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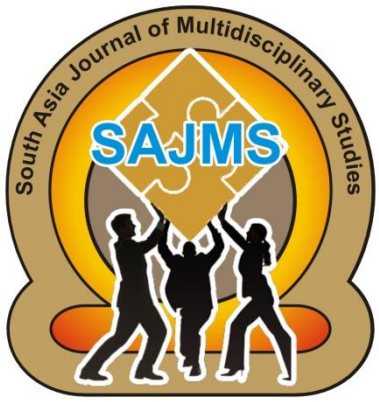

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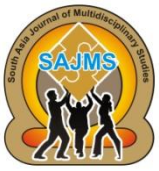
Mailing Address
Business Manager 4830/24, Ansari Road Darya Ganj
New Delhi-110002
India
Principal Contact
Dr. Rajiv Kaushal
Chief Editor
Regional Office, South Asia Management Association 4830/24, Ansari Road Darya Ganj New Delhi-110002 India
Phone: 9644794563Email: chiefeditorsajms@gmail.com
Support Contact
Anil Mehra
Email:-chiefeditorsajms@gmail.com



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Mailing Address
Business Manager, 4830/24, Ansari Road Darya Ganj
New Delhi-110002
India
Principal Contact
Dr. Rajiv Kaushal
Chief Editor
Regional Office, South Asia Management Association 4830/24, Ansari Road Darya Ganj New Delhi-110002 India
Phone: 9644794563
Email: chiefeditorsajms@gmail.com
Support Contact
Anil Mehra
Email: chiefeditorsajms@gmail.com

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TABLE OF CONTENTS

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GROWTH PERFORMANCE WITH REFORMS: INDIA AND CHINA

Dr. Deepchand[1]

[1]Assistant Professor

[1]Political Science Umrao Pachari Badi, Jhunjhunu, Rajasthan

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ABSTRACT: India and China are the emerging global players today with high growth rates. Both are aggressively redrawing the world economic landscape through their spectacular performances. The two economies together account for 40 percent of the world population, 9 percent of the world's GDP at market exchange rates and 16 percent of the world's GDP in purchasing power parity terms. Over the last quarter century, both the economies instituted pervasive economic reforms and their growth accelerated. However, they did not follow similar growth paths. For its growth, China has pursued typical East Asian model of manufacturing- led growth; on the other hand, India followed the path of service-sector led growth. While initially, both were largely autarkic nations, not integrated with the world market, China acted more quickly to embrace globalization. China started reforming its centrally planned, non-market economy in 1979. It enthusiastically lowered trade barriers and welcomed foreign direct investment [FDI] with no inhibitions. In addition, China experienced explosive growth in its industrial sector and gained control of the world markets for low-technology, labor intensive manufactures. India's economic reforms began in 1991; more than a decade after China began liberalizing in 1979. The growth rate of the Indian economy doubled from the previous Hindu growth rate as a result of market oriented reforms and opening up of the economy; but the growth still lagged that of China. There was no significant difference in the economic performance of India and China roughly until 1980, when their per capita incomes were also similar. Since then, the economy of China has outperformed India by a wide margin. Starting with more or less the same level of economic development in 1985, China's per capita income today is more than double that of India's. China has miraculously transformed itself to the world's largest exporter, has the world's largest foreign exchange reserves, largest current account surplus, and it would soon be the second largest economy of the world, displacing Japan.

KEYWORDS: Economic, Displacing, Aggressively.

INTRODUCTION

In its developmental process Chinafollowedthe classic pattern of moving from primary to manufacturing sector. Its growth was driven by an expansion of manufactures which were largely exported and a large part of the incremental income was saved and invested in infrastructure. However, India has not focused on manufacturing in the same way as China did. India's trajectory has used the skill of educated middle class to boost services like software, telecom, airlines banking etc. Asia's growth has traditionally been through low-cost manufacturing. No country has grown by expanding its service sector first. The share of manufacturing has always been above 40 percent in China throughout during the last four decades in contrast with India where its share has

wavered only around 25 percent during the same period (table-1).

Table-1:Sector-wise Breakup of GDP in China and India (%)

	1980	1990	2005	2008	2018
INDIA :					
Agriculture	40	33	20	17	27
Industry	23	26	27	29	39
Services	37	41	53	54	68
CHINA :					
Agriculture	30	27	12	11	21
Industry	49	42	47	49	52
Services	21	31	40	40	51

Source: RBI –Handbook of Statistics-various issues.
World Development Report – various issues.

PATTERN OF STRUCTURAL CHANGE

During their process of development both the nations have cut the share of agriculture sector in total investment, along with rapid fall in this sector's contribution to GDP. In India the share of primary sector in GDP fell from 47 percent to 17 percent in last four decades, but its share in employment is still more than 60 percent. Share of manufacturing is as low as 29 percent. Till 1980 share of agriculture was the largest at 40 percent of GDP. By 1990 services overtook agriculture and its share rose to 41 percent. Since then, service sector is the fastest growing sector in India with more than 54 percent of GDP coming from it (table-1). In China industry has always had the largest share in GDP. The share of services has continuously grown since 1980 but still industry contributes 49 percent to GDP while services 40 percent to GDP. The share of agriculture has fallen from 35 percent to 11 percent of GDP in China. The benefitting factors for the manufacturing-sector led growth of China have been: high domestic savings rate, huge FDI inflows and efforts on infrastructure front. High savings were coupled with domestic consumption being held in check. During 90s foreign inflows jumped substantially and much of China's dazzling infrastructure was built during this decade. India's economic growth has been fuelled by service sector benefitting from the skill of educated middle class. India is a rising power in software design services and precision industry. India has taken advantage of buoyant external demand for services. Exports of software and IT-enabled services have risen at the compound growth rate of 38percent a year since 1995. Perhaps, lack of infrastructure was a factor in entrepreneurs choosing services rather than manufacturing. However, with a rise in its savings rate in recent years India is already beginning to compete well in complex manufacturing such as chemicals, engineering goods and machinery, automobiles and auto parts.

DIFFERING FOCUS ON INVESTMENTANDPRODUCTIVITY

Chinese growth model has meant high investment rate. China's investment to GDP ratio has increased from 33.2 percent in 1982 to 44 percent in 2007 compared to a rise in India's investment share of GDP from 21.7 percent to 36 percent during the same period (Table-2). This difference in investment alone is enough to explain the difference in aggregate growth between the two nations. Investment rates have been financed by a high domestic savings rate, lower interest rates, and large retained earnings from corporate profits. China has historically maintained a high rate

of savings. When reforms were initiated in 1979, domestic savings were 32 percent of GDP. Most of the savings during this period were generated by the profits of SOEs. Economic reforms led to substantial growth in household savings. Since then savings as percentage of GDP has steadily risen in China; it has reached 54 percent of GDP in 2008 (Table-3), among the highest savings rate in the world. During its process of growth, China recycled exports revenue into fixed investment. As capacity expands in line with rapid economic growth, the domestic economy does not suffer from high inflation. In fact, inflation has never been very high in China. Massive increases in fixed investment along with better management have also enabled China to raise manufacturing productivity by 20 percent per annum over a decade. It achieved unprecedented economies of scale for productivity gains leading to its industrial competitiveness. In infrastructure, economies of scale have cut capital costs in transportation, telecom and electricity to much below those of any other economy. Although capital accumulation and cheap labor were important; a sharp and sustained increase in productivity, spurred by 1979 marked oriented reforms, was the driving force behind the economic boom of China. Such explosive growth in productivity is remarkable.

Table-2: Investment as percent of GDP in China and India

	1992	**2001**	**2002**	**2007**	**2018**
China	36.2	38.5	41.0	44.0	54.0
India	23.8	22.3	22.8	36.0	45.0

Source: World Development Report -various issues.

Table-3: Gross Domestic Saving as percent of GDP in China and India

	1992	**2001**	**2002**	**2008**	**2018**
China	37.7	41.0	44.0	54.0	62.0
India	21.8	23.5	24.2	36.4	42.0

Source: World Development Report -various issues, RBI – Handbook of Statistics.

Two major areas where India's economic growth has suffered when compared with China are lower productivity and low capital accumulation. The bedrock of China's industrial competitiveness is rapid productivity gains and not cheap labor or an undervalued currency. Gopalan's (2001) estimates of labor productivity in manufacturing suggest that except in petroleum products and non-electric machinery, the productivity of Chinese worker is higher than that of an Indian worker by anywhere in between 30 percent to 150 percent depending on the product. India has poor penetration in fixed investment. India's fixed investment was 3.6percent of GDP compared with 9 percent of GDP in China (2005). One of the major areas of difference in the capital expenditure of the two countries is the investment for infrastructure. China's investment in housing construction was 10 percent of GDP versus 4percent for India in 2005 (Statistical Yearbook, China). China's steel and cement demand is about 7 to 10 times that of India. In contrast to India's neglect of the basic infrastructure, China has invested its surplus heavily in infrastructure such as railways, power, telecom, roads and water management. In India, with the opening up of the economy, foreign investment was

concentrated in consumer durable sectors where it is quick yielding and with drawl is easy. China's massive investment in public works proved to be a successful formula for rapid growth and job creation. India has savings rate only a little more than half of China. As a result, it has far less in the way of internally generated funds available to put into infrastructure. However, it may be argued that investment in physical capital is not the only source of growth and in part it could be substituting for other sources which could be contributing more to India's growth. Indeed, growth in total factor productivity according to some estimates was higher in India, in at least part of the 1980-2001 periods.

CONSUMPTION PATTERN

The driving engine of Chinese economy has been investment, while for India it has been consumption. In 2008 the ratio of household final consumption expenditure to GDP was 56 percent in India compared to 37 percent for China (WDR-2010). A relatively higher private consumption to GDP ratio of India shows that domestic consumption of goods and services is a major contributor towards real GDP It is one of the key reasons why India was able to register the current high level of growth, a great attraction for both domestic and foreign investors. China's low private consumption share to GDP reflects country's reliance on investment that crowds out consumption. India's comparatively higher share of consumption to GDP has been mainly due to its active consumerism culture, larger share of household income in GDP and populist attitude of the government. Demand in China comes from exports to developed nations while in India most demand is based on domestic consumption growth. That is why China has surplus in current account while India has a deficit. Although China's share of consumption in GDP is lower compared to India, its absolute consumption spending has been larger, which may be due to its higher per capita income. China's consumption growth has been higher at 7.6percent over the past 10 years compared with India's 5.8 percent. China's consumer product market is about three to ten times that of India. Since 1980s, both India and China have witnessed a clear shift in their consumption basket on account of factors such as changing demographics (a rise in the proportion of young population), increase in per capita income, fast emerging retail sector, and improved access to financing. A declining share of primary products is being observed. However, the penetration rates of consumer products higher in China than in India since China's per capita income is 2.5 times that of India.

TRADE PERFORMANCE

Economic reforms have transformed China into a major trading power. Over the past four decades, it has shown commendable performance on trade front. It has registered rapid growth in exports involving aggressive increases on the world market shares. China has increased its share in world merchandise exports from 1.2 percent in 1983 to 9.1 percent in 2008. During this period India's contribution in world trade has grown marginally from 0.5 percent to 1.1 percent. China's over reliance on exports for enhancing economic growth is clear from the fact that its export to GDP ratio has increased to 38percent in 2005 from 7 percent in 1980. India's exports to GDP ratio stood at 19percent in 2005 rising from 6 percent in 1980 (Table-5). Bottlier (2003) points out that although growth of China's services and merchandise exports

far outpace average growth of world exports, its merchandise exports grew much faster than service exports, so that the share of services exports in total exports has fallen to one of the lowest such ratios for any major country. He notes that, in contrast, India's service exports are growing at about double the rate of its merchandise exports, and if current trends continue, the share of services exports in total exports will exceed 50percent in a decade. Today, China is the largest exporter of the world .The ratio of trade to GDP is 72.5 percent for China while it is 49 percent for India (WDR-2009). India lags China substantially despite an improvement in the trend over the past few years. China's growth in merchandise exports is phenomenal, more than quadrupling during 1983-2002. In India, manufacturing sector has not grown at a desirable pace during 1980s and 2000 period. Manufactures constitute 93 percent of the total exports of China (Table-4) while this sector's share in India's total exports is much lower at 63 percent in 2008.

Table-4: Breakdown of Economy's Total Exports (2018) (percent)

	China	**India**
Agriculture products	3.0	12.0
Fuels, mining products	3.2	24.4
Manufactures	90.1	59.2

Source: REITI (Research Institute of Economy, Trade, and Industry).

The key factors constraining manufacturing exports of India are: less supportive business environment, lack of world class infrastructure, inefficient tax laws, inflexible labor laws, and government interference. However, in recent years, India has achieved breakthrough in trade. Exports grew at 25 percent a year in 2002-05 compared with 10 percent in ten year period prior to this. Even then India's export base at 19 percent of GDP in 2005 is much lower than that for China with 38 percent and so its export performance is not enough to drive the economy's strong growth. India has taken advantage of its flexible financial market to attract foreign capital for its growth. India has taken a lead in high end commercial services exports mainly IT software, ITES business process. They currently account for 40 percent of India's total services exports. India has notably outstripped China in IT sector primarily because of the lack of facility with English language among Chinese and the absence of experienced project managers in China. India is also ahead of China in pharmaceuticals, chemicals, and automotive products which will continue will continue to remain growth drivers in exports sector. India is beginning to make inroads into manufactured exports with the implementation of reforms and a rise in savings rate since 2000.

Despite entrepreneurial vitality and cheap and abundant labor in the country, manufacturing in India is nowhere near China in terms of contributing to GDP growth. Besides overhauling antiquated labor laws, India must create opportunities by dismantling hurdles to private investment in infrastructure and retail, boosting agriculture – industry linkages and reframing land acquisition rules so factories can start up easily.

ROLE OF FOREIGN INVESTMENT

Much of China's dazzling growth has been due to substantial jump in foreign inflows to

which it opened its door in 1980s. It has been brilliant in attracting FDI as a means to acquire technology, managerial expertise, and factories on a scale and with scope that is hard to believe. In 1990 net foreign direct investment accounted for 1.0 percent of GDP in China compared to only 0.1 percent of GDP in India. In 2005 it rose to 3.5 percent in China and 0.8 percent in India. The total foreign exchange reserves of China are exorbitantly high at an amount of $1528 billion as against merely $ 283 billion for India. Improved physical infrastructure in China provided opportunity for TNCs to produce, move goods and services efficiently and minimize costs so that they can compete globally on cost advantage. In India, FDI and FII inflows have jumped only since 2000. Environmental and bureaucratic obstacles including lack of transparency, hazy rules, cumbersome tax laws, procedural complexities, land acquisition problems, rigid labor laws etc. are responsible for relatively lower foreign inflows in India compared to China. Since liberalization, stock market has become a major source of financing for corporate. A large part of India's recent growth has been driven by liquidity provided by foreign institutional inflows (FIIs). Low interest rates and buoyant assets markets have created a feel good factor that has led to high growth of Indian economy. China has used foreign money to build infrastructure on which liquidity outflows have no impact. China's sprawling success in attracting FDI is partly a historic accident since it has a wealthy Diasporas. During 1990s more than half of China's FDI came from overseas Chinese sources. Indian Diasporas has accounted for less than 10 percent of the foreign money flowing to India.

Creation of special economic zones (SEZ) has been a grand success in China. Over 20 percent of FDI flows into SEZ and it has generated 10 percent of exports. The first SEZ in China was set up in 1980 as soon as the nation embarked on economic reforms. On the other hand, India's SEZ policy was launched in 2001, a decade after the initiation of economic reforms. While China established SEZ close to ports or major industrial locations, in India SEZ have been approved arbitrarily across the country in large numbers. FDI inflows in Indian SEZ are very erratic and insufficient.

QUALITY OF LIFE

As compared to India, China also scores higher than India on human development indicators such as living standards, poverty ratios, female adult literacy, and life expectancy rate by a wide margin. Good education and health facilities are crucial for sustained and inclusive development. They are state subjects in both the nations. Local government has a large share of responsibility for their provision. China has surpassed India by focusing intensively on primary and secondary education. The human development rank (HDI) of China is 92 much ahead of India which is at 134th place. Table-6 provides a bird's eye view of the comparison of the two economies in terms of quality of life indicators.

It has been widely acknowledged that poverty has declined significantly in both the countries since 1980s after both experienced substantial acceleration in their growth of per capita income. In India, official estimates reveal that the proportion of poor in the population, using national poverty line, declined from 45.7 percent in 1983 to 27 percent in 1999-2000 in rural areas, and from 40.8 percent to 23.6

percent during the same period in urban areas. For the country as a whole, poverty declined from 44.5 percent to 26 percent.Sundaram and Tendulkar (2003) estimate the decline to have been from 46 percent to 27 percent in the country as a whole. Hu, Hu, and Chang (2003) report that, according to official data, the proportion of poor in the rural population of China fell steadily from 33percent in 1978 to as low as 3.7 percent in 1999. The incidence of poverty is still very high in India compared to China. Over the past 25 years regional disparities in growth have significantly widened in China as well as India. Rural China and western regions lag far behind urban China and coastal regions. The deliberate policy choice of the Chinese government to concentrate reforms and external opening to coastal cities and SEZs contributed to their growing faster and moving ahead of other regions, particularly in the west. In India, there was no such deliberate effort in terms of policy, however, groups and states, that were initially better placed in infrastructure and human development grew faster than others not so well placed. According to National Sample Survey and RBI estimates on the growth of net state domestic product in 5 fastest and slowest growing states among 16 large states in India during 1980s and 1990s, the fastest growing state, Delhi, grew at nearly 2.5 times than the slowest growing state of Kerala in 1980s and more than 5 times the then slowest growing state of Assam in 1990s.

ESSENCE OF CHINA'S MIRACULOUS SUCCESS

The above analysis clearly reveals how China has gone way ahead of India in almost all the parameters of economic growth and has created a miracle over past three decades. It has enjoyed a sustained stability for this entire period as a precondition for modernizing a huge nation. Indeed, China's model of growth has outstripped all models advocated by the west for developing countries. The strength of the China's model lies in the fact that it enjoys masses support, blends well with the countries own cultural traditions, and it has taken shape in the midst of international competition. Its approach towards reforms provides useful lessons for other transition economies. Such miraculous performance may be attributable to the following factors:

1. Primacy to Poverty Alleviation and People's Livelihood: The secret of unprecedented success story of china is its effort on poverty eradication front. At the time when reforms started, there was widespread poverty in the rural areas of China. Deng Xiaoping's large scale modernization program took off in 1979. Prerequisites for growth already existed since Mao era. China phased out rigid commune system and empowered farmers as a strategy to wipe out poverty. It met with great success. In the process of rapid economic development nearly 400 million people was lifted out of poverty. China has also been successful in introducing flexible labor system.

