classroom setting.

### **The Concept of Artificial Intelligence**

The ability of a machine to learn similarly to humans and to react to particular circumstances is referred to as AI in the scientific community. It also goes by the name AI. AI is becoming increasingly significant. A lot has transpired in technology and industry since AI first hit the market. As per computer experts, "85% of customer contacts will be managed without a human" by 2020. AI is a branch of science and engineering that deals with the theory and practice of developing systems that exhibit the qualities of intelligence that we associate with human behaviour. The theory and practice of structural systems that demonstrate the behaviors we relate with intelligence in humans, such as perceived notion, natural language processing, problem-

solving and planning, learning and ability to adapt, and acting on the environment, are at the core of the science and engineering of AI. The primary objective of this study is to comprehend the rules that control intelligent behavior in people, animals, and artificial items. The development of human-machine systems that benefit from the complementary nature of human and automated reasoning, the development of intelligent agents, the formalization of knowledge, and the automation of reasoning across all domains of human endeavor are just a few of the engineering goals that this scientific goal directly supports. The primary purpose of AI is to build robots smarter so they can function, think, and accomplish tasks like that of people. Deep learning and the method of natural learning are two current applications of AI, including computer chess and self-driving automobiles (Naveen, G., Naidu, M. A., Rao, B. T., & Radha, K., 2019). Most AI systems are created as parts of complex applications that they add intelligence to in various ways, such as by enabling them to reason with knowledge, comprehend natural language, or learn and adapt. An instance of a developed system that may be regarded as a pure application of AI is a planning or expert system. The technology that most likely will shape both the upcoming and previous ten years is AI. By providing easy access to knowledge about the whole range of actual and potential techniques and their effects, this study intends to enable informed perspective and fruitful discussion about AI.

Moreover, it explains various legal, technological, and sociological responses that might be adopted (Boucher, P. N., 2020). The majority of AI systems are developed as components of advanced designs. They add intelligence in several ways, enabling them to reason with knowledge, recognize natural language, or learn and adapt. A planned or expert system is an example of a built system that might be regarded as a pure application of AI. In addition, an unintended AI conflict could arise from an arms race among AIs. It is more effective due to the absurd uses that AI security may be put to. This applies to both robots designed to replace human soldiers and autonomous weapons systems that have the potential to cause harm if used with malice. This study aims to comprehend and assess how AI empowers SwDs in inclusive education settings of the twenty-first-century society.

Artificial Intelligence in Education

The most likely technology to influence the next ten years is AI. This study provides an extensive description of how it works, why it is essential, and what we can do to address the problems it raises. The new technology of AI is beginning to alter businesses and educational resources. The best educational practices in the realm of education require the presence of teachers. The employment of teachers, who are crucial to the educational system, is impacted by the development of AI. The AI employs practical methods to track a person's relative speed to others, including deep learning, machine learning, and intelligent systems. As AI solutions develop, it will become simpler to identify areas with teaching and learning gaps, raising the bar for education. Teachers may have more time and freedom to concentrate on teaching understanding and adaptation, two distinctively human attributes in which computers would fail, as administrative procedures become more simplified, personalized, and efficient owing to AI. Robots and teachers working together can help students reach their best outcomes (Kengam, J., 2020). AI is an effort by computerized systems to mimic human thought and behavior. The ability of robots or computers to think and act the same way as humans are how the general public frequently refers to AI (Wartman & Combs, 2018). The core concept of AI in this context is the expert mimicking of human behavior or thought processes by tools or computers (Mohammed & Watson, 2019). The idea that AI would be included in home computers may be a fiction of the present system, claims Timms (2016). It could enter our lives in a variety of ways and take on a variety of different forms. Future AI will significantly affect almost every element of our lives. Still, it will substantially impact education because teaching and learning are crucial components of life and the current educational system requires a lot of development. Compared to what the future of AI in education will bring, older instruction was less adaptive. The most influential teachers for the educational system are costly and impossible to expand. Other countries' teachers deal with a tonne of paperwork and little recognition. AI can uniquely help people by offering them a customized curriculum based on their interests and skill assessments (Kengam, J., 2020). Emerging technologies have also changed teaching and learning in the educational industry. The AI business in the US education sector is anticipated to increase by 48% between 2018 and

2022. 2018 (BusinessWire.com, 2018). These days, youngsters use their cell phones and tablets frequently. Students can now use AI applications to study for 10 to 15 minutes in their spare time. During lectures, AI uses gesture recognition technologies to assess pupils' attitudes and comfort levels. As AI advances, it can now evaluate a student's hand or facial motions to determine their understanding of a lecture. The computer can then modify the lesson plan to make it easier for the learner to follow (Kengam, J., 2020). Usage of AI technology in education has become more and more common as the field has advanced. A few include personalized learning, dynamic assessments, and support for meaningful interactions in online, mobile, and hybrid learning environments. To overcome the teacher shortage in nations like the USA, academics (Edwards & Cheok, 2018) have divisively recommended utilizing AI-powered robots to take over some teaching responsibilities. AI-enabled machines have the power to alter the academic curriculum. The inclusion of students with hearing or vision impairments in classrooms worldwide is made possible by using AI tools. This is especially useful for ill students who cannot attend class. In the traditional educational system, the teacher spends a lot of time evaluating the students based on their assignments and assessments. When AI steps in, it will finish these duties quickly. It also helps by offering advice on filling knowledge gaps in the 21st-century inclusive education settings.