2. Big Impetus to Agriculture and Rural Economy: Success of reforms on rural front set the Chinese economy moving. China adopted a new agriculture strategy which did not compete with industrial expansion. It focused on mass mobilization of rural labor to work on labor-intensive projects such as flood control, irrigation, and reclamation of land. A massive decollectivisation program was initiated whereby the land was contracted out or distributed to rural agriculture input prices. The farmers were given incentives to work

hard and prosper. All this gave a big push to the rural economy. A Positive chain reaction led to rise of millions of small and medium sized entrepreneurs accounting for more than half of China's industrial output. In India there have not been any major reforms in agriculture since the beginning of reform process in 1991. Over the entire reform period, the government spending on infrastructure for agriculture has been quite low. Total public spending on agriculture dropped to 0.4 percent of GDP in 2004 from 0.6 percent in 1991. Even today only 40 percent of land is irrigated in India.

3. Constant Experimentation Approach: In China growth started with market oriented economic reforms and modernization program introduced by Deng Xiaoping. The government initiated gradual experimentation approach in the rural sector and later followed it up to the industrial sector. After the success of first set of reforms in agriculture sector, the government launched a big-bang industrialization plan with liberalization of product pricing, introducing a new system which involved rewarding local governments for promoting development, reforming loss-making state owned enterprises. This was followed by testing other new ideas like granting of greater autonomy of management to SOEs, encouraging external trade, setting up SEZs, attracting FDI, encouraging high tech joint ventures and other such experiments which became growth drivers for China. This cautious approach of gradual reforms enabled China to maintain much needed stability.

4. Long –term Strategy and Correct Sequencing: During its transformation since 1979, China has rejected both the Soviet model and western style democratization and explored its own path of development. It has shown to the world country's peaceful rise and mutually beneficial cooperation with other countries. As early as mid 1980s, Deng Xiaoping's government framed a strategy of next seventy years of development and modernization for the country. Its successive governments have unswervingly pursued it till this day. China's reform process has reflected a clear pattern of change: soft reforms followed by more difficult ones. Advantage of this approach is that lessons and experiences gained in the first stage of reforms generate conditions for the next stage of change. In 1980, China created SEZ, which enjoyed special policy benefits such as good infrastructural facilities along with lower tax rates. The success of these SEZs led to the creation of more such zones and this has been a corner stone of the success of China's reforms. The reforms of late 1980s and early 1990s were directed towards creating a price driven market economy and reducing the role of state in resource allocation. During late 1990s the reform focused on shutting down loss making enterprises and dealing with insolvency in the banking system. With the start of 20th century, China increased its focus on narrowing income inequalities. Today, one can witness the rapid modernization of infrastructure, including new super highways, airports, telecom facilities among others.

5. Good Governance and Performance Criterion: China has traditionally believed that the quality of a political system has to be defined by its substance, i.e. good governance. It is tested by what it can deliver to its people, and not merely by correct procedures. Their philosophy is that substance will evolve right procedures. Criteria such as performance in fighting poverty, attracting FDI, ensuring cleaner environment have become key factors in the promotion of officials. Representatives

are chosen from top performers at different levels of responsibility.

6. Innovations and Appetite for Learning: China has undergone a series of institutional innovations in the process of reforms. The country has a long tradition of selective cultural borrowing, drawing useful elements and foreign ideas to enrich its own system. It has exemplified Socialist Market Economy, combining positive role of state-intervention with market efficiency in resource allocation. A good example of China's innovativeness is its land tenure system where land ownership remains public, yet individuals have long term renewable land-use right. The joint ventures between Diasporas and local residents, incentives in tax holidays, lease and ownership rights to foreigners, bilateral tax treaties and many such measures helped China in its development. China has created the world's largest real estate market in less than two decades. It has to its credit world's second largest expressway network in one decade. The country has adopted its own path of development rejecting both the Soviet Model and western style democratization.

7. An Enlightened, Strong Developmental State: The state of China took economy's initial conditions into consideration and exploited all favorable internal and external factors. The specific design and sequence of reforms were induced rather than imposed. Chinese state has been successful in shaping national consensus on the need for reforms and modernization. Over the years China has ensured political and macroeconomic stability. It remains state-run but is witnessing an increasing commercial class and is very pro business. India is a democracy but also with a strong bureaucracy and continues to be under state control on many key industries. Structural changes made in the Chinese economy can be demonstrated through development of Shanghai and its modern infrastructure. Shanghai has achieved a growth rate of 10 percent for last ten years. The state has followed the policy of decentralization of economic decision making to local governments and the creation of incentives for local governments. Indian economy is plagued by ethnic and religious tensions, and it has also had a long standing dispute with Pakistan over Kashmir. China, on the other hand, has enjoyed two decades of tranquility; it has been able to focus almost exclusively on economic development.

LESSONS TO LEARN AND ROAD AHEAD

Although India's growth performance has been impressive, it needs to be made more inclusive through stimulating agriculture growth. Country's service sector is strong but manufacturing is weak and the two sectors need to be linked. In India a manufacturing boom is required to employ its huge population. China's promotion of SEZ for manufacturing sector suggests that well designed and sector specific government policies can improve the investment climate of a country and allow developing countries to compete globally in new fields. SEZ, in China, have been instrumental in enhancing exports and attracting foreign investment. India has not been successful in developing SEZ to the desired extent. Large real estate companies have grabbed land from the state government at throw away prices. India must redesign its SEZ policy, emphasizing on a greater role of the government in developing the zones. A whole new package that suits India's need is required to ensure the success of SEZ. Infrastructure has to be developed on a war

footing using foreign exchange reserves and public sector off loadings. India's strong entrepreneurial business culture, increasingly favorable demographics, and growing middle class fuelling domestic consumption can be an advantage in making India an economic prowess. The country offers better long term returns on stocks than China, given the outlook for corporate earnings and economic growth. Greater economic freedom has to be created by reducing government interference, reducing fiscal burden and striving to balancing development in different regions of the country.

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COAL MINING AIR POLLUTION IS A MAIN CAUSE OF TUBERCULOSIS?

Dr. Anamika Singh[1]

[1]Department Of Zoology

[1]Govt. Model Science College (Autonomous) : NAAC Reaccredited 'A' Grade,
College with Potential for Excellence (UGC) Centre of Excellence for Science Education
(Govt. of M.P.) Jabalpur, 482001, M.P. India

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ABSTRACT: Coal mining is a basic need of our country's energy demand. But is a dirtiest of all energy resources. It is a causative factor of many respiratory and cardiovascular diseases like bronchitis, bronchial obstructions, tuberculosis and the killer disease Pneumoconiosis. This disease causes many premature deaths in Hasdev valley region. The concentration of suspended particulate matter in Rajnagar open cast mine in summer season was found to be 648 and 653 microgram/meter^3 while RSPM was found to be 258 and 270 microgram/meter^3 in year 2014 and 2015. In Ekta Nagar colony the SPM concentration was found to be 549 microgram/meter^3 in 2014and 556 microgram/meter^3 in 2015 and RSPM was found to be 185 microgram/meter^3 in2014and195 microgram/meter^3 in2015This gives an alarm for the persons living in this area. In the same period, the health survey results shows that more than 50% of peoples of more than 30 years of age group are suffering from respiratory problems, and another 50% having small respiratory problems like shortness of breath, cold and cough in more than 2 to 3 months in a year.

KEY WORDS: Spm, Rspm, Respiratory Problem

INTRODUCTION

Tuberculosis (TB) is generally considered to be linked to industrialization and urbanization. This research is based on research-based on lung disease caused by coal mining pollution in the mining area and focusing on conditions of public health importance arising from coal dust exposure. Air pollution from biomass fuels have been implicated as risk factors for tuberculosis (TB) infection, disease, and death the burden of non-smoking COPD is therefore much higher. About 3 billion people, half the worldwide population, are exposed to smoke from biomass fuel compared with 1·01 billion people who smoke tobacco, which suggests that exposure to biomass smoke might be the biggest risk factor for COPD globally. While mining exposures contribute significantly to lung disease, smoking is a major factor in the development of lung cancer and chronic obstructive airways disease necessitating a comprehensive approach for prevention and control of mining-related occupational lung disease.

Coal play a very important role in Indian economy. Many industries are directly or indirectly depends on coal and coal derivative products like coke. It is such a tragic that after 69 years of our independence and God gifted wonderful natural resources for electricity generation, now today we still depends on coal for fulfillment our countries energy demand. Above all fact,we say that coal is backbone of development of India like growing economical

countries. Coal consumption is increasing in these countries day by day and for fulfillment of this demand, coal production is also increasing. and due to that coal mining pollution is also increasing. From mining to coal cleaning, from transportation to electricity generation and to disposal, coal releases numerous toxic pollutants in air, water and land and they disturb ecosystem and endanger human health. Mining is dangerous and it is a cause of high injury and mortality rate which rates it as potential health and safety hazard including respiratory illness such as emphysema, black lung diseases and chronic bronchitis due to exposure to toxic fumes and gases, noise induced hearing loss, heads stroke, exhaustion etc

India is 3rd largest coal producer in the world. Total coal production of India in the year 2015 was 462.482 million tones. India cover 7.2% worlds total coal production. In spite of all that, India didn't exports coal because it itself uses its 70% of total coal production for electricity generation and rest of it for cement and steel plants. Not only India, but many other developing countries, especially those dependent on oil imports to meet their energy requirements, lay great emphasis on the production and development of coal in order to fulfill their demand for energy.

Total 55O Collieries are coming under these companies Governance In which 144 Collieries are open cast, 295 underground and 31 are mixed type Collieries. In these Collieries, approximately 5.5 lack workers are working. Total 93 Collieries are coming under SECL Governance in which 72 underground and 20 open casts and 1 mixed type mine are present. In which 82,782 workers are working.

METHOD: Study area of the present study is basically situated in the Hasdev vally region .Total 14 working mines are established in this area. Approximate 1.5lac peoples are living in this area in which Most of the persons are working in the coal mines. For the study 6 sampling site are chosen according to working and residential area. In this region, Rajnagar is the only open cast mine and other 13 are underground including Palkimara, is selected for the study, because it is only 3 k.m away from the Rajnagar opencast mine.

SAMPLING SITE

1. Palkimara underground mine
2. Rajnagar open cast mine.
3. Ekta nagar colony-This colony is situated in between Rajnagar and Palkimara mine. It is basically a workers colony some tribal's also lives in this area
4. Shanti nagar colony- it is situated 3k.m north side from Rajnagar and 5 kilometer away from palkimara .It is a basically tribal's area and mine workers also live in this area.
5. Jhagarakhand –it is a village which is situated 7k away from mining site.
6. V.I.P.geust – It is 9k away from mining site and a very low population area.

Air monitoring on selected sampling station is done for the following Parameter

PARAMETERS

1. Suspended particulate matter (SPM) more than 10 >100 microns.
2. Respirable particulate matter (RSPM) more than 2.5 < 10 microns.
3. NO_2 (Nitrogen oxides)- Analyzed by Jacob and Hachkhochheiser 1958 method.
4. SO_2 (sulphur dioxide) - By west & Gaeke(1956) method
5. SPM and RSPM were analyzed by Respirable dust sampler

Test for T.B (tuberculosis) done by sputum analysis

SPUTUM ANALYSIS: Sputum analysis done by acid fast bacillus staining method.

MICROSCOPIC EXAMINATION: observe the slide under low power objective and then examine under oil immersion objective. Acid fast (AF) organisms: Bright red Bacillion blue back ground. Other organism; Dark blue by using malachite green

ARTIFICIAL: yeast cells take up and may look like AF organisms

No. of acid fast bacteria in the Field	Report
None	Absent
1 to 2	positive +
2 to 10	Positive ++
10 to 100	Negative +++
above 100	positive ++++

THE POSITIVE FINDING REPORTED AS FOLLOWS

2. Spirometric Analysis: - In this spirometric analysis we go to workers and the test is performed in 3 times, will record the maximum reading and make a curve of expiratory volume. This test helps to find the vital capacity of workers lungs and also helps to know asthma bronchitis, Dysponea and shortness of breath and difficulty in breathing in workers.

TABLE 5.1- Spirometric Analysis Table

Zone	Reading	Description
Green Zone	80 to 100 percent of the usual or normal peak flow readings are clear.	A peak flow reading in the green zone indicates that the asthma is under good control.
Yellow Zone	50 to 79 percent of the usual or normal peak flow readings	Indicates caution. It may mean respiratory airways are narrowing and additional medication may be required.
Red Zone	Less than 50 percent of the usual or normal peak flow readings	Indicate a medical emergency. Severe airways narrowing may be occurring and immediate action needs to be taken. This would usually involve contacting a doctor or hospital.

RESULT

Air pollution monitoring of the study the shocking result are obtained in the Hasdev area Many people are dying because of this coal mining air pollution most polluted area between all six station was Rajnagar open cast (S2) mine where SPM concentration in summer season was found 648 $\mu g/m^3$ in 2014 and 653 $\mu g/m^3$ in 2015 and RSPM is 258 $\mu g/m^3$ in 201 and 248 $\mu g/m^3$ in 2012-13 the most polluted residential area was Ektanagar(S_3) colony where SPM concentration in summer season was 549 $\mu g/m^3$ in 2014 and 556 $\mu g/m^3$ in 2014, RSPM was found 185 $\mu g/m^3$ in 2014and 195 $\mu g/m^3$in 2015. This difference was found because of early monsoon in 2012-13. SO_2 and NO_2 concentration was found with in the (CPCB) pollution standards.

SPUTUM ANALYSIS

In the 2 year study period, total 2076 slides were stained at the average of 1038 slides per year in which 386 slides were found positive. Patients are coming for diagnoses were differentiated as new diagnosed and follow up patients. Follow up patient are the patient who are suffering from T.B and their treatment was continued under Dot's program. New patients are the patients who are suffering from cough and cold and coming into the hospital for diagnosis.

In the study it was found that 45, 74 new diagnosis T.B patients in 2014-15 and 23, 51follow-up patients was found in corresponding years.

In New diagnosed patients total 49 patients were found 1º positive, 43 was found 2º positive and 27 were 3º positive. In follow up patients 12 were 1º, 51 was 2º, 123 was 3º positive patient.

Sputum Analysis Summary No. Of T.B Patients According To SPM &RSPM Concentration

YEAR	2014	2015
SPM CONCENTRATION	486	547
RSPM CONCENTRATION	174	177
NEW DIAGNOSIS T.B PATIENTS	45	74
FOLLOWUP PATIENTS OF T.B	23	51

Concentration of SPM & RSPM

TABLE-1 VARIATION OF SPM & RSPM CONCENTRATION IN SUMMER SEASON 2014&2015

Unit -µg/m^3

SPM

Sampling Station	SMV 2014	SMV 2015
S1	621	629
S2	648	653
S3	549	556
S4	551	560
S5	512	520
S6	439	445

RSPM

Sampling Station	SMV 2014	SMV 2015
S1	246	253
S2	258	270
S3	185	195
S4	168	189
S5	169	178
S6	164	180

TABLE-2 VARIATION OF SPM & RSPM CONCENTRATION IN RAINY SESON IN 2014 &2015

SPM

Sampling Station	RMV 2014	RMV2015
S1	556	562
S2	561	570
S3	482	498
S4	483	490
S5	412	423

RSPM

Sampling Station	RMV 2014	RMV2015
S1	215	222
S2	229	231
S3	186	199
S4	176	186
S5	160	169

S6	317	329

S6	146	153

TABLE-3 VARIATION OF SPM & RSPM CONCENTRATION IN WINTER SEASON IN 2014 &2015

SPM

Sampling Station	WMV 2014	WMV 2015
S1	578	582
S2	589	592
S3	499	510
S4	507	516
S5	447	458
S6	320	339

RSPM

Sampling Station	WMV 2014	WMV 2015
S1	203	211
S2	239	248
S3	180	202
S4	159	167
S5	138	142
S6	129	137

Fig.1- VARIATION OF SPM & RSPM CONCENTRATION IN WINTER IN 2014 &2015

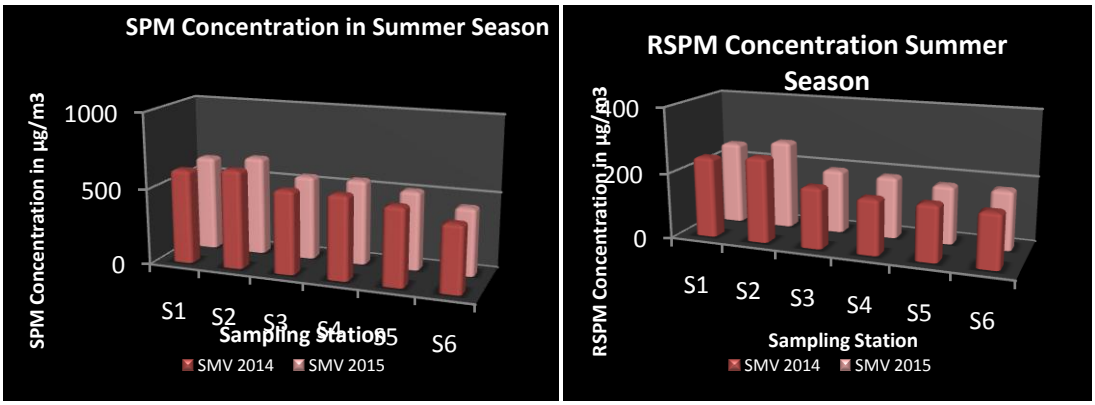

Fig.2- VARIATION OF SPM & RSPM CONCENTRATION IN RAINY SEASON IN 2014 &2015

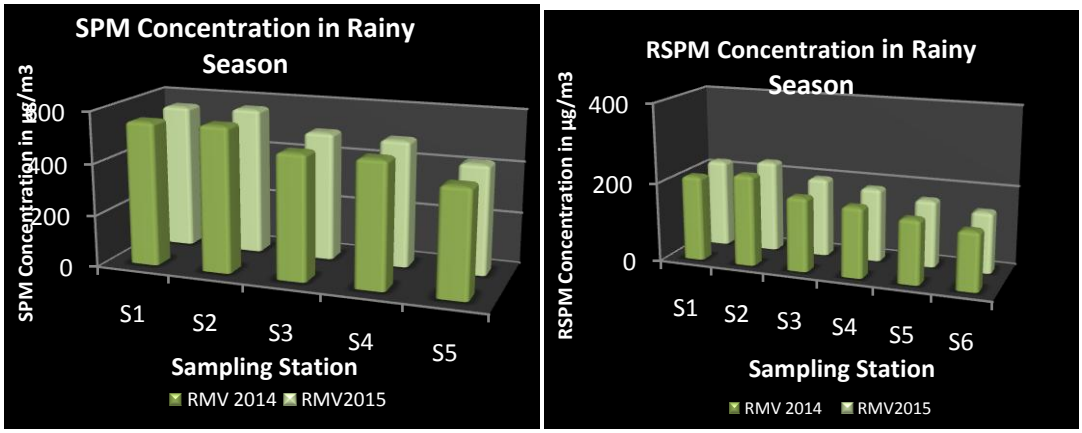

Fig.3- VARIATION OF SPM & RSPM CONCENTRATION ON SUMMER SEASON IN 2014 &2015

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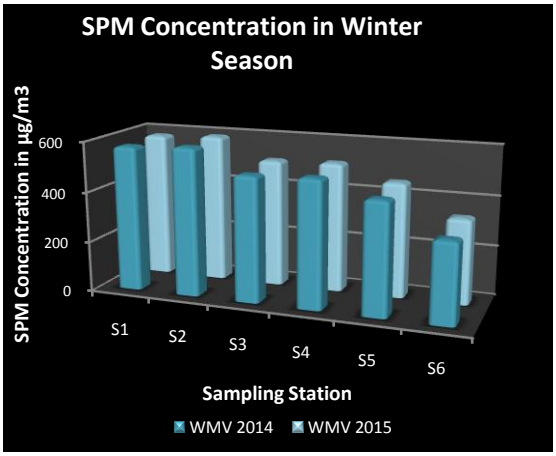

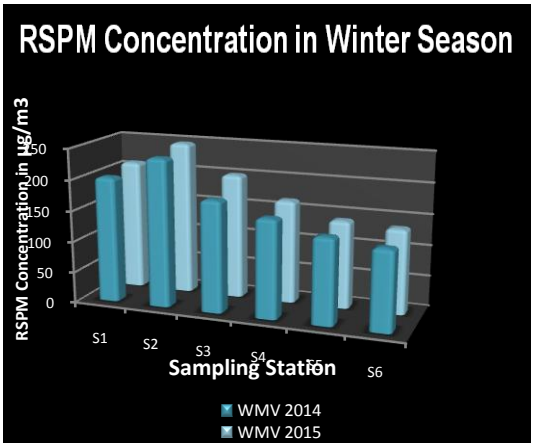

Concentration of SO_2 &NO_2

TABLE-4 - VARIATION OF SO_2& NO_2 CONCENTRATION IN SUMMER IN 2014 &2015**Unit -µg/m^3**

SO_2

SAMPLING STATION	SMV 2014	SMV 2015
S1	52	61
S2	57	63
S3	43	54
S4	42	49
S5	27	33
S6	25	31

NO_2

SAMPLING STATION	SMV 2014	SMV 2015
S1	85	89
S2	91	94
S3	75	79
S4	71	74
S5	47	49
S6	45	49

TABLE-5 VARIATION OF SO_2 & NO_2 CONCENTRATION IN RAINY SESON IN 2014 &2015

SO_2

Sampling Station	SMV 2014	SMV 2015
S1	52	59
S2	57	63
S3	43	51
S4	42	47
S5	27	32
S6	25	29

NO_2

Sampling Station	SMV 2014	SMV 2015
S1	81	84
S2	91	89
S3	73	76
S4	68	71
S5	50	58
S6	47	51

TABLE-6 VARIATION OF SO_2 & NO_2 ONCENTRATION IN WINTER IN 2014 &2015

SO_2

Sampling Station	SMV 2014	SMV 2015
S1	30	35
S2	39	44
S3	31	37
S4	26	36
S5	18	28
S6	16	26

NO_2

Sampling Station	SMV 2014	SMV 2015
S1	77	78
S2	82	84
S3	65	68
S4	61	65
S5	39	46
S6	34	40

Fig.4- VARIATION OF SO_2 & NO_2 CONCENTRATION IN SUMMER IN 2014 &2015

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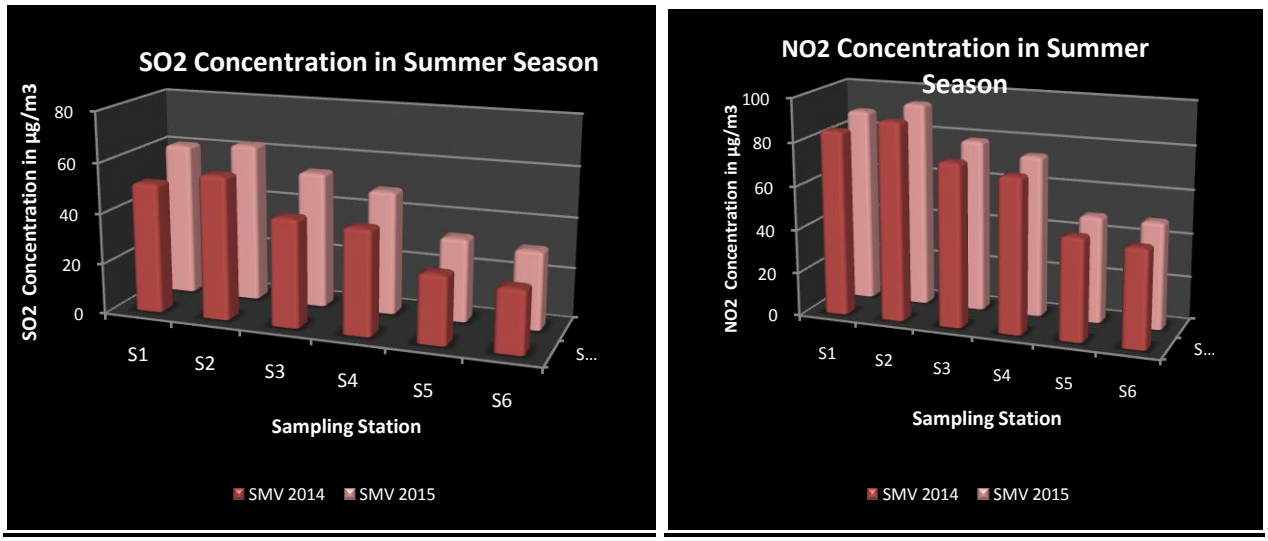


Fig.5- VARIATION OF SO_2 & NO_2 CONCENTRATION IN SUMMER IN RAINY SEASON 2014 &2015

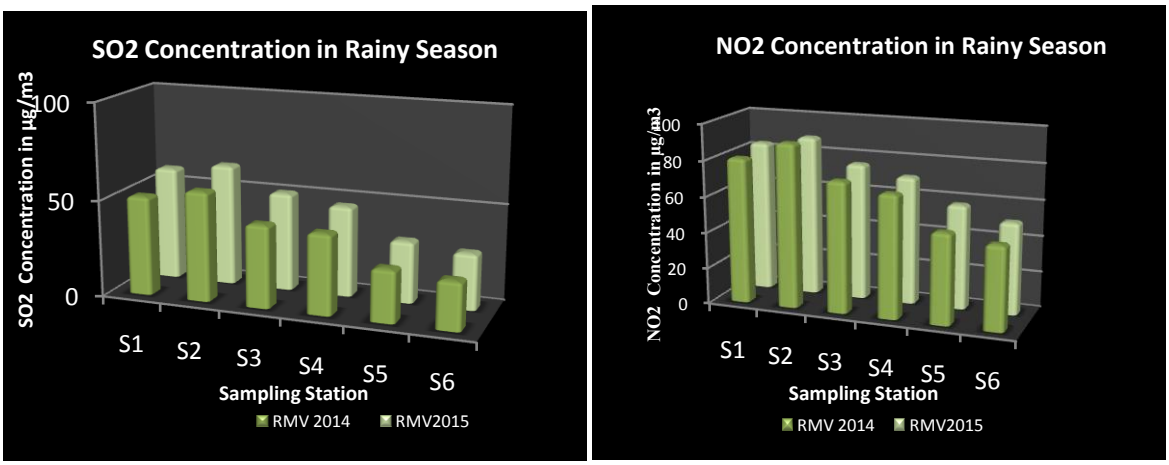
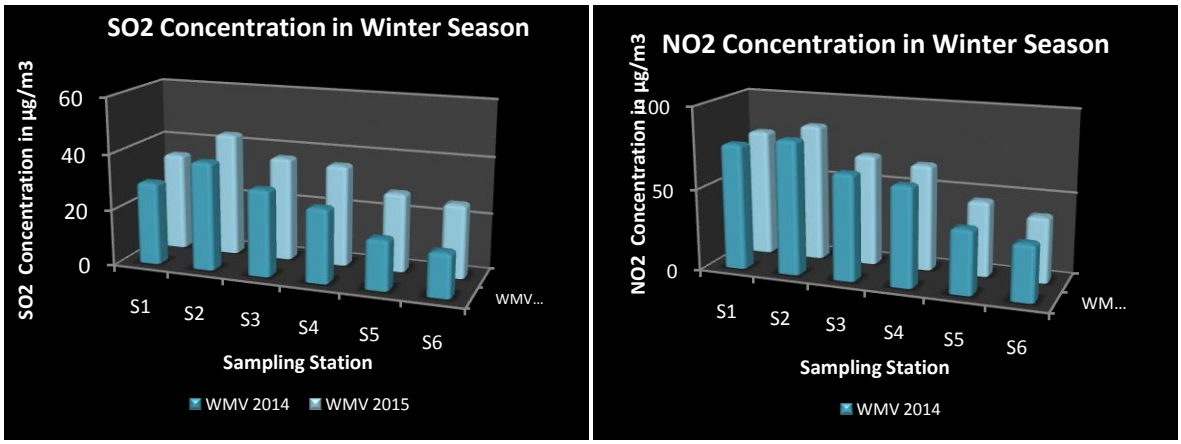


Fig.6 – VARIATION OF SO_2 & NO_2 CONCENTRATION IN WINTER IN 2014 &2015



CONCLUSION

In the present study, we are of the opinion that the great need of awareness about coal miming air pollution on diseases among the tribal's living in this area. We have to focus in using non conventional energy resources because the coal energy may be cheaper but from economical point of view, it is very expensive for health of the people living in this area, our ecosystem and environment. Concentration of SPM, RSPM, SO_2 and NO_2 are reached to dangerous level. The mining authorities must adopt prevention measures for decreasing this deadly level of pollution.

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बैंक शाखा उपलबधता एवं जनजातियों के सामजिक आर्थिक जीवन का विश्लेषण

(खरगोन जिले के विशेष संदर्भ में)

प्रो. मदन मुरारी[1]

[1]सहायक प्राध्यापक–अर्थशास्त्र

शासकीय महाविद्यालय कालापीपल शाजापुर म.प्र.

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सारांश : आदिवासी समाज और उनके सामाजिक आर्थिक जीवन के प्रति हमारे तथाकथित सुसंस्कृत समाज का रवैया क्या है? वो चाहे सौलानी पत्रकार लेख हों या समाज शास्त्री, आम तौर पर सबकी एक ही मिली जुली कोशिस इस बात को खोज निकालने की रही है कि आदिवासियों में अद्‌भुत और विलक्षण क्या है? उनके जीवन और व्यवहार में आश्चर्य और तमाशे के लायक चीजों की तलाश और हमसे बेमेल और पराए पहलुओं को अपने तरीके से रोशन करने, लोगों का ध्यान आकर्षित करने और मनोरंजन के लिये ही लोग आदिवासी समाज और संस्कृति की ओर जाते रहे है। नतीजा हमारे सामने है: उनके मौन जीवन और रीति रिवाजों के बारे में गुदगुदाने वाले सनसनी खेज ब्यौरे तो खुब मिलते है, पर उनके पारिवारिक जीवन आर्थिक जीवन की व्यथा नहीं। उनके अलौकिक विश्वास, जादु–टोने और विलक्षण अनुष्ठानुं का आंखो देखा हाल तो मिलता है, पर उनकी जिन्दगी के आर्थिक जीवन की हाड़तोड संघर्ष की बहुरूपी और प्रमाणिक तस्वीर नहीं। वे आज भी आदमी की अलग नस्ल के रूप में अजूबा की तरह पेश किए जाते है। विचित्र वेशभुषा में आदिम और जंगली आदमी की भांति। परन्तु मेरा मानना इन सबसे भिन्न और अलग है क्योंकि बदलते परिवेश नीति नियम एवं आगे बढ़ने के समान अवसरों के तहत जनजातीय समाज को काफी सुविधाऐं मिल रही है। इन्ही प्राप्त सुविधाओं के तहत मेरा यह शोध पत्र का उद्धेश्य बैंको से प्राप्त साख के कारण आदिवासीयों के सामाजिक आर्थिक जीवन में हुये बदलाओं का विश्लेषण करना है। शोध विश्लेषणात्मक प्रकृति का है जिसमें प्राथमिक संमको का प्रयोग किया गया है। तत्पश्चात शोध निषकर्ष एवं सुझाव दिये गये है।

परिचय : बैंक साख एक प्रकार का विनिमय कार्य है जिसमें कोई ऋण दाता या बैंक किसी ऋणी को वर्तमान समय में कुछ वस्तुये या मुद्रा इस विश्वास पर प्रदान करता है कि कुछ समय बाद वह उसे वापस करदेगा। बैंक जिस मुद्रा का निर्माण करती है उसे बैंक मुद्रा या साख मुद्रा कहा जाता है और इस मुद्रा का संचालन बैंको द्वारा ही किया जाता है। प्रो. वालरस के अनुसार –''साख का अर्थ पूंजी उधार देना है। ''

बैंको के राष्ट्रीयकरण के पश्चात 1969 मेंगठित गाडगिल समित ने इस बात का उल्लेख किया है कि ग्रामीण परिवेश के लिये बैंको की स्थिति पर्याप्त नहीं है, ग्रामीण क्षेत्रो में विशेषकर जनजातिय क्षेत्रों यदि शासकीय योजनाओं और गरीबी निवारण व बेरोजगारी मिटाने जैसे कार्यक्रमों का विस्तार किया जाना है तो वहा बैंकिंग साख संरचना का विस्तार किया जाये। तत्पश्चात ग्रामीण क्षेत्र के सम्पूर्ण विकास केलिए प्राथमिकता प्रदत्त क्षेत्रों विशेषकर जनजातीय क्षेत्रों में बैंको के वित्तीय प्रवाह को बढ़ाया जाये। विभिन्न योजनाओं जैसे – स्व–सहायता समूह, एन.आर.एल.एम., मेक इन इंडिया, जनधन योजना, स्टार्टअप इंडिया, स्टैण्डअप इण्डिया, पी.एम. स्वरोजगार योजना, सी.एम. स्वरोजगार योजना, कौशल विकास योजना, यूवा उद्यमी जैसी अनेको अनेक योजनाओं के माध्यम से बैंक साख का वितरण ग्रामीण क्षेत्रों एवं जनजातीयों को कर रहे है। अब जरूरत यह जानने की है कि बैंको के साख वितरण ने जनजातीय जीवन के सामाजिक आर्थिक पहलुओं को कैसे प्रभावित किया है का पता लगया जाये, इसी उद्धेश्य के साथ यह शोध पर तैयार किया गया है।

उद्धेश्य :

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1. खरगौन जिले में बैंक शाख वितरण का जनजातीय जीवन पर सामाजिक आर्थिक प्रभाव को जानना।
2. खरगोन जिले में बैंक शाख वितरण से सम्बधित नीतिगत मुद्दे एवं उनके प्रदर्शन पर सुझाव देना।

परिकल्पना : Ho–ऋण लेने के पश्चात जनजातियों के सामाजिक आर्थिक स्थिति में कोई सार्थक परिवर्तन नहीं हुआ है।

H1–ऋण लेने के पश्चात सामाजिक आर्थिक स्थिति में सार्थक परिवर्तन नहीं हुआ है।

शोध प्रविधि : प्रस्तुत शोध पत्र विश्लेषणात्मक प्रकृति का है। जिसका उद्धेश्य वास्तविक तथ्यों के आधार पर वर्णनात्मक विवरण प्रस्तुत करना है। शोध में प्राथमिक एवं द्वितीयक सभंको का प्रयोग किया गया है। प्राथमिक संमक 400 उत्तरदाताओं के अनूसूची/प्रश्नावली के माध्यम से प्राप्त किय गये है। जबकि द्वितीयक संभक जिला अग्रणी बैंक, जिला पंचायत से प्राप्त किये गये है। प्राप्त सभंको का विश्लेषण एवं निष्कार्षो की सार्थकता ज्ञात करने के लिये शोध पत्र में कई वर्ग परिकलन (Z^2)का प्रयोग किया गया है। इसमें वास्तविक आवृत्तियों (Fo) की सहायता से प्रत्याशित आवृत्तियां (Fe) निकालकर फिर निम्न सुत्र का प्रयोग कर काई वर्ग (Z^2) का मूल्य ज्ञात किया गया है:–Z^2 $\Sigma\{f0-fe/fe\}=\Sigma\{(o-e)^2/e\}$

शोध विश्लेषण : बैको के माध्यम से विभिन्न योजनाओं एवं विकास कार्यक्रमों के तहत ऋण प्राप्त करने के पश्चात खरगोन जिले की जनजातियों की आर्थिक स्थिति एवं सामाजिक जीवन स्तर में सुधार हुआ है या नहीं जानने के लिए 400 परिवारों के सर्वेक्षण के माध्यम से यह देखने का प्रयास किया गया है। जिले के जनजातियो के सामाजिक एवं आर्थिक जीवन स्तर में वृद्धि को देखने के लिये ऋण लेने के पूर्व एवं पश्चात जनजातियो की घरेलू सुविधाओं जैसे पानी की उपलब्धता तथा मनोरंजन के साधनों आदि की सुविधाओं का अध्ययन किया गया है तथा आर्थिक स्थिति में हुये सुधार को जानने के लिये ऋण लेने के पूर्व एवं पश्चात कृषि सुविधाओं का अध्ययन किया गया है।

A. ऋण लने के पूर्व एवं पश्चात घरेलू सुविधाओं का अध्ययन :

सुविधाऐ	ऋण लने के पूर्व लाभार्थी		ऋण लेने के बाद लाभार्थी	
	लाभार्थी	प्रतिशत	लाभार्थी	प्रतिशत
गोबर गैस	12	3.0	7	1.8
गैस टंकी	167	41.8	294	73.6
चूल्हा	221	55.3	98	24.5
कुल	400	100.0	400	100.0

स्त्रोत : प्राथमिक सर्वे

उपरोक्त तालिका से स्पष्ट है कि ऋण लेने के पूर्व 400 उत्तरदाताओं में से 12 के पास गोबर गैस की सूविधा थी, 167 के पास गैस टंकी व 221 के चूल्हे से खाना बनाते थे, अर्थात 55.3 प्रतिशत जनजातीय परिवार भोजन बनाने के लिये चूल्हे का प्रयोग करते थे। ऋण लेन के पश्चात गोबर गैस का प्रयोग करने वाले परिवार कम होकर 7 रह गये है। गैस टंकी के उपयोग में वृद्धि हुई है। अब 294 परिवार इसका उपयोग कर रहे है। अर्थात 73.6 प्रतिशत लोगो के पास गैस टंकी है। चूल्हे के उपयोग में कमी आई अब केवल 24.5 प्रतिशत व्यक्ति ही इसका उपयोग कर रहे है।