**Historical Development of Artificial Intelligence**  
The concept of "artificial intelligence" and the associated technology is not new to scientists. Contrary to what many people think, this technology is far older. Stories concerning mechanical men can be found in both Greek and Egyptian literature. More and more aspects of daily life are integrating AI. The most recent trend is AI processors and related smartphone apps. However, the Dartmouth Summer Research Project on AI at Dartmouth College in the United States launched the technology in the 1950s. The work of Allen Newell, Herbert A. Simon, and Alan Turing can also be linked to the development of the well-known Turing test. Because of IBM's Deep Blue chess computer, which made history in 1996 by becoming the first machine ever to defeat Garry Kasparov in a match, AI could grab the public's attention. AI algorithms have been used in data centres and on mainframes for a long time. One must look

back to Milat's formative years to comprehend the history of AI. As is well known, the Ancient Greeks had various concepts for humanoid robots. The mythological character Daedalus, who is said to have command over the wind, is one example of a person attempting to build artificial humans. The need to clarify philosophers' conceptions of the human mind has begun to arise throughout history due to the development of modern AI. The year 1884 is crucial for AI. Charles Babbage started work on a mechanical device capable of independent thought on this important day. These discoveries convinced him that he would not be able to build a machine that would behave as intelligently as a human being; therefore, he decided to put his work on pause. Claude Shannon suggested that computers should be able to play chess in 1950. Before the early 1960s, AI technology had made little progress. (Mijwel, M. M. 2015). At this time, AI is progressing quickly. Right now, there is a lot of interest in deep learning, big data, and data science. Google, Facebook, IBM, and Amazon are just a few companies utilizing AI quickly to create unique new technology. The future of artificial intelligence will see it evolve into a system with high intellect, claims the study.

#### **Artificial Intelligence Empower Students with Disabilities**

This sector has grown exponentially over the past decade, and its influence can be felt in every aspect of modern life. Computer scientists have spent many years attempting to catalog and explain every component of human intellect. Science has been preoccupied with this puzzle for the better part of the previous half-century, and the outcome of their efforts is AI. The field of AI focuses extensively on developing intelligent agents that can analyze their environment and take appropriate action to increase their likelihood of success (Russell, S.J., Norvig, P, 2003). New methods of communication with SwDs have emerged as an outcome of developments in educational technology. Over the past decade, strategies based on AI approaches have been increasingly effective (2001-2010). Providing AI is appropriately applied can potentially enhance the lives of SwDs. Therefore, AI techniques must be incorporated into creating diagnostic and treatment procedures. This study aims to address some of the moral difficulties that arise when AI is applied to the realm of disability. Two disabled people's narrative diaries will be used to explore AI's promise, help, and perils in the context of

daily life. Finally, we will glance at what is already being written about inclusive ethics and AI that is easy to use.

At last, we will review our findings and conclude how developers of AI tools may do better in the future. One school of thought among the Experts wonders how this might be adopted in the classroom. Teachers are essentially in agreement that AI-enhanced technologies have the potential to significantly improve students' academic outcomes (Lanzilotti, R., Roselli, T, 2007). All the world's one billion disabled people have a solid argument in favor of AI technology. If their requirements are addressed, PwDs could be helpful to partners in the drive to realize AI's full potential. According to the Alan Turing Institute, no all-encompassing strategy for the ethical advancement of AI has been created yet (Alan Turing Institute., 2019). The "unmet requirement of assistive goods needed to meet the UN Convention on the rights of PwDs" may be reduced with the support of an established network of professionals and resources for AI and inclusion.