(B) पानी की सुविधा की उपलब्धता विश्लेषण :

सुविधा विस्तार	ऋण लेने के पूर्व की स्थिति		ऋण लेने के पश्चात की स्थिति	
	लाभार्थी	प्रतिशत	लाभार्थी	प्रतिशत

कोई सुविधा नही	21	5.3	8	2.0
ट्यूबवेल	56	14.0	86	21.5
हैण्ड पम्प	63	15.8	44	11.0
निजी	183	45.8	175	43.8
सरकारी	32	8.0	58	14.5
अन्य	45	11.5	29	7.3
कुल	400	100.0	400	100.0

स्त्रोत : प्राथमिक सर्वे

उपरोक्त तालिका से स्पष्ट है कि खरगोन जिले मे पेय जल व्यवस्था के लिये ट्यूबवेल, हैण्डपम्प, अन्य साधनों के कुए, तालाब निजी तथा सरकारी नल कनेक्शन उपलबध है। तालिका से स्पष्ट है कि ऋण लने के पूर्व व्यक्गित रूप से पेय जल की व्यवस्था करने वाले 183, जनजातीय परिवार है, 32 के पास सरकारी नल कनेक्शन, 56 ट्यूबवेल से 63 हैण्डपंप से पेय जल की व्यवस्था करते है। तालिका में 21 परिवार ऐसे है जिनके पास पानी की कोई सुविधा नही है। जनजाति परिवारों द्वारा विभिन्न योजनाओ एवं विकास कार्यक्रमों के तहत ऋण प्राप्त करनेके पश्चात पानी की सुविधा में परिवर्तन हुआ है। ट्यूबवेल का उपयोग करनेवाले 56 से बढकर 86 हो गये। जिन परिवारों के पास पानी की कोईसुविधा नहीं थी उनकी संख्या घटकर 2 प्रतिशत रह गई हैं जो पूर्व में 5.3 प्रतिशत थी। इसी प्रकार हैण्ड पम्प अन्य साधनों तथा निजी स्तर पर व्यवस्था करने वाले परिवारों की संख्या में कमी आई है। वही सरकारी तौर पर जल व्यवस्था प्राप्त करने वाले व्यक्तियों की संख्या बढ़कर 8 प्रतिशत के स्थान पर 14.5 प्रतिशत हो गयी है।

(C) मनोरंजन के साधनों का विश्लेषण

साधन	ऋण लेने के पूर्व की स्थिति		ऋण लेने के पश्चात की स्थिति	
	लाभार्थी	प्रतिशत	लाभार्थी	प्रतिशत
कोई सुविधा नहीं	38	9.5	30	7.6
रेडियों	5	1.2	00	0
टी.वी.	94	23.5	14	3.5
मोबाईल	5	1.2	9	2.3
कम्प्यूटर	2	.5	9	2.3
मोटर साईकिल	3	.7	21	5.3
एक से अधिक साधन	243	60.75	257	64.0
दो से अधिक साधन	3	.7	18	4.6
सभी साधन	7	1.7	42	10.5
कुल	400	100.0	400	100.0

स्त्रोत :– प्राथमिक सर्वे

उपरोक्त तालिका से स्पष्ट है कि 400 जनजातीय परिवारों में से ऋण लेने के पूर्व 38 के पास कोई मनोरजंन के साधन नहीं थे। 94 परिवारों के पास टी.वी., 5 के पास मोबाईल, 2 के पास कम्प्यूटर तथा 3 व्यक्तियों के पास बाईक उपलब्ध थी। इसी प्रकार ऋण लेन के पूर्व एक से अधिक सुविध वाले 243 परिवार, दो से अधिक सुविधा वाले 3 तथा सभी सुविधाओं वाले 7 परिवार है। ऋण लेने के पश्चात लाभांवित परिवारों की संख्या में परिवर्तन हुआ है। तालिका से स्पष्ट है कि एक से

अधिक सुविधा वाले व्यक्ति 257 हो गय है अर्थात 64 प्रतिशत परिवारों के पास एक से अधिक मनोरंजन के साध है। 10.5 प्रतिश परिवारों को सभी सुविधाए उपलब्ध है। ऋण लने के पश्चात 21 परिवारों के पास मोटर साईकिल, 9 के पास मोबाईल व 9 के पास कम्प्यूटर तथा 14 से पास टी.वी. उपलब्ध थी, केवल 7.6 प्रतिश के पास मनोरंजन का कोई साधन नही था, स्पष्ट है कि ऋण लेने के पश्चात घरेलू सुविधाओं, जल सुविधाओं तथा मनोरंजन के साधनों में वृद्धि हुई है। जो उत्तरदाताओं के जीवन स्तर में सुधार को इंगित करता है।

(D) कृषि सुविधाओं का विश्लेषण :

साधन	ऋण लेने के पूर्व की स्थिति		ऋण लेने के पश्चात की स्थिति	
	लाभार्थी	प्रतिशत	लाभार्थी	प्रतिशत
कोई सूविधा नहीं	268	67	324	58.6
ट्रैक्टर	47	11.8	64	16
थ्रेसर	8	2.0	39	9.6
पानी की मोटर	58	14.5	25	6.3
बैलगाड़ी	2	.5	2	.5
एक से अधिक साधन	16	4.0	34	8.5
दो से अधिक साधन	1	.3	2	.5
कुल	400	100.0	400	100.0

स्त्रोतः– प्राथमिक सर्वे

उपरोक्त तालिका से स्पष्ट है कि बैंक से ऋण लेने के पूर्व 67 प्रतिशत परिवारों के पास कृषि कार्य के लिये कोई सुविधा उपलब्ध नहीं है, वही 47 परिवरों के पास ट्रैक्टर, 8 के पास थ्रेसर मशीन तथा 58 के पास सिंचाई हेतु पानी की मोटर उपलब्ध है। तालिका से स्पष्ट है कि एक से अधिक सुविधा वाले परिवार 4 प्रतिशत है। 2 के पास बैलगाड़ी है तथा दो से अधिक सुविधा प्राप्त परिवार मात्र 1 है। ऋण लेने के पश्चात कृषि सुविधाओं में परिवर्तन हुआ है। ट्रैक्टर 64 परिवारों के पास तथा पानी की मोटर 25 परिवारों के पास उपलब्ध है। इसी प्रकार एक से अधिक सुविधा प्राप्त परिवार 4 प्रतिशत से बढ़कर 8.5 प्रतिशत हो गये है। साथ ही यह भी स्पष्ट है। कि कोई सुविधा न प्राप्त परिवारों की संख्या घटकर 234 रह गयी है।

इस प्रकार तालिक के आधार पर कहा जा सकता है कि कृषि साख प्राप्त होने से उत्तरदाताओं की कृषि सुविधाओं में वृद्धि हुई है। अर्थात उनकी आर्थिक स्थिति में भी सुधार हुआ है।

परिकल्पना परीक्षण : ऋण लेने के पूर्व एवं पश्चात की सुविधाओं के वर्णात्मक अध्ययन कर लेन के पश्चात यह जानने के लिये कि ऋण लेने से जनजातीय परिवारों के सामाजिक एवं आर्थिक जीवन स्तर में सुधार हुआ है, कि नहीं की सार्थकता का परीक्षण करने के लिये हमने शोध पत्र में निम्न परिकल्पना का परीक्षण किया हैः–

Ho–ऋण लेने के पश्चात जनजातिय परिवारों के सामाजिक आर्थिक स्थिति में कोई सार्थक परिवर्तन नहीं हुआ है।

H1–ऋण लेने के पश्चात जनजातिय परिवारों के सामाजिक आर्थिक स्थिति में सार्थक परिवर्तन हुआ है।

उपरोक्त परिकल्पना का परीक्षण करने के लिये हमने 5 प्रतिशत सार्थकता स्तर पर पेयर टेस्ट का प्रयोग किया हैः–

Paired T Sample Statistics 'A'

Paired Sample Statistics	Mean	N	Std. Deviation	Std.error Mear
Pair I before loan house fecility	2.52	400	.557	.028
After loan house fecility	2.53	400	.493	.028
Pair II before loan Water fecility	3.02	400	1.404	.070
After loan Water fecility	3.13	400	1.469	.073
Pair III before loan Intertenment fecility	4.53	400	2.465	.123
After loan Intertenment fecility	6.18	400	2.667	.133
Pair IV before loan Agriculture fecility	.87	400	1.491	.075
After loan Agriculture fecility	1.05	400	1.654	.083

Paired T Sample Statistics B

Paired Samples Test	Paired Defferences					T	DF	Sig.2-tailed
	Mean	Std.Deviation on	Std error mean	95% Confidence interval of the Deference				
				Lower	Upper			
Pair-1 Before loan house fecility After loan House fecility	.293	.546	.027	.239	.346	10.722	399	.000
Pair-2 Befor loan water fecility After loan water fecility	-.105	1.171	.059	-.2.20	.010	-1.793	399	.074
Pair-3 Befor loan Entertainment fecility After loan Entertainment fecility	-1.655	2.289	.114	-1.880	-1.430	-14.461	399	.000
Pair-4 Befor loan Agriculture fecility After loan Agriculture fecility	-.185	1.263	.063	-.309	-.061	-2.930	399	.004

शून्य परिकल्पना को अस्वीकार कर वैकल्पिक परिकल्पना कि ऋण लेने का प्रभाव परिवारों के इन सामाजिक आर्थिक सूचकों पर सार्थक रूप से पड़ता है को स्वीकार किया जाता है जबकि जल सुविधा का मान 0.05 से अधिक है इस हेतु शुन्य परिकल्पना कि ऋण लेने का प्रभाव जल सुविधा पर सार्थक रूप से प्रभाव नहीं डालता है को स्वीकार किया जाता है उपरोक्त 4 सामाजिक आर्थिक सूचकों में से 3 सूचकों पर ऋण लेने का सार्थक प्रभाव पड़ा है अर्थात उनकी सुविधाये ऋण लेने के बाद अधिक हुई है। जबकि जल से संबंधित सुविधाओं में कोई सार्थक परिवर्तन देखने को नहीं मिला इसके पीछे कारण हो सकता है कि उनके द्वारा लिया गया ऋण कृषि रोजगार या अन्य

उपभोग से संबंधित हो एवं ऋण राशी का प्रयोग जल सुविधाओं के विस्तार हेतु नहीं किया गया है।

निष्कर्ष : प्रस्तुत शोध पत्र में विभिन्न योजनाओं एवं कार्यकर्मों के माध्यम से जनजातीय परिवारों को प्राप्त ऋण के पश्चात उनके घरेलू सुविधाओं पेयजल सुविधाओं एवं मनोरंजन साधनों की सुविधाओं के आधार पर जीवन स्तर में वृद्धि का अध्ययन किया है। पेयजल सुविधाओं को छोड़कर अन्य दो प्रकार की सुविधाओं में वृद्धि यह बताती है कि जिले के उत्तरदाताओं द्वारा लिये गये ऋण से उनके जीवन स्तर में सुधार हुआ है तथा कृषि संसाधनों में वृद्धि आर्थिक स्तर सुधारने में सहायक होगी। अर्थात कहा जा सकता है कि ऋण वितरण की विभिन्न योजनाऐं एवं साख योजना जिले के नागरिकों का जीवन स्तर सुधारने एवं आर्थिक स्थिति सुदृढ़ करने में सहायक रही है।

सुझाव :

1. जिले की 75 प्रतिशत जनजाति बाहुल्य आबादी वाले विकास खण्ड झिरन्या, भगवानपुरा तथा सेगांव में विभिन्न बैंको की मात्र 22 शाखाये (औसत 7 शाखाये प्रति विकासखण्ड) है, जबकि जिला मुख्यालय खरगोन में 52 शाखाये है। जिले के संतुलित विकास हेतु झिरन्या, भगवानपुरा तथा सेंगाव विकासखण्ड में बैंक शाखाओं के विस्तार की आवश्यकता है, जिनके माध्यम से अधिक लोगों को बैंकिग सुविधाओं का लाभ मिल सकेगा।
2. अध्ययन क्षेत्र में कृषि संबंधित गतिविधियों जैसे डेयरी विकास, मुर्गी, बकरी पालन, मत्स्य पालन, शीतगृह निर्माण जैसी गतिविधियों में लक्ष्य के विरूद्ध बहुत कम शाख प्रदान की गई है। वनोपज गतिविधि लगभग निष्क्रिय ही रही है। अतः रोजगार के अवसरों में वृद्धि तथा आय वृद्धि हेतु उपरोक्त गतिविधियों को प्रोत्साहित करने कि आवश्यकता है।
3. जिले में सर्वाधिक ऋण जिला सहकारी केन्द्रीय बैंक द्वारा दिया जाता है। जिसका मुख्य कारण 0 प्रतिशत ब्याज तथा वस्तु ऋण पर 10 प्रतिशत अनुदान दिया गया है। शासन द्वारा यह सुविधा व्यापारिक बैंको के माध्यम से भी उपलब्ध कराई जाने की व्यवस्था की जाये। जिससे अधिक हितग्राही लाभांवित हो सकें।

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CONTAMINATION OF HEAVY METALS IN WATER OF BHIMGADH DAM AT SEONI DISTRICT MP: TRANSPORTING, TOXICITY AND TREATMENT

Gautam Patil[1] and Irfan Ahmad[1]

[1]Deptt. Of Chemistry, Govt. College, Bichhua

Dist-Chhindwara (M.P.), 480001 INDIA.

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ABSTRACT

The term ‘‘heavy metal’’ refers to any metal and metalloid element that has a relatively high density ranging from 3.5 to 7 g cm3 and is toxic or poisonous at low concentrations, and includes mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), zinc (Zn), nickel (Ni), copper (Cu) and lead (Pb). Although ‘‘heavy metals’’ is a general term defined in the literature, it is widely documented and frequently applied to the widespread pollutants of soils and water bodies. This study was carried out to the concentration of heavy metals in water of Bhimgarh dam near Seoni city. The detection of heavy metals by different analytical process and confirmation by Atomic Absorption spectrophotometer as required.

KEYWORDS: Heavy metals, Concentration, Spectrophotometer, Toxic metal , Pollution.

INTRODUCTION

Water pollution is contamination of water by foreign matter that deteriorates the quality of the water. Water pollution covers pollutions in liquid forms like ocean pollution and river pollution. As the term applies, liquid pollution occurs in the oceans, lakes, streams, rivers, underground water and bays, in short liquid-containing areas. It involves the release of toxic substances, pathogenic germs, substances that require much oxygen to decompose, easy-soluble substances, radioactivity, etc. that becomes deposited upon the bottom and their accumulations will interfere with the condition of aquatic ecosystems. For example, the eutrophication: lack of oxygen in a water body caused by excessive algae growths because of enrichment of pollutants. According to the water cycle, naturally, water around us will be absorbed to the land (soil) and rivers will stream from the upstream to the downstream and released to the sea. In normal situation organic pollutants are biodegraded by microbes and converted to a form that brings benefits to the aquatic life. And for the inorganic pollutants, in the same situation, don't bring to much hazards because they are widely dispersed and have almost no effect to the environment which they are released to. Some of the pollutants like lead (Pb), arsenic (As), mercury (Hg), chromium (Cr) specially hexavalent chromium, nickel (Ni), barium (Ba), cadmium (Cd), cobalt (Co), selenium (Se), vanadium (V), oils and grease, pesticides, etc are very harmful, toxic and poisonous even in ppb (parts per billion) range. There are some minerals which are useful for human and animal health in small doses beyond which these are toxic. Zinc (Zn), copper (Cu), iron (Fe), etc fall into this category. For agriculture, some elements like

zinc, copper, manganese (Mn), sulphur (S), iron, boron (B), together with phosphates, nitrates, urea, potassium, etc are useful in prescribed quantities.

SOURCES OF HEAVY METAL

Environmental pollution from hazardous metals and minerals can arise from naturalas well as anthropogenic sources. Natural sources are: seepage from rocks into water, volcanic activity, forest fires etc. Pollution also arises from partitioning of polluting elements (which are concentrated in clay minerals with high absorption capacities),between sedimentary rocks and their precursor sediments and water. With rapid industrialization and consumerist life style, sources of environmental pollution have increased. The pollution occurs both at the level of industrial production as well as end use of the products and run-off. These toxic elements enter the human body mostly through food and water and to a lesser extent through inhalation of polluted air, use of cosmetics, drugs, poor quality herbal formulations‘(herbo-mineral preparations) and `Unani’ formulations, and even items like toys which have paints containing lead. Sources of heavy metals Chromium (Cr)-Mining, industrial coolants, chromium salts manufacturing, leather tanning.

- Lead (Pb) lead acid batteries, paints, E-waste, Smelting operations, coal- based thermal power plants, ceramics, bangle industry
- Mercury (Hg) Chlor-alkali plants, thermal power plants, fluorescent lamps, hospital waste (damaged thermometers, barometers, sphygmomanometers), electrical appliances etc.
- Arsenic (As) Geogenic/natural processes, smelting operations, thermal power plants, fuel
- Copper (Cu) Mining, electroplating, smelting operations
- Vanadium (Va) Spent catalyst, sulphuric acid plant
- Nickel (Ni) Smelting operations, thermal power plants, battery industry Recent Research in Science and Technology 2013, 5(5): 98-99 99
- Cadmium (Cd) Zinc smelting, waste batteries, e-waste, paint sludge, incinerations & fuel combustion
- Molybdenum (Mo) Spent catalyst
- Zinc (Zn) Smelting, electroplating

Table 1.1 The standard metal concentration in drinking water and the health effects

SN	Metal	Effects	Drinking water standards
1	Lead	• Toxic to humans, aquatic fauna and livestock High doses cause metabolic poison • Tiredness, irritability anemia and behavioral changes of children • Hypertension and brain damage • Phytotoxic	• maximum concentration: 0.1 mg L^{-1} • By European Community: 0.5 mg L^{-1} • Regulation of water quality (India) 0.1 mg L^{-1}
2	Nickel	• High conc. can cause DNA damage Eczema of hands	• By the Environmental Protection Agency

		High phytotoxicity Damaging fauna L^{-1} • Regulation of water quality (India) 0.1 mg L^{-1}	• maximum concentration: 0.1 mg L^{-1} By European Community: 0.1 mg
3	Chromium	• Necrosis nephritis and death in man (10 mg kg^{-1} of body weight as hexavalent chromium) Irritation of gastrointestinal mucosa	• By the Environmental Protection Agency • maximum concentration: (hexavalent and trivalent) total 0.1 mg L^{-1} • By European Community: 0.5 mg L^{-1} • Regulation of water quality (I5ndia) 0.1 mg L^{-1}
4	Copper	• Causes damage in a variety of aquatic fauna Phytotoxic • Mucosal irritation and corrosion Central nervous system • irritation followed by depression	• By the Environmental Protection Agency maximum concentration: 1.0 mg L^{-1} • By European Community: 3 mg L^{-1} • Regulation of water quality (India) 0.01 mg L^{-1}
5	Zinc	• Phytotoxic Anemia • Lack of muscular coordination Abdominal pain etc.	• By European Community: 5 mg L^{-1} • Regulation of water quality (India) 0.1 mg L^{-1} • By the Environmental Protection Agency maximum concentration: 5 mg L^{-1}
6	Cadmium	• Cause serious damage to kidneys and bones in humans Bronchitis, • Emphysema, • Anemia Acute effects in children	• By the Environmental Protection Agency maximum concentration: 0.005 mg L^{-1} • By European Community: 0.2 mg L^{-1} • Regulation of water quality (India) 0.001 mg L^{-1}
7	Mercury	• Poisonous • Causes mutagenic effects • Disturbs the cholesterol	• By the Environmental Protection Agency maximum concentration: 0.002 mg L^{-1} • By European Community: 0.001 mg L^{-1} • Regulation of water quality (India)

			0.004 mg L^{-1}
8	Arsenic	• Causes toxicological and carcinogenic • Effects Causes melanosis, • Keratosis and hyperpigmentation in humans Genotoxicity through generation of reactive oxygen species and lipid • Peroxidation • Immunotoxic Modulation of co-receptor expression	• World Health Organization guideline of 10 mg L^{-1} • By European Community: 0.01 mg L^{-1} • Regulation of water quality (India): 0.05 mg L^{-1}

EXPERIMENT

Water samples were collected from different sample sources of the different region of the Bhimgadh Dam, Seoni city in the period of Octo-2018 to Dec.-2018. The water samples volume 500 ml in polythene bottles which acidify with nitric acid to bring down the pH up 2.0. The samples for heavy metals analysis were collected separately and acidify immediately. Metals like Pb, Ni, Hg, As, Cd, Cr, Cu, Fe, Mn and Zn were analyzed by different analytical estimation method and after analyzed by Perkin Calmer Flame AAS (Model 2380) using standard methods. All water samples were analyzed in Jan-2019.

REMEDIATION TECHNOLOGIES

Bioaccumulation of heavy metals in food chains and their toxicity to biological systems due to increased concentration over time have led to tremendous pressure for their separation and purification. Heavy metals can enter into water bodies through agricultural runoff, industrial effluents, household uses and from commercial applications. We can remove heavy metals from drinking water very easily with reliable technology. Several technologies available in the market remove a huge range of metals commonly found in drinking water and wastewater effluents. There are various remediation technologies that have been used for the removal of heavy metals from water/wastewater. These remediation technologies are summarized as:

- ✓ Precipitation and coagulation
- ✓ Ion exchange
- ✓ Membrane filtration
- ✓ Bioremediation
- ✓ Heterogeneous photocatalysts
- ✓ Adsorption

MEMBRANE FILTRATION

Membranes are complex structures that contain active elements on the nanometer scale. Modern day reverse osmosis membranes are typically homogeneous polymer thin films supported by a porous support structure.

PHYTOREMEDIATION

Bioremediation is the technological process whereby biological systems, plants and animals, including microorganisms, are harnessed to effect the cleanup of pollutants from environmental matrices. During the past few years, microbe-assisted bioremediations have been widely applied for the treatment of wastewater contaminated with heavy metals

and metalloids. Here we will address the global problem of heavy metal pollution originating from increased industrialization and urbanization and its amelioration by using plants from various environmental conditions. Conventional technologies are not cost effective and may produce adverse impacts on aquatic ecosystems. Microbe-assisted bioremediation and phytoremediation of heavy metals are cost-effective technologies and metal ion accumulating plants have been successfully used for the treatment of wastewater.

HETEROGENEOUS CATALYSTS AND CATALYSIS

In 1972 Fujishima and Honda discovered the photocatalytic splitting of water on titanium dioxide (TiO2) electrodes. Their discovery provided the foundation stone for photocatalysis. Since this remarkable discovery much research has been carried out on the efficiency of TiO2 as a photocatalyst. During the past few years, the applications of TiO2 for environmental cleanups have been performed by several laboratories for the treatment of industrial effluents.

PHOTOCATALYSTS

Reduction of Cr(VI) using semiconductor heterogeneous photocatalysts has been carried out as an economical and simple method of wastewater treatment. Surface-catalyzed Cr(VI) reduction is a very slow reaction and has been described as a feasible process in the presence of oxide surfaces Furthermore, organic donors have a chelation capacity for the TiO2 surface, which accelerates the reduction of Cr(VI).

ELECTROCOAGULATION

Electrocoagulation consists of electrodes that act as the anode and cathode, where oxidation and reduction takes place. Many physicochemical processes such as oxidation, reduction, coagulation and adsorption govern the electrocoagulation. Similarly to other treatment techniques, the electrocoagulation of heavy metals offers a cost-effective and easy-handling technique on an industrial scale.

CLAYS/LAYERED DOUBLE HYDROXIDES (LDHS)

Clays have been widely used for the removal of heavy metals from aqueous solutions due to their outstanding properties. Heavy metals can be removed by ion exchange or a complexation reaction at the surface of clays. During the past few years, surface modifications of natural clays with reagents containing metal binding groups have been explored. Several modification techniques such as intercalation of organic molecules into the interlayer space and grafting of organic moieties have been applied. Organic-modified clays based on montmorillonite were prepared by embedding ammonium organic derivatives with different chelating functionalities for heavy metal removal. Montmorillonite intercalated with polyhydroxyl Fe(III) complexes was used for the sorption of Cd(II).

BIOMASS AND BIOSORPTION OF METAL IONS

In this section we will discuss ‘‘Biomass based biosorbents and biosorption of heavy metals’’. Biosorption has been defined as the ‘‘property of certain bio-molecules to sequester metal ions or other molecules from aqueous solutions’’. It differs from bioaccumulation, where active metabolic transport takes place, as biosorption involves a passive process in which interaction between sorbent and sorbate occurs. Biosorption of heavy metals has become a popular and active field of research in environmental science.

MAGNETIC NANOPARTICLES AS NANOSORBENTS

Magnetic nanomaterials are one of the recently highlighted branches of materials science and technology that have been utilized in the removal of pollutants from aqueous solutions. Owing to their magnetic properties, high chemical stability, low toxicity, ease of synthesis and excellent recycling capability, magnetic nanoparticles have been studied to remove toxic metal ions from water.

REMOVAL OF IRON AND MANGANESE FROM WATER

The presence of iron and manganese gives an astringent and metallic taste to drinking water, which causes problems in cooking and in the production of beverages. A simple method of iron and manganese removal consists of oxidation and ion-exchange resins. The oxidation of iron is dependent on the solution's pH, and organic matter and carbonate concentration. Oxidation of iron and manganese can be achieved by introducing an oxidizing agent and it may be done through the application of methods that include Contamination of Heavy Metals in Aquatic Media. Activated carbons have also been applied for the removal of iron and manganese from aqueous solutions. Klueh and Robinson investigated the sequestration of iron by polyphosphate addition while providing the necessary disinfection through chlorine addition. They observed that the presence of calcium in the groundwater inhibited the removal of iron. The addition of polyphosphate to the groundwater first and the simultaneous addition of polyphosphate and chlorine were both fairly successful at removing the iron.

ION EXCHANGE

Ion-exchange resins provide many advantages and are one of the most widely techniques used for treatment of wastewater effluents. Lee and Nicol have used the Diphonix resin to remove ferric iron from a cobalt sulfate solution with various pH ranges. A lower pH and higher dose of resin gives a higher removal of iron from solution. Elution of iron was observed with an increase of Ti(III) in the sulfuric acid eluent. These workers found that the iron elution enhancement with Ti(III) was due to the combined effects of a reduction of Fe(III) and competitive adsorption of Ti(III) and Ti(IV) ions. Lasanta et al. studied the equilibrium diagrams for ionic exchange, which occurs between Fe in different solutions by a chelating ion exchange resin. A mathematical model was used to predict the equilibrium, which gave a good fit for the experimental data in various solutions. It had been observed that solvent type influences the adsorption capacity. Khalil et al. studied the removal of ferric ions by using crosslinked chitosan resins immobilized with diethylenetriamine and tetraethylenepentamine. It had been found that the tetraethylenepentamine containing chitosan resin showed a higher uptake capacity towards Fe(III) compared with diethylenetriamine containing chitosan resin. Kinetic data showed that the adsorption process followed the pseudo-second order kinetics. Thermodynamic studies indicated that the adsorption process was exothermic and spontaneous in nature.

ACTIVATED CARBONS

Omri and Benzina achieved the removal of Mn (II) ions from aqueous solutions by adsorption on activated carbons derived from Ziziphus spinachristi seeds. The effects of

process parameters such as solution pH, initial metal ion concentration and temperature on the adsorption performance of activated carbons for Mn(II) ions removal were tested to optimize the system. Maximum adsorption was obtained at pH. Freundlich isotherms followed the adsorption system and the higher adsorption capacity for a Langmuir isotherm. Adsorption of iron and manganese ions from aqueous solution by low-cost adsorbents of palm fruit bunch and maize cobs was carried out. Adsorption of iron ions on palm fruit bunch and was in the range of 80–57%, for initial concentrations ranging between 1 and 10 ppm. Recently, Mengistie et al. performed the adsorption of Mn(II) by using activated carbons of Militia ferruginea leaves from aqueous solutions in the batch mode. Adsorption equilibrium was achieved within 2 h. It had been found that pH 4 was appropriate for Mn(II) removal and 95.8% metal ions were removed. The adsorption isotherms were best fitted to a Freundlich model, which showed multilayer adsorption at the surface of the activated carbons. The adsorption kinetics were best fitted to a first-order kinetic model. Thermodynamic analysis showed that the adsorption process was endothermic and spontaneous in nature. Emmanuel and Rao studied the adsorption of Mn(II) by activated carbons of Pithacelobium dulce from aqueous solutions and found a good sorption capacity for metal ions. The sorption equilibrium was achieved within 50 min. The equilibrium isotherm was best fitted to a Langmuir isotherm model, which indicates the adsorption of Mn(II) onto activated carbons was as a monolayer.

RESULT AND DISCUSSION

Analytical results of heavy metal in various sample of different water sample of Bhimgadh Dam at Seoni City.

SN	HEAVY METAL	STANDARD VALUE (mg/L) According (WHO)	OBSERVED VALUES (mg/L)
1	Pb (Lead)	0.05 mg/l	0.001 mg/l
2	Ni (Nickel)	0.02 mg/l	0 mg/l
3	Hg (Mercury)	0.001 mg/l	0 mg/l
4	As (Arsenik)	0.05 mg/l	0.001 mg/l
5	Cd (Cadmium)	0.005 mg/l	0.003 mg/l
6	Cr (Chromium)	0.1 mg/l	0.04 mg/l
7	Cu (Copper)	1 mg/l	0.08 to 0.13 mg/l.
8	Fe (Iron)	0.1 mg/l	0.1 mg/L
9	Mn (Mangnige)	0.5 mg/l	0.01 to 0.03 mg/l
10	Zn (Zink)	5.0 mg/l	2.0 mg/l

CONCLUSION

The presence of heavy metals and their toxicity to the water and to human beings is posing a serious challenge to environmental engineers with respect to the treatment of wastewater effluents prior to discharge into the nearby water bodies. Several removal techniques have been developed and applied for the treatment of water to remove the toxic metal ions. Technologies such as microbe-

assisted phytoremediation, ion exchange, membrane filtration, photocatalytic oxidation and reduction and adsorption have their own advantages and disadvantages over metal ion sequestrations from environmental matrices. During recent years the developments in adsorption of heavy metals from aqueous solutions have gained tremendous popularity among the scientific community as methods to treat industrial wastewater. Several adsorbents such as clays, LDHs, zeolites, carbon nanotubes and their composites, activated carbons, biomass derived biosorbents, inorganic nanomaterials, inorganic organic hybrid nanocomposites and magnetic nanomaterials have been synthesized and investigated for their ability to sequester metal ions from water. Functionalized magnetic nanoparticles are very promising for applications in catalysis, biolabelling and bioseparation. In liquid-phase extraction of heavy metals and dyes in particular, such small and magnetically separable particles may be useful as they combine the advantages of high dispersion, high reactivity, high stability under acidic conditions and easy separation. In this chapter we focused mainly on recent developments in the synthesis of active adsorbents and nanoparticles.

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HUMAN ACTIVITIES CAUSING NATURAL DISASTERS

Shobha Upadhyay[1]

[1]Asstt. Proffesor

[1]H.P.M.M (Hitkarini Prashikshan Mahila Mahavidyalaya) Civic Center Jabalpur, (M.P)

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ABSTRACT: "A natural disaster is an act of nature of such magnitude as to create a catastrophic situation in which the day-to-day patterns of life are suddenly disrupted and people are plunged into helplessness and suffering, and, as a result, need food, clothing, shelter, medical and nursing care and other necessities of life, and protection against unfavourable environmental factors and conditions." Guide to sanitation in natural disasters WHO (1971). Every year natural disasters kill around 90 000 people and affect close to 160 million people worldwide. Natural disasters include earthquakes, tsunamis, volcanic eruptions, landslides, hurricanes, floods, wildfires, heat waves and droughts. They have an immediate impact on human lives and often result in the destruction of the physical, biological and social environment of the affected people, thereby having a longer-term impact on their health, well-being and survival.

KEY WORD: Natural Disaster , volcanic eruptions, hurricanes

INTRODUCTION

A natural disaster is a major bad event caused by the natural processes of the Earth. Examples include floods, hurricanes, tornadoes, volcanic,eruptions, earthquakes, ts unamis and other geologic processes. A natural disaster causes loss of life or property damage, and leaves some economic damage after wards. Natural disasters are out of human control but the consequences of natural disasters overlap with the consequences of war or combat. In both contexts, there is human suffering caused by damage to life, personal property, and infrastructure. Families are displaced and victims lose shelter. This is complicated further by immense shortages of food and drinking water. Several medical and psychological problems among the victims are major offshoots of natural disasters. When disasters occur due to natural forces they are called natural disasters, over which man has hardly any control. Some common natural disasters are earthquakes, landslides floods, droughts, cyclones, etc. Tsunamis, volcanic eruptions and wildfires are also included under natural disasters. These disasters cause enormous loss to life and property.

HUMAN ACTIVITIES CAN HAVE AN IMPACT ON NATURAL DISASTERS

We used to blame climate change as a reason for all the natural disasters. However, it seems that humanity conceives disasters as a new DIY project.

So what human activities can have an impact on natural disasters?

1. There were cases when **irresponsible mining** led to the permanent landscape modifications. In November 1980 the whole lake vanished because of the drilling of the salt mine beneath the lake. More than that, mining increases the occurrence of tremors.

2. **Building dams** can cause earthquakes because of the huge water mass that applies pressure on the surface beneath.
3. **Fracking for oil and natural gas**. Wastewater used in the process affects the seismic activity as it cracks rocks and lubricates faults.

Which of the following human activities can increase the risks of flooding?

When do the rivers start to flood? Usually, it happens when the water starts to overflow the banks of the river and spreads out onto the surroundings. There may be several reasons for it:

- A long period of rain
- Snowmelt
- Heavy rainfall
- Very wet soils
- Invincible obstacles

All these are the natural factors that increase the possibility of the flood. But how can human increase the possibility of a flood? Here is a list of activities that are responsible for it:

- Deforestation
- Urban development
- Natural wetland destruction
- Agricultural activities
- Hydroelectric power

HOW CAN HUMAN INTERFERENCE CAUSE A FLOOD?

Deforestation is rightfully considered to be one of the most destructive activities. People destroy vegetation that protects the topsoil and absorbs excess rainwater with its roots. As a result, high water freely spreads in the region leaving less time for rescue activities.

Agriculture, similar to deforestation, destroys the topsoil so it has to possibility to absorb rainwater. Consequently, more water will wash into the riverbed and the water system becomes overloaded. The water level rises and that inevitably leads to floods.

Urban development is another aspect that increases the possibility of flooding. First and foremost, all the surfaces in the town or city are covered with cement or asphalt. Naturally, these materials do not absorb rainwater so it has to search for the remaining water channels. Any blunder in the venting system may lead to the water spill over. In addition, levees are often used as a way to gain more land for a settlement. One of the downsides of levees is the water level rising in the rivers near the cities. Potentially, the levees issues may cause a huge flood when all the excess water that was restrained by the levees starts to spread in the surroundings.

Same is with the destruction of the natural wetlands. People ditch swamps, destroy natural obstacles for watercourses and water collection areas. As a result, excess water finds new ways and they all trend near or through human settlements.

Hydroelectric power is impossible without dam constructions. Apart from the dangers of earthquakes, dams can cause floods. The whole process of obtaining electric power through the water power plant requires a huge reservoir of water which flow is thoroughly regulated. Any miscalculation may lead to the catastrophe.

A. NATURAL DISASTERS CAUSED BY HUMANS

Earthquakes: One of the recent examples is the earthquake in China in 2008. Newly created Zipingpu Reservoir contained 320 million tons of water that and all that weight pushed on the crust fracture.

Flooding: in 2005 Hurricane Katrina struck New Orleans and the 50 failures of levees have led to huge flooding that covered 80% of

New Orleans. It took more than 1,800 lives and damaged more than 100,000 houses and buildings.

Dams: Banqiao Dam in China collapsed in 1975 claimed more than 171,000 deaths.

Avalanches: In 2006 the Philippines have witnessed one of the most disastrous avalanches in history. A rockslide leveled a mountain village Giunsaugon to the ground killing thousands of people. The reason for it was uncontrolled deforestation and mining around the village.

Landslides: On 20th December 2015 a landslide in Shenzhen killed 70 people and destroyed 14 factory buildings. The reason for it was an artificially made dump of the excavated soil with a height over 100 meters that was brought down by the heavy rain.

B. How can human activities affect the frequency and impact of natural disasters?

All the examples depicted above show that the reason was human activity, be it faulty levees system or incogitant deforestation. Saved vegetation, well-thought-out draining systems in the settlements, correct placement of dams or scrupulous regulation of mining and fracking could save thousands of lives.

All in all, the increasing number of disasters that are caused or worsened by humans is a warning sign. Rising awareness and engagement of the governmental agencies is the only way to improve the situation and flesh out a more responsible way of the interaction with nature. Otherwise, the situation will worsen every day causing more and more deaths of the civilian population.

CONCLUSIONS

C. Natural disasters are not uncommon events, though they are very much unpredictable. Droughts, earthquakes, extreme temperatures, floods, cyclones, volcanic eruptions, wildfires and landslides are natural phenomena that occur from time to time. For example, the A.D.R.C. (A.D.R.C., 2009 **Asian Disaster Reduction Center (A.D.R.C.). (**2009**). Natural disaster data book 2009. Tokyo:** Asian Disaster Reduction Center**.** [Google Scholar]) reported that 399 natural disasters occurred worldwide in 2009, killing almost 16,000 people and affecting over 220 million people. The estimated amount of economic damage came close to US$50 billion. By geographical region, Asia is the highest in all four accounts: 35.8 percent of the occurrence of disasters; 52.1 percent of the total number of people killed; 78.3 percent of the total number of people affected; and 44.9 percent of the amount of economic damage.

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किशोरों एवं किशोरियों के व्यक्तित्व के विभिन्न आयाम पर अभिभावक प्रोत्साहन के प्रभाव का अध्ययन

श्रीमती आरती कोरी[1]

[1]सहायक प्राध्यापक (शिक्षा संकाय) माता गुजरी महिला महाविद्यालय, जबलपुर (म.प्र.)

डॉ. (श्रीमती) गीता शुक्ला[2]

[2]प्रोफेसर शासकीय मोहनलाल हरगोविंददास गृहविज्ञान एवं विज्ञान महिला (स्वषासी) महाविद्यालय, जबलपुर (म.प्र.)

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सारांशः प्रस्तुत शोधपत्र किशोरों एवं किशोरियों के व्यक्तित्व आयाम पर अभिभावक प्रोत्साहन के प्रभाव का अध्ययन से संबंधित है। किशोर एवं किशोरियों की व्यक्तित्व आयाम पर अभिभावक प्रोत्साहन के प्रभाव के अध्ययन हेतु डॉ. आर. आर. शर्मा द्वारा निर्मित अभिभावक प्रोत्साहन मापनी एवं डॉ. अरूण कुमार सिंह द्वारा निर्मित सिंह डिफरेन्षियल पर्सनॉल्टी इन्वेन्टरी का उपयोग किया गया। शोध कार्य हेतु सर्वेक्षण विधि का उपयोग किया गया। न्यादर्श हेतु शासकीय एवं अशासकीय विद्यालयों के 400 छात्र एवं छात्राओं का चयन किया एवं परिणामों के विष्लेषण उपरांत निष्कर्ष स्वरूप पाया कि छात्र, छात्राओं एवं विद्यार्थियों के व्यक्तित्व आयाम निर्णात्मकता एवं उत्तरदायित्व पर अभिभावक प्रोत्साहन का कोई प्रभाव नहीं पाया गया है। छात्राओं एवं विद्यार्थियों के व्यक्तित्व आयाम सांवेगिक स्थिरता पर अभिभावका प्रोत्साहन का प्रभाव पाया गया जबकि छात्रों के व्यक्तित्व आयाम सांवेगिक स्थिरता पर कोई प्रभाव नहीं प्राप्त हुआ है।

प्रस्तावना :

किशोरावस्था वह अवस्था है, जिसमें बाल्यावस्था के उपरांत के बदलाव दिखाई देते हैं, इस समय को सबसे कठिन काल कहा गया है। इस बदलाव की अवस्था में किषोरों के शारीरिक, मानसिक, संवेगात्मक एवं सामाजिक विकास पर सकारात्मक व नकारात्मक दोनों ही बदलाव दिखाई दे रहे हैं, जो उनके व्यक्तित्व को दर्षाते हैं। व्यक्तित्व वह मुखौटा है, जिसमें किषोर अपने स्वयं के चरित्र को प्रस्तुत करते हैं। यदि इसमें कोई बाधा आती है तो किशोरों में संवेगात्मक अस्थिरता व मनोबल में कमी जैसे व्यक्तित्व कारकों की नकारात्मकता को कम करने के लिए अभिभावक प्रोत्साहन एक सकारात्मक व्यवहार होता है। ऐसे व्यवहार में माता–पिता ही उनके जीवन में मार्गदर्षक का कार्य करते हैं और उन्हें उचित व अनुचित व्यवहार का ज्ञान कराते हैं। माता–पिता द्वारा दिए गये मार्गदर्शन से वे प्रोत्साहित होते हैं और अपने कार्यों को और अच्छी तरह से करते हैं। क्या प्रोत्साहन से उनमें सकारात्मक भावनाएँ प्रबल होती हैं और नये कार्यों को करने के लिए प्रेरित करती हैं। और क्या इससे नकारात्मक स्वभाव से किशोरों को बचाया जा सकता है। इन प्रश्नों के उत्तर जानने के लिए वर्तमान अध्ययन में अभिभावक के प्रोत्साहन का प्रभाव उनके व्यक्तित्व के विभिन्न आयामों में किस प्रकार पड़ता है, इसका अध्ययन किया जा रहा है क्योंकि व्यक्तित्व किसी भी किषोर के जीवन काल का दर्पण होता है। इस पर अभिभावक प्रोत्साहन का कैसा प्रभाव पड़ता है, यह जानना अति आवश्यक है। इन प्रश्नों के उत्तर को जानने के लिए इस अध्ययन की महत्ता बढ़ जाती है।

आधुनिक वर्तमान समय में शिक्षा का विकास होने के साथ ही किशोरों का शैक्षणिक स्तर बदल गया है, जिससे शैक्षणिक बदलाव से उनकी समस्याएँ भी बदल गई हैं। अतः इन समस्याओं के समाधान के लिए अभिभावक प्रोत्साहन ताले की चाबी के समान अपनी भूमिका प्रदर्शित करते हैं। जिससे किशोरों में सकारात्मक व्यक्तित्व आयामों का विकास हो और अभिभावक प्रोत्साहन उचित मार्ग पर जाने के लिए किषोरों को प्रेरित कर सके। इस शोध कार्य से अभिभावक प्रोतसाहन से किषोरों के

व्यक्तित्व के विभिन्न आयामों पर पड़ने वाले प्रभाव को जाँचा जा सकता है।

वर्तमान समय में किशोर/किशोरियाँ के जीवन में विभिन्न प्रकार की कठिनाईयाँ आती है इन कठिनाईयों से निकलने के लिए उन्हें उचित मार्गदर्शन की आवश्यकता होती है, जो उन्हें अपने अभिभावक द्वारा दिया जाता है। जिससे वे कठिन परिस्थितियों से लड़ने के लिए सही मार्ग चुन सकते है। अभिभावक प्रोत्साहन उनके कठिनाईयों को दूर कर आत्मनिर्भर बनाने में मदद करता है।

किशोरों का व्यक्तित्व उस गुलाब के फूलों की महक जैसा होता है जो आस–पास के सभी लोगों को प्रभावित करता है। उनके व्यक्तित्व के विभिन्न आयाम मिलकर ही व्यवहार का निर्माण करते है। जिस प्रकार गुलाब के फूलों में महक होती है। उसी प्रकार कांटे भी होते है, अतः कांटों को हटाने के लिए उन्हें तोड़कर फेंका जा सकता है, उसी तरह किशोरों के व्यक्तित्व में सकारात्मक व नकारात्मक दोनों ही पहलू होते है। उनमें नकारात्मक पहलू को हटाने के लिए अभिभावक प्रोत्साहन स्थिर ऊर्जा का काम करता है। जिससे किशोरों में सकारात्मक व्यक्तित्व आयामों का विकास हो और अभिभावक प्रोत्साहन उचित मार्ग पर जाने के लिए किशोरों को प्रेरित कर सके।

इस शोध कार्य से अभिभावक प्रोत्साहन से किषोरों के व्यक्तित्व के विभिन्न आयामों और शैक्षणिक उपलब्धि के प्रभाव को जांचा गया है।

चर :

स्वतंत्र चर – अभिभावक प्रोत्साहन

परतंत्र चर – व्यक्तित्व

नियंत्रित चर – 11 वीं कक्षा में पढ़ने वाले जबलपुर शहर के छात्र एवं छात्राएँ औसत बुद्धिलब्धि (95–105) के छात्र–छात्राएँ

उद्देश्य – प्रस्तुत शोध कार्य के निम्न उद्देष्य लिए गए हैं–

1. छात्र/छात्राओं के व्यक्तित्व के आयाम ''निर्णयात्मकता'' पर अभिभावक प्रोत्साहन के प्रभाव का अध्ययन।
2. छात्र/छात्राओं के व्यक्तित्व के आयाम ''उत्तरदायित्व'' पर अभिभावक प्रोत्साहन के प्रभाव का अध्ययन।
3. छात्र/छात्राओं के व्यक्तित्व के आयाम ''सांवेगिक स्थिरता'' पर अभिभावक प्रोत्साहन के प्रभाव का अध्ययन।

परिकल्पनाएँ –

1. छात्र/छात्राओं के व्यक्तित्व के आयाम ''निर्णयात्मकता'' पर अभिभावक प्रोत्साहन का कोई सार्थक प्रभाव नहीं है।
2. छात्र/छात्राओं के व्यक्तित्व के आयाम ''उत्तरदायित्व'' पर अभिभावक प्रोत्साहन का कोई सार्थक प्रभाव नहीं है।
3. छात्र/छात्राओं के व्यक्तित्व के आयाम ''सांवेगिक स्थिरता'' पर अभिभावक प्रोत्साहन का कोई सार्थक प्रभाव नहीं है।

न्यादर्श–

प्रस्तुत शोधकार्य में न्यादर्ष निम्न प्रकार से लिया गया–

न्यादर्श तालिका

अभिभावक प्रोत्साहन के आधार पर न्यादर्श

अभिभावक प्रोत्साहन	शाला की प्रकृति	छात्र	छात्रा	योग
उच्च	शासकीय	50	50	100
	अशासकीय	50	50	100
निम्न	शासकीय	50	50	100
	अशासकीय	50	50	100
योग		**200**	**200**	**400**

परीक्षण– प्रस्तुत शोधकार्य में निम्नलिखित परीक्षणों का उपयोग किया गया है–

(1) अभिभावक प्रोत्साहन मापनी–डॉ. आर. आर. शर्मा

(2) सिंह डिफरेन्षियल पर्सनॉल्टी इन्वेन्टरी– डॉ. अरूण कुमार सिंह

षोध विधि–

शोधकार्य के लिए सर्वेक्षण विधि का उपयोग किया गया है।

संख्यिकीय विधियाँ–

शोधकार्य में सांख्यिकीय विष्लेषण के लिए मध्यमान, मानक विचलन तथा क्रांतिक अनुपात का उपयोग किया गया।

परिणामों का विश्लेषण एवं व्याख्या–

सारणी क्रमांक–01

किशोर, किशोरियों एवं इनके सम्मिलित समूह के व्यक्तित्व आयाम– ''निर्णयात्मकता'' पर अभिभावक प्रोत्साहन के प्रभाव संबंधी परिणाम

स्मूह	अभिभावक प्रोत्साहन	संख्या	मध्यमान	मानक विचलन	क्रांतिक अनुपात
किषोर	उच्च	76	8.21	2.25	0.18
	निम्न	88	8.27	2.18	
किषोरियों	उच्च	78	8.68	1.88	1.07
	निम्न	59	9.05	2.12	
किषोर+किषोरियां	उच्च	154	8.45	2.07	0.56
	निम्न	147	8.59	2.18	

स्वतंत्रता के अंश – 135 / 162 / 299 0.05 स्तर पर सार्थकता हेतु मान – 1.98 / 1.98 / 1.97

0.01 स्तर पर सार्थकता हेतु मान – 2.62 / 2.61 / 2.59

उपरोक्त सारणी में प्रदर्षित परिणामों से स्पष्ट होता है कि किषोर, किषोरियों एवं इनके सम्मिलित समूह के लिए व्यक्तित्व के आयाम–'' निर्णयात्मकता'' पर अभिभावक प्रोत्साहन का सार्थक प्रभाव नहीं पड़ता है। प्राप्त क्रांतिक अनुपातों के मान क्रमषः 0.18, 1.07 एवं 0.56 हैं जो सार्थकता के लिए न्यूनतम सारणी मान की अपेक्षा कम हैं।

अतः निष्कर्षस्वरूप कहा जा सकता है कि किषोर, किषोरियों अभिभावक प्रोत्साहन का व्यक्तित्व के आयाम–''निर्णयात्मकता'' पर अभिभावक प्रोत्साहन का सार्थक प्रभाव नहीं पड़ता है।

सारणी क्रमांक–02

किषोर, किषोरियों एवं इनके सम्मिलित समूह के व्यक्तित्व आयाम– ''उत्तरदायित्व'' पर अभिभावक प्रोत्साहन के प्रभाव संबंधी परिणाम

समूह	अभिभावक प्रोत्साहन	संख्या	मध्यमान	मानक विचलन	क्रांतिक अनुपात
किषोर	उच्च	76	8.42	2.57	1.02
	निम्न	88	8.03	2.24	
किषोरियों	उच्च	78	8.41	1.96	0.95
	निम्न	59	8.08	2.02	
किषोर+किषोरियां	उच्च	154	8.42	2.27	1.42
	निम्न	147	8.05	2.15	

स्वतंत्रता के अंष – 135 / 162 / 299 0.05 स्तर पर सार्थकता हेतु मान – 1.98 / 1.98 / 1.97

0.01 स्तर पर सार्थकता हेतु मान – 2.62 / 2.61 / 2.59

उपरोक्त सारणी में प्रदर्षित परिणामों से स्पष्ट होता है कि किषोर, किषोरियों एवं इनके सम्मिलित समूहों के लिए व्यक्तित्व के आयाम–''उत्तरदायित्व'' पर अभिभावक प्रोत्साहन का सार्थक प्रभाव नहीं पड़ता है। प्राप्त क्रांतिक अनुपातों के मान क्रमषः 1.02, 0.95 एवं 1.42 हैं जो सार्थकता के लिए न्यूनतम सारणी मान की अपेक्षा कम हैं।

अतः निष्कर्षस्वरूप कहा जा सकता है कि किषोर, किषोरियों एवं किषोर–किषोरियों में अभिभावक प्रोत्साहन का व्यक्तित्व के आयाम–''उत्तरदायित्व'' पर सार्थक प्रभाव नहीं पड़ता है।

सारणी क्रमांक–03

किशोर, किशोरियों एवं इनके सम्मिलित समूह के व्यक्तित्व आयाम– ''सांवेगिक स्थिरता'' पर अभिभावक प्रोत्साहन के प्रभाव संबंधी परिणाम

स्मूह	अभिभावक प्रोत्साहन	संख्या	मध्यमान	मानक विचलन	क्रांतिक अनुपात
किषोर	उच्च	76	8.43	2.20	1.51
	निम्न	88	7.91	2.25	
किषोरियों	उच्च	78	8.24	2.38	2.21
	निम्न	59	7.42	1.95	
किषोर/किषोरियां	उच्च	154	8.34	2.29	2.44
	निम्न	147	7.71	2.14	

स्वतंत्रता के अंष – 135/162/299 0.05 स्तर पर सार्थकता हेतु मान – 1.98/1.98/1.97

0.01 स्तर पर सार्थकता हेतु मान – 2.62/2.61/2.59

उपरोक्त सारणी में प्रदर्षित परिणामों से स्पष्ट होता है कि किशोरियों, किशोर+किशोरियों के सम्मिलित समूहों के लिए व्यक्तित्व के आयाम–''सांवेगिक स्थिरता'' पर अभिभावक प्रोत्साहन का सार्थक प्रभाव पड़ता है। प्राप्त क्रांतिक अनुपातों के मान क्रमषः 2.21 एवं 2.44 हैं जो 0.05 स्तर पर सार्थकता के लिए न्यूनतम सारणी मान की तुलना में अधिक हैं। उच्च प्रोत्साहन समूहों में सांवेगिक स्थिरता अधिक है। अभिभावक प्रोत्साहन का किशोरों की सांवेगिक स्थिरता का सार्थक प्रभाव नहीं पड़ता है क्योंकि प्राप्त क्रांतिक अनुपात का मान 0.05 स्तर के सारणी मान की अपेक्षा कम है।

अतः निश्कर्षस्वरूप कहा जा सकता है कि किशोरियों, किशोर+किशोरियों में अभिभावक प्रोत्साहन का व्यक्तित्व के आयाम–''सांवेगिक स्थिरता पर सार्थक प्रभाव पड़ता है जबकि किषोरों की सांवेगिक स्थिरता पर अभिभावक प्रोत्साहन का सार्थक प्रभाव नहीं पड़ता है।

निष्कर्ष –

1. किशोर, किशोरियों अभिभावक प्रोत्साहन का व्यक्तित्व के आयाम–''निर्णयात्मकता'' पर अभिभावक प्रोत्साहन का सार्थक प्रभाव नहीं पड़ता है।
2. किशोर, किशोरियों एवं किशोर–किशोरियों में अभिभावक प्रोत्साहन का व्यक्तित्व के आयाम–''उत्तरदायित्व'' पर सार्थक प्रभाव नहीं पड़ता है।
3. किषोरियों, किषोर+किषोरियों में अभिभावक प्रोत्साहन का व्यक्तित्व के आयाम– ''सांवेगिक स्थिरता पर सार्थक प्रभाव पड़ता है जबकि किषोरों की सांवेगिक स्थिरता पर अभिभावक प्रोत्साहन का सार्थक प्रभाव नहीं पड़ता है।

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INSTANCES OF CAMOUFLAGE (MIMICRY) OBSERVED ON THE FERGUSSON COLLEGE HILL

Aditi Rajan[1], Mugdha Shewalkar[1] & Dr Nigam Anukriti N.[1*]

[1]Department of Zoology, Fergusson College (Autonomous) 411004, Pune, INDIA

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ABSTRACT: Mimicry is basically a similarity of one organism to another which protects one through its effect on the behavior of the operator (third party). This similarity can be in appearance, behaviour, sound, scent or location. It is however important to note that the mimics are found in the same area as their models. In most cases, mimicry is advantageous to the mimic and harmful to the receiver. It may have beneficial, detrimental or no effect on the fitness of the model too. This project was aimed to observe and record various instances of mimicry in the area encompassed by the Fergusson College campus. Most of the visits were made in the morning hours, from 07:30 hours to 11: 00 hours and few were made in the evening hours, from 18:30 hours to 19:30 hours. For identification various identification keys were used, such as: Introduction to the Identification of Insects and Related Arthropods (P.M. Choate, 2003), Key to Insect Orders (Colorado State University) and the field guide Birds of the Indian Subcontinent (Grimmett, Inskipp, Inskipp). It was inferred that order Orthoptera that of the Grasshoppers was the most abundant order. The least observed individuals were Plant Hoppers and Spotted Owlets belonging to the orders Hemiptera and Strigiformes, this could possibly be due to the greater degree of camouflage that they exhibit. The number of individuals may vary according to the season and time of visits. We carried out the survey in the months of December and January.

KEYWORDS: Mimicry, Mimic, Model, Camouflage.

INTRODUCTION

Mimicry is an evolutionary process occurring when a group of organisms have evolved to share common perceived characters with another group. This group of animals which shares characters with another group is called 'mimic' while the group with which it shares these characters is called 'model'.

Mimicry is related to camouflage in which a species resembles its surroundings or is otherwise difficult to detect while mimicry is the act that resembles the real animal as another. Camouflage is a means of external coloration present in most of the animals that especially blends with the appearance of the surroundings in which the animal lives. Camouflage is an adaptation that helps the animal to be unnoticed by the other animals, especially predators. Camouflage has three major means of achieving it, namely:

MIMESIS

It is a type of camouflage where the animal is seen as another object, for example, leaf insect.

CRYPSIS

Animal blends in with the environment in such a way that it is almost impossible to spot. Animal often changes body colour.

DAZZLE

This phenomenon has been serving the animals to be protected as well as being unnoticed or distracted. In this project we have focused on the camouflage aspect of mimicry. The study of camouflage has a long history in biology, and the numerous ways of concealment and disguise found in the animal kingdom provided Darwin and Wallace with important examples for illustrating and defending their ideas of natural selection and adaptation. Thus, various forms of camouflage have become classical examples of evolution (Stevens et al 2009).

Animals use camouflage to make detection or recognition more difficult, with most examples associated with visual camouflage involving body coloration. However, in addition to coloration, camouflage may make use of morphological structures or material found in the environment, and may even act against senses other than vision (Ruxton 2009). In nature, some of the most striking examples of adaptation can be found with respect to avoiding being detected or recognized, with the strategies employed diverse, and sometimes extraordinary. Such strategies can include using markings to match the colour and pattern of the background, as in various moths (Kettlewell 1955), and to break up the appearance of the body, as in some marine isopods (Merilaita 1998). Camouflage is a technique especially useful if the animal can change colour to match the background on which it is found, such as can some cephalopods (Hanlon & Messenger 1988) and chameleons (Stuart-Fox et al. 2008). Further remarkable examples include insects bearing an uncanny resemblance to bird droppings (Hebert 1974) or fish resembling fallen leaves on a stream bed (Sazima et al. 2006), to even making the body effectively transparent, as occurs in a range of, in particular, aquatic species (Johnsen 2001; Carvalho et al. 2006). Examples such as leaf mimicry in butterflies helped convince Wallace (1889), for example, of the power of natural selection. Other strategies may even stretch to the use of bioluminescence to hide shadows generated in aquatic environments (Johnsen et al. 2004), and include ‘decorating’ the body with items from the general environment, such as do some crabs (Hultgren & Stachowicz 2008). This diversity of camouflage strategies is a testament to the importance of avoiding predation, as this is surely one of the most important selection pressures an organism can face. Concealment represents one of the principal ways to do so.

METHODOLOGY

In this project we aimed to observe and record various instances of mimicry in the area encompassed by the Fergusson College campus. For identification we used identification keys such as: Introduction to the Identification of Insects and Related Arthropods (P.M. Choate, 2003), Key to Insect Orders (Colorado State University) and the field guide Birds of the Indian Subcontinent (Grimmett, Inskipp, Inskipp).

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ABOUT THE STUDY SITE

Fig.1 Google Map Image

The vast campus is dotted with beautiful trees and is flanked by the famous 'Fergusson hill' to its west, also popularly called the 'Hanuman hill'. The college ground is set in sylvan surroundings and the old bungalows and college buildings, built in the Gothic style, are well spread out, with the hostels and canteen occupying suitable locations. The botanical garden with its greenery and flowering plants, near the entrance gates of the college, are the lungs of the campus.

From the 37 acres (150,000 m2) leased out by the DES in 1891, the college expanded to 65 acres (260,000 m2) by the time of Independence. The road that runs along the college is named after it and is one of the busiest in Pune. The campus extends until the slopes of a hillock, popularly called Fergusson Hill, which is where we carried out the survey.

OBSERVATIONS

In the course of our visits we were able to find several instances of camouflage in both birds and insects. They are as follows:

ARTHROPODS

1. Grasshopper (Order: Orthoptera, Sub-order: Caelifera)

Fig.2a and 2b-The type of camouflage exhibited by this specimen can be classified as a blending type.

The colouring of different species of grasshopper are often dependent on their environment. Grasshoppers are terrestrial insects. Many species are adapted to green

fields and forests, and blend in well there to avoid predators. Others have adapted to drier, sandy environments and blend in well with the colours of dry dirt and sand. Size of the grasshopper depends on the species. Smallest grasshoppers are only 0.5 inches long. Larger species can grow to 5 inches in length. Females are longer than males. The Color of the body provides camouflage and it depends on the habitat. Grasshoppers can be green, brown, greyish and ochre in colour. Main predators of grasshoppers are primates, birds, lizards, snakes, rodents and large insects. The specimen observed in fig. 2a and 2b camouflages in the dry, brown grass thus protecting itself from the predators.

2. Unidentified Caterpillar

Fig.3a and 3b- The type of camouflage exhibited by this specimen can be classified as a disguise type of camouflage.

The ventral side of this specimen in fig 3a and 3b resembles the colour of the blade of the grass, making it difficult for predators such as birds to spot it easily. The type of camouflage exhibited by this specimen can be classified as a disguise type.

3. Ants (Order :Hymenoptera)

Fig-4a and 4b - The type of camouflage exhibited by this specimen can be classified as a blending type.

Ants have evolved from wasp-like ancestors. Ants form colonies that range in size from a few dozen predatory individuals living in small natural cavities to highly organised colonies that may occupy large territories and consist of millions of individuals. Ants thrive

in most ecosystems and may form 15–25% of the terrestrial animal biomass. The above specimen was seen on the bark of a tree with its abdomen mimicking the colour of the bark, probably to avoid attack by the predators.

Fig.5-The type of camouflage exhibited by this specimen can be classified as blending type

4. Stick Insect (Order: Phasmatodea)-The Phasmatodea are an order of insects, whose members are variously known as stick insects, walking sticks or stick-bugs, phasmids, ghost insects and leaf insects. The type of camouflage exhibited by this specimen can be classified as blending type. Their natural camouflage can make them extremely difficult to spot. Phasmatodea can be found all over the world in warmer zones. They are terrestrial organisms. Phasmids can be relatively large, ranging from 1.5 centimetres (0.59 in) to over 30 centimetres (12 in) in length. Females are longer than males. Some have cylindrical stick-like bodies, while others have flattened, leaflike shapes. The thorax is long in the winged species, since it houses the flight muscles, but is typically much shorter in the wingless forms. Where present, the first pair of wings is narrow and cornified, while the hind wings are broad, with straight longitudinal veins and multiple cross-veins. The body is often further modified to resemble vegetation, with ridges resembling leaf veins, bark-like tubercles, and other forms of camouflage.

5. Dragonfly (Order:Odonata)

Fig 6a and 6b-The type of camouflage exhibited by this specimen can be classified as blending type.

This odonate is called the Granite Ghost (Bradinopyga geminate)because it blends with the surroundings such as granite rocks, pavements, stone boulders and walls. It is grey in colour, with grey eyes and the abdomen is grey with black/white/grey marbling pattern.

This morphology helps it to perfectly blend with the surrounding being practically invisible. The adaptation to urban environments is not just in the camouflage. It feeds on mosquitoes and larvae which are abundant in urban buildings. The Genus Bradinopyga has four main species of which B. geminata is endemic to India. Other species are endemic to Africa.

6. Jumping Spider (Order:Araneae)

Fig 7a and 7b-The type of camouflage exhibited by this specimen can be classified as blending type.

As the common name suggests, a jumping spider can jump quite well, achieving distances over 50 times its body length. Look at their legs, however, and you'll see they don't have strong, muscular legs. To leap, salticids quickly increases the blood pressure to their legs, which causes the legs to extend and propel their bodies through the air.

Some jumping spiders mimic insects, like ants. Others are camouflaged to blend into their surroundings, helping them sneak up on prey.This particular specimen can be seen mimicking the pattern of the bark of the tree thus can be classified as a blending type.

7. Plant hopper (Order:Hemiptera)

Fig 8-The type of camouflage exhibited by this specimen can be classified as a blending type.

The plant hopper does not resemble a jumping spider from the human point of view,but from the point of view of its prey this insect resembles a jumping spider, particularly the eyes. This also explained why the planthopper only moves sideways, forwards

and backwards but seldom turns around. For if it turns, the mimicking will fail.

The jumping-spider-mimicking may help the planthopper to avoid some predators, such as ants and even the jumping spiders. We did see the Zenodorus orbiculatus prey on ant. In addition to this, it can be seen that the colour of the body closely matches that of the bark.

8. Grasshopper (Order: Orthoptera, Sub-order: Caelifera)

Fig 9-The type of camouflage exhibited by this specimen can be classified as a blending type.

This type of camouflage seen in grasshoppers resembles the colour and pattern of the floor of a wooded area with fallen leaves, seeds, fruits, and branches. This type of camouflage can be classified as a blending type of camouflage.

9.Mantis (Order:Mantodea)

Fig. 10a and 10b-The type of camouflage exhibited by all three specimens can be classified as blending type.

The praying mantis mimics plants in order to hide from predators and prey. It can easily blend into an environment of leaves, sticks or flowers. Mantises can be green, brown or a

combination of colors to match their environment. It will molt every few weeks, and can then take on the colors of its natural surroundings. A praying mantis might even mimic the charred remains of sticks, weeds and grass after a fire. Swaying repetitively from side to side is a common camouflage behavior of the praying mantis. It might be used to mimic the swaying movement of vegetation in the wind.

BIRDS

10. Spotted Owlet (Order:Strigiformes)

Fig.11 The type of camouflage exhibited by this specimen can be classified as a blending type.

Owls and Owlets are well known for their camouflage. They are raptorial birds that feed on insects and small vertebrates and are mostly active at night. During the day, they usually stay hidden in trees.

Coloration is the tool that owls use for safety during the day. The colors of their feathers and shapes of their bodies enable owls to be camouflaged during the day while they rest. As they sit motionless in a branch, they are able to blend into the twigs and branches, blending into the habitat around them. Even on their eyelids, most owls have a pattern or striping, so that while they sleep they are hidden.

When threatened, owls often stay still rather than take flight. This stillness enables them to take advantage of their camouflage. To hide themselves further, owls elongate their bodies, pull in their feathers to reduce their silhouettes, raise their ear tufts (if they have them), and close their eyes. This posture is thought to be the best for blending into the surroundings. Owls can also move the feathers around their faces. By flattening or spreading their feathers, they can make their eyes appear larger or make them seem to disappear against a tree. In addition to this some owlets and owls have feathers with jagged edges that break up their outline,making it difficult for their prey to spot them.

11. Rose-ringed Parakeet (Order:Psittaciformes)

Fig 12-The type of camouflage exhibited by this specimen can be classified as a blending type.

Parrots and Parakeets, as many other animals, use pattern and color variation as a means of camouflage. The purpose for bold patterns and vivid colors is to disrupt the outline of an animal's body. As the predator's eyes follow the contours of what they believe to be the body of the prey, a color or pattern change will draw the eye sharply to the left or right, disrupting the image. Some brightly colored parrots tend to have green, yellow or blue undersides that blend into the scenery in the dim forest lighting from below, and rely on this pattern and color disruption for safety from above.

In fact, everything about a parrot's coloring is completely deceiving. Many vibrantly colored feathers do not actually contain what appears to be their predominant color at all, but are instead the product of a trick of lighting. Some colors absorb light, others reflect it, and by making use of the Tyndall effect, which is an illusion created using light, the same illusion that makes the sky appear blue when it is not, parrots have evolved to host the coloring that makes it safest in its natural habitat.

12. Coppersmith barbet (Order:Piciformes)

Fig 13-The type of camouflage exhibited by this specimen can be classified as blending type.

Barbets are brilliant green birds that chiefly feed on Banyan, Peepul, and other wild figs, various drupes and berries, and the occasional insect, caught in aerial sallies. They use camouflage to blend into their background by mimicking the colour of leaves. The colors of a bird's plumage are its first camouflage defense. Shades of brown, buff, rust, black, gray and white can help a bird blend into its surroundings effectively, and many bird species have developed specific colors that match their habitats in different seasons or different geographic regions.

RESULT AND DISCUSSION

In nature camouflage is considered as one of the most common anti-predator strategies, (Quicke 2017) , (Ruxton et al 2004), (Bates 1862) , (Wickler 1968). Camouflage is an act of masking or concealment and there are different ways of exhibiting it like by changing colour or patterns to match the background, or for masking edge information display of disruptive colouration , decepting as a non-target object, (Ruxton et al 2004) , (Pasteur G 1982), (Stevens et al 2008), (Wickler 1968) (Mugleston J, et al 2016).We observed that the most abundant order observed was that of the Grasshoppers namely Orthoptera. The least observed individuals were Plant Hoppers and Spotted Owlets belonging to the orders Hemiptera and Strigiformes, this could possibly be due to the greater degree of camouflage that they exhibit.The number of individuals may vary according to the season and time of visits.

The specimens observed during the survey have been compared in the following chart:

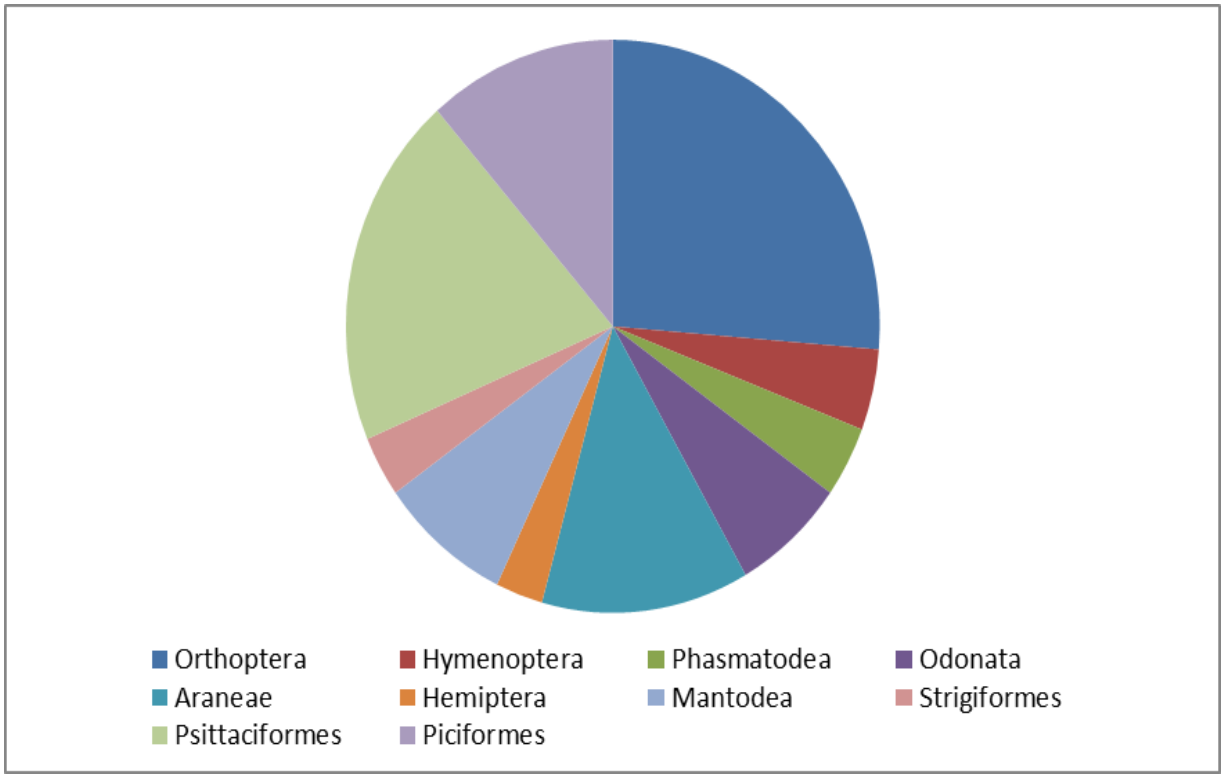

Fig.14 - Distribution of mimicking organisms observed

Note: One ant colony (Hymenoptera) was considered as one unit.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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IMPORTANCE OF CLASSROOM MANAGEMENT IN TEACHING LEARNING PROCESS

Dr. Rajeshwari Garg[1]

[1]Asstt.Professor

[1]Department Of Education, GGV (A Central University) Bilaspur C.G.

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ABSTRACT: Students' behaviour must be managed within educational institutions at all levels, and members of the institutions must work to improve the implementation of tasks and functions. The primary goal of this research paper is to comprehend the effect of classroom management on student behaviour. There have been instances where students exhibit unacceptable behaviour traits that must be modified in order for them to grow and develop effectively. It is necessary to develop skills and capabilities in students in order to achieve the desired results. Classroom management strategies, traditional and consistency management, and cooperative discipline within the classrooms have all been considered, as well as a theoretical framework: classroom management approaches, classroom management interventions, and so on**.**

KEYWORDS: Classroom, Instructions, Management, Teachers, Students, Task-Behaviour.

INTRODUCTION

The key to behavior management is to understand the fundamentals of behavior and then to find a management style that works for you and your students. Behavior is a form of communication: listen to what students are communicating with their behavior while being aware of their own.

It is true that schools play a huge role in the development of every child. Schools not only educate the children but also help in socializing and polishing their talents and abilities. However, schools are not solely responsible for the education and development of children. It is known that before any child goes to school his parents play an important role in shaping his behavior and teaching him the rules of society and how one survives in this world.

The ideas of classroom management are offered by the teachers but the students are the ones who carry out the activities to perform. A child learns the basics and some of life's most important lessons from their parents, so it is important for them to pay attention to their children and teach them what schools cannot.

It is essential for the child to know in advance about the manners and customs of the world so that when they step into the world including their schools, they will make a good impression on everyone as a decent person. This is possible only if they follow all the rules of classroom behavior management and follow positive behavior in the classroom.

Classroom management skills are teaching techniques that help students to manage their classroom effectively by controlling their activities in the classroom and to achieve success in disciplinary action as needed to achieve learning objectives.

Classroom management skills are such behavior of the teacher by which the teacher attracts attention towards the subject by controlling the behavior of the students by

creating a proper classroom environment for effective teaching-learning process and controlling the behavior of the students. It is very important for a good teacher to acquire proficiency in classroom management skills.

MEANING OF CLASSROOM MANAGEMENT

Where classroom management is called classroom management in English which is the English version of Hindi itself. Classroom Management is made up of two words:-

1. Classroom
2. Management

Classroom management is the availability of all facilities for teaching in a classroom or to achieve educational objectives and to run the class smoothly.

1. **Prof. s. Dubey**, "Classroom management refers to the psychological and legal management of the physical and human resources of the classroom so as to make the teaching-learning process effective and efficient."
2. **Mrs. R Sharma**,"Classroom management includes the management of all the elements that directly and indirectly affect the teaching-learning process."

COMPONENTS OF CLASSROOM MANAGEMENT SKILLS -

- Following are the components of classroom management skills.
- To motivate the students to achieve the objectives.
- To strive for the proper development of the students
- To encourage student teacher interaction.
- Control having discipline.
- Reinforcement of desired behavior.
- Accepting student participation in classroom management.
- To explain the importance of discipline in classroom management.
- Creating an aesthetic environment.

There should be clarity in the instructions.

PROCESS OF CLASSROOM MANAGEMENT-

To complete the process of class-room management, it is essential to manage the facts related to it. Classroom management can be accomplished by managing the following facts-

1. **PROPER SIZE**

The size of the class should be decided on the basis of the number of students i.e. every student should get proper place in the class so that he can do his work properly. Therefore, the size of the class should not be more or less than normal.

2. **PROPER LIGHT**

There should be proper arrangement of lighting in the classroom so that students can easily see the blackboard and other materials. For this, the number of windows and doors in the classroom should be sufficient and arrangements for cross ventilation should be made.

3. **PROPER SEATING ARRANGEMENT**

Furniture for the students to sit in the classroom should be fixed according to their age group so that they do not face any inconvenience in sitting. With this work, students will be able to fully engross in the study. When the seating arrangement is not proper, the teaching-learning process will be adversely affected.

4. **DISCIPLINE**

Discipline has an important place in classroom management, unless there is complete discipline in the classroom, the teaching-learning process cannot be completed. Therefore, in an ideal classroom

there should be such a system that all the students remain in discipline.

5. ENVIRONMENT

The atmosphere of the classroom should be purely educational. As soon as you enter the classroom, you should have such an experience that there cannot be a better place to complete the teaching-learning process. For this the classroom should be equipped with modern equipments.

We can see the purpose of classroom management through the following points-

1. CREATING AN EDUCATIONAL ENVIRONMENT IN THE CLASSROOM

The first objective of classroom management is to create an educational environment in the classroom. It is the biggest responsibility of a teacher that he can run the class smoothly, this will happen only when the teacher has a hold on his subject as well as he should be able to present his subject effectively so that the child can achieve the educational objectives And if the class can run smoothly, only then the educational environment will remain in the class room, otherwise the mind of the children will not be elsewhere in the class, then the atmosphere of the class will start deteriorating.

2. TO MAKE TEACHING-LEARNING PROCESS SIMPLE AND EFFECTIVE

Another important purpose of the classroom is to make the teaching-learning process simple and effective. There are different types of children in the classroom, some child learns any teaching-learning very quickly, then some takes time to learn, so the teacher should keep these things in mind and simplify the teaching-learning process and make them child-friendly. It should be presented effectively so that the child can understand it.

3. COORDINATING THE RELEVANT FACTS IN THE CLASSROOM

The third important objective of classroom management is to establish co-ordination between the relevant facts in the classroom. Use appropriate educational material for the subject a teacher is teaching so that those facts can be coordinated with the child. Constructing facts in the classroom should be according to the class and not according to the teacher.

4. PROPER USE OF PHYSICAL AND HUMAN RESOURCES

We can run the class room smoothly only when we are able to achieve their educational objectives. For this, the teacher should know how to use the physical and human resources at the proper place.

5. DEVELOP THE CLASSROOM WITH COMPLETE FACILITIES

A classroom is called a classroom only when it has all the facilities of teaching or class room like blackboard, good life, facilities for children to sit, classroom environment, chalk duster, books, charts, important facilities like dustbin available in the class needed. And being a teacher, it is the responsibility of the teacher whether the class has all these facilities or not, the responsibility of fulfilling all these lies with the teacher.

6. MAKE LEARNING PERMANENT

An important purpose of classroom management skills is also what teachers should do so that whatever they are teaching the children is perpetuated. Learning is very important for children, without learning children will not be able to progress. Whatever is taught or taught in the class room, it should be done so effectively that it sits in the

children permanently. And it is the responsibility of a teacher that how he presents his subjects.

7. ESTABLISHING A RELATIONSHIP BETWEEN STUDENT AND TEACHER

Unless there is a good relationship between student and teacher in a class, children will not be able to learn. Therefore, the teacher should have a grip on his subject and should have discipline and good character. There should be so much power inside a teacher that he can know the shortcomings of the children and to fulfill those shortcomings, he should come to influence them in different ways, then only a good relationship will be established between a student and teacher.

8. DEMOCRATIC MANAGEMENT

In the classroom management, democratic system means equal treatment to every student. Every student should have equal right to participate in the teaching-learning process. The retarded and normal students should also be made full participants in the teaching-learning process and efforts should be made to bring them in the category of talented students.

CONCLUSION

Students need to feel comfortable and secure in order to learn effectively. As a teacher, you need to manage your classroom in such a way that you create such an environment. A classroom management plan is a strategy you create and implement to help you gain and maintain control over the classroom, as well as redirect and deal with negative behavior.

Many classroom management plans begin with the teacher's philosophy of motivation. Basically, it describes what you believe about education and how students should learn. You can talk about the environment you want to create and how you plan to create that environment, both physically and emotionally.

Classroom management systems are effective because they increase student success by creating an orderly learning environment that enhances students' academic skills and competencies, as well as their social and emotional development. Classroom management systems are most effective when they adhere to three basic principles (Brophy, 2006, pp. 39-40):

1. Emphasize student expectations for behavior and learning.
2. Promote active learning and student involvement.
3. Identify important student behaviors for success. More specifically:

a. What behaviors are required to reach the goals of learning
b. What implications does a particular learning activity have for student roles?
c. How will the teacher prepare students to take on these roles?

Classroom management certainly isn’t easy, but it’s a valuable skill that any teacher can acquire through patience and a willingness to improve their educational experience. In any case, remember to stay positive! When you’re happy, your students are happy.

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भारतीय पूँजी बाजार के विकास में बैंकिंग तथा अन्य वित्तीय संस्थाओं का वित्तीय सुधारों में योगदान

डॉ0 मनन कौशल[1]

[1]एसोसिएट प्रोफेसर

[1]अध्यक्ष अर्थशास्त्र विभाग, जे.एस.हिन्दू (पी.जी.) कालिज, अमरोहा

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सारांश : वित्त एक मौद्रिक कोष है जिसकी आवश्यकता व्यक्ति, व्यवसाय तथा सरकार सभी को अपनी आवश्यकताओं की पूर्ति हेतु होती है जबकि वित्तीय प्रणाली का अर्थ सभी सम्बन्धित पक्षकारों द्वारा उधार लेने तथा उधार देने की प्रक्रिया से है। समाज के एक बिन्दु पर सभी पक्षकार पूर्ण स्वावलम्बी नहीं होते हैं, अतः यह लेनदेन चलता ही रहता है। किसी देश के आर्थिक विकास के लिए एक दृढ़ एवं सुगठित वित्तीय प्रणाली की आवश्यकता होती है जिसके अन्तर्गत अनेक सहायक प्रणाली, क्रियाएँ शामिल होती हैं। इन सहायक प्रणालियों के अन्तर्गत वित्तीय संस्थान, वित्तीय बाजार, वित्तीय प्रपत्र एवं वित्तीय सेवायें प्रमुख हैं जो कि पूँजी निर्माण में सदैव सक्रिय रहती हैं। इनके द्वारा रचित कार्यप्रणाली में बचतों को निवेश में परिवर्तित करने में सहायता मिलती है। इन्हीं क्रियाओं के कारण किसी देश की वित्तीय प्रणाली का देश के आर्थिक विकास में महत्वपूर्ण योगदान रहता है क्योंकि यही प्रणाली देश में उपलब्ध साधनों के आधिक्य को एकत्रित करके उन्हें उत्पादक उद्देश्यों के लिए प्रभावशाली ढंग से प्रयोग को सम्भव बनाती है।

शब्दकूट : भारतीय पूँजी, बैंकिंग, संस्थाऐं एवं योगदान।

प्रस्तावना :

पूँजी निर्माण की प्रक्रिया में तीन प्रमुख चरण हैं– बचतें, वित्त एवं विनियोग। ऐसी योग्यता, जिसके द्वारा सम्पत्तियों पर दावे भविष्य में प्रयोगों हेतु सुरक्षित कर दिये जाते हैं, बचतें कहते हैं। बचतों को गृहस्थों से एकत्रीकरण, विदेशों से प्राप्ति, बैंक जमाओं या मुद्रा के रूप में संग्रह करके अधिक लाभदायक विकल्पों के लिए निवेशक को सौंपने की प्रक्रिया वित्त है। विनियोग के अन्तर्गत साधनों को उत्पादन कार्यों में नियोजन करने की क्रियाएँ शामिल हैं।

भारतीय अर्थव्यवस्था में पूँजी बाजार की भूमिका :

किसी भी अर्थव्यवस्था के विकास के लिए उद्योगों का विकास आवश्यक है और उद्योगों के विकास के लिए पर्याप्त आर्थिक संसाधन आवश्यक हैं। उद्योगों को इस वित्तीय पूर्ति में पूँजी बाजार की अग्रणी भूमिका है। भारतीय अर्थव्यवस्था में पूँजी बाजार की भूमिका को निम्न प्रकार स्पष्ट किया जा सकता है –

- पूँजी बाजार उद्योगों को आवश्यक वित्त प्रदान करने का एक मात्र साधन है। भारत जैसे विकासशील देश में जहाँ धीमी पूँजी निर्माण के कारण सामान्यतः बड़ी परियोजनाएँ लम्बित रह जाती हैं, पूँजी बाजार बचत का एकत्रीकरण करके उद्योगों को आवश्यक वित्त के रूप में प्रदान करता है।
- निवेशकों द्वारा अपनी बचत अधिक आय प्राप्ति में उद्देश्य से बाजार के माध्यम से बड़ी परियोजनाओं को पहुँचती हैं। इससे उद्योगों के प्रवर्तन तथा विस्तार को प्रोत्साहन मिलता है।
- स्टॉक एक्सचेंज द्वारा निर्गमित प्रतिभूतियों के क्रय बिक्रय की सम्भावना के कारण ही निवेशक दीर्घकालीन निवेश को तत्पर होता है। स्टॉक एक्सचेंज के अभाव में निवेशक अपनी बचत को दीर्घकाल के लिए निवेश नही करता, क्योंकि

उसकी तरलता बन्धक हो जाती है। अब निवेशक आवश्यकता होने पर प्रतिभूतियों के विक्रय द्वारा पुनः तरलता प्राप्त कर सकता है।

- पूँजी बाजार किसी विशेष समयावधि के लिए न होकर एक हर समय उपलब्ध निरन्तर सेवा है जिसके कारण निवेशक अपनी बचत औद्योगिक प्रतिभूतियों में विनियोजित कर सकता है क्योंकि तरलता के लिए पूँजी बाजार सदैव उपलब्ध रहता है।
- पूँजी बाजार मे सक्रिय वित्तीय संस्थान प्रतिभूतियों में सौदे करने के साथ–साथ विभिन्न प्रकार की सेवाएँ (दीर्घकालीन ऋण अभिगोपन, प्रवर्तन सेवा, समता पूँजी में सहभागी) भी प्रदान करते हैं।
- पूँजी बाजार न केवल प्रतिभूतियों को तरलता प्रदान करता है, वरन् सर्वाधिक कुशल उद्योग/फर्म को साधन आवण्टन करने में भी महत्वपूर्ण भूमिका निभाता है क्योंकि प्रतिभूति का मूल्य तथा उपलब्ध प्रत्याय की दर कोषों को एक फर्म से दूसरे फर्मों तक प्रतिस्थापन करने तथा सर्वोत्तम विकल्प का चुनाव करने में अति सहायक मापदण्ड है। पूँजी बाजार विभिन्न विकल्पों की उपलब्धि द्वारा इस कोष आवण्टन प्रक्रिया को निरन्तर सक्रिय रखता है।

पूँजी बाजार का अभिप्राय :

वित्त किसी भी व्यवसाय का जीवन रक्त है। वित्त की आवश्यकता अल्पकालीन तथा दीर्घकालीन दोनों उद्देश्यों के लिए होती है। अल्पकालीन वित्त मुद्रा बाजार में सक्रिय विभिन्न घटकों से प्राप्त किया जा सकता है एवं दीर्घकालीन वित्त के लिए अंश तथा प्रतिभूतियों का निर्गमन एवं बृहत विकासोन्मुख वित्तीय संस्थान से ऋण उपलब्ध होता है, अतः दीर्घकालीन वित्त (पूँजी) प्राप्ति के लिए व्यवसायिक इकाईयॉ जिस तन्त्र को अपनाती हैं उसे पूँजी बाजार कहा जाता है। इस बाजार में दीर्घ तथा मध्यकालीन वित्त पूर्ति के लिए वित्तीय परिसम्पत्तियों का क्रय–बिक्रय किया जाता है। सरल शब्दों में, पूँजी बाजार में बड़ी तथा मध्यम अवधि वाली प्रतिभूतियों अथवा दावों में व्यवहार किया जाता है।

पूँजी बाजार एक बहुत बृहत् एवं जटिल मिश्रण है, जिसमें विभिन्न संस्थान उपयुक्त वित्तीय प्रपत्रों द्वारा एकत्रित संसाधनों को इच्छुक फर्मों तथा व्यक्तियों को हस्तान्तरित करते हैं। यह हस्तान्तरण ऋणी के उद्देश्य तथा आवश्यकताओं के अनुरूप होता है। ऋणदाता के रूप में गृहस्थ,संस्थान, बैंक तथा विशिष्ट वित्तीय संस्थान सक्रिय होते हैं। पूँजी बाजार वास्तव में अपने तन्त्र द्वारा ऋणी तथा ऋणदाताओं को एक दूसरे के निकट लाने का कार्य करता है।

पूँजी बाजार रेखा :

पूँजी बाजार रेखा कुल जोखिम तथा पोर्टफोलियो में अपेक्षित दर के बीच सम्बन्ध को दर्शाती है। यदि सभी विनियोक्ता एक जैसे जोखिम वाले पोर्टफोलियो को रखते हैं तब समानता की स्थिति में यह बाजार पोर्टफोलियो होना चाहिए। पूँजी बाजार रेखा एक ऐसी रेखा को जन्म देती है जिस पर सक्षम पोर्टफोलियो आधारित हो सकता है। जो पोर्टफोलियो सक्षम नहीं हैं वे इस रेखा से नीचे होंगे।

पूँजी बाजार रेखा कभी भी सभी बिन्दुओं को सम्मिलित नहीं करेगी, यदि सक्षम पोर्टफोलियो तथा अक्षम पोर्टफोलियो तथा व्यक्तिगत प्रतिभूतियों को एक ही ग्राफ पर साथ–साथ दिखाया गया हो। व्यक्तिगत प्रतिभूतियों तथा अक्षम पोर्टफोलियो को पूँजी बाजार रेखा के नीचे दिखाना चाहिए क्योंकि उनकी कुल जोखिम में प्रतिभूतियों की विभेदित जोखिम भी जुड़ी है।

भारत में पूँजी बाजार का विकास :

भारतीय पूँजी बाजार का स्वरूप पिछले एक दशक में कई गुना विकसित हुआ है। 1991 की उदारवादी अर्थव्यवस्था के उदय के पश्चात्, अर्थव्यवस्था के सभी क्षेत्रों में बहुमुखी विकास की भांति, पूँजी बाजार का आकार भी बढ़ा है। भारत में पूँजी बाजार के विकास में निम्नलिखित घटक सहायक रहे हैं –

- पूँजी बाजार के विकास में उन्नत वित्तीय सेवाओं, मर्चेण्ट बैंकिंग, तकनीकी सलाहकारिता, पुनर्वित, लीजिंग, ब्रोकर्स, क्रेडिट कार्ड, फण्ड

हस्तान्तरण, मार्केट मेकर्स, डिपॉजिटरी आदि का महत्वपूर्ण योगदान रहा है।

- विभिन्न सेवाओं तथा नियामक संस्थाओं के संरक्षण द्वारा उत्पन्न विनियोग बाजार का ढॉचा तथा कार्यप्रणाली में परिवर्तन एक विश्वसनीय वातावरण बनाने में सफल हुए। परिणामस्वरूप निवेशक परम्परागत स्थायी जमा तथा डाकखाना बचत योजनाओं से निकालकर सीधी म्यूचुअल फण्ड के द्वारा पूँजी बाजार में सक्रिय हुआ।

भारतीय पूँजी बाजार के सम्मुख चुनौतियॉ :

पूँजी की आवश्यकता व्यवसायिक एवं औद्योगिक संस्थाओं के द्वारा प्रायः दो प्रकार के प्रयोजनों के लिए अनुभव की जाती हैं –

- कार्यशील पूँजी के लिए, एवं
- स्थिर सम्पत्ति के लिए।

कार्यशील पूँजी के लिए वित्त की आवश्यकता अल्पकालीन होती है जो प्रायः द्रव्य बाजार द्वारा पूरी की जाती है और जिसमें व्यापारिक बैंक, साहूकार एवं देशी महाजन आदि प्रमुख भाग अदा करते हैं। ऐसी पूँजी की आवश्यकता प्रायः एक वर्ष या इससे कम अवधि के लिए होती है। इसके विपरीत, स्थिर सम्पत्ति में लम्बी अवधि के लिए पूँजी विनियोग की अपेक्षा की जाती है, क्योंकि इसमें भूमि, भवन, औजार आदि के लिए पूँजी की मॉग की जाती है। इसकी पूर्ति के लिए मध्यकालीन एवं दीर्घकालीन वित्त की पूर्ति करने वाली विशेष संस्थाओं के गठन की आवश्यकता होती है जो विभिन्न सूत्रों से व्यक्तियों एवं संस्थाओं आदि की बचतों को गतिशील बनाकर मध्यकालीन एवं दीर्घकालीन विनियोगों में लगाने की व्यवस्था करती है। मध्यकालीन वित्त की अवधि एक वर्ष से अधिक किन्तु तीन या पॉच वर्ष से कम होती है। दीर्घकालीन वित्त लम्बी अवधि का होता है (सामान्यतः 5 वर्ष से 12 वर्ष या इससे अधिक)। यह वित्त स्थायी भी हो सकता है, जैसे कि कम्पनियों के सामान्य अंशों में विनियोजित पूँजी अनिश्चित काल के लिए होती है, सामान्यतः उसकी वापसी का कोई प्रश्न ही नहीं उठता है यद्यपि व्यक्ति