In recent decades, there has been a growing awareness of the necessity to meet the learning requirements of people of all ages. There has been a recent uptick in the number of persons looking at assistive technologies in the hopes of enhancing their capabilities despite an obvious disability. The potential benefits of AI in the classroom have been the subject of significant debate. Many people have put forth a lot of effort in recent years to introduce novel strategies to special education. Early research in the field made heavy use of "experts' systems," or AI programs created to imitate the actions of human experts (Wu, T.K., Meng, Y.R., Huang, S.C., 2006). Many novels and academic papers have explored the intersection between disability, AI, and ethics (justice or fairness). Since these developments, we have hope that the design of AI systems will become more inclusive of people like me who have disabilities and hence more moral. Due to the wide variety of disabilities, Trewin (218) argues that a different approach is needed to ensure fairness for SwDs in AI technologies than for other protected characteristics such as age, gender, or ethnicity. Much ink has been spilled over the potential of AI to improve the lives of people with impairments. Some of the recent innovations are artificially intelligent robotic arms and other prosthetic limbs, decision support systems to aid specialists and the disabled, and



route planning software for the visually impaired. As an outcome of these tools, we can reach more persons and significantly influence their lives. Thus, it would appear that numerous initiatives are working to find solutions to and address the concerns related to creating AI systems that are fair and ethical for and meet the requirements of SwDs in the 21st-century inclusive education settings.

#### Artificial Intelligence in Inclusive Education

Knowledge of AI is going to be required shortly. Multiple industries could be profoundly affected by AI. There is a shared responsibility for ensuring that humanity's rapid technological progress is used for good and not evil. In this research, we propose an entire AI system with specified service life, including specifications for its physical construction and accompanying user manual. The world would benefit from having someone interested in AI allowed to contribute. Everyone should be able to meet their fundamental needs, such as having a safe and comfortable workplace and reliable means of transportation to get there—strategies for using the AI design method in all-inclusive classroom settings. Interesting conjecture based on studies in AI and inclusive education has been made about how SwDs from more different social, cultural, emotional, and backgrounds will be taught and graded in the future. To what extent can AI tools designed for uniformity, standard, and automation be used to enhance teaching methods in a way that helps all SwDs is a core topic that drives our study. Academics and students interested in deepening their understanding of the potential impact of AI on the future of inclusive education will find it helpful. This study thoroughly introduces the challenging issues raised by the widespread adoption of AI technologies and the imperative of making education available to all SwDs. To do this, we provide an overview of the relevant theory, highlight the most significant practical challenges, and share the results of the most recent studies. Despite the extensive usage of AI and other types of "smart" technology throughout numerous sectors of the economy, society, and even education, there does not appear to be much of an attempt to further the goal of inclusion. AI's origins as a study and development topic are primarily in the technical sphere. There are rising concerns about the inherent biases associated with machine learning techniques powered by 'big data in the field of education, despite the exciting prospects that such

approaches bring, such as software that is claimed to "personalize" learning or adapt to learner behaviors. The Inclusive AI field study aims to learn how AI could be implemented to make schools more welcoming and flexible for SwDs managing several tasks. The goal is to use AI in many ways to assist the most disadvantaged children. Because of the global scope of the Great Practice Exchange project, we will need to work together to create a unified, AI enhanced curriculum that incorporates the world's most effective methods. By adopting AI tools to the needs of disadvantaged SwDs and the specifics of the educational model in each consortium member country, this strategy would significantly enhance the usage of AI technology in inclusive classroom settings. Here, we shall investigate how being disabled affects one's chances of social acceptance. Additionally, we discuss recent approaches that combine AI with SwDs-friendly design. In the future, we will examine whether or not incorporating AI into classroom materials might increase the students' exposure to various cultures. Culture-specific technological biases and their underlying causes and potential solutions are then discussed. A culturally sensitive strategy must not be colorblind but must consider questions of race and gender. The study provides suggestions for the future of AI and inclusive education interaction. While designing learning systems and picking suitable datasets for training, more should be given to the potential of biased. This strategy aims to help, facilitate, and speed up the process by which corporations, governments, educational institutions, and the general public adapt to a future in which technological advancement serves humanity. Its most fundamental goal of AI empowers SwDs in 21st-century inclusive education settings.

#### Conclusion

The study examines the benefits of AI technology for children with special needs and their effects on the general community. AI that can replace human work and facilitate learning without bias has had the most impact in education, where institutions, instructors, and parents have attempted to advance inclusive education. The application of AI methods in inclusive education has proven fruitful. Experts agree that AI-based solutions have the potential to accommodate users' autonomy while proficiently directing them toward their individual educational goals. Rights protection for SwDs and AI are major topics right now. AI technology may have both positive and



negative effects. However, there are also contexts where AI falls short. As for us, though, we have had nothing but success when employing AI ourselves. Our study and personal experiences have shown us that involving SwDs in developing AI software and mobility aids is essential. You cannot merely wait to make changes for SwDs until after you have finished testing or evaluating. This is a vital stage in the design process. We need genuine co-design, where SwDs are fully integrated into the design team and process. The study also suggested using AI as part of an inclusive education teaching strategy, which does not include labelling students as having any form of disability. It also proposes using innovative teaching strategies to foster an open classroom where SwDs feel safe voicing their opinions and raising concerns about how they may most effectively use AI to further their education in 21st-century inclusive classroom settings.

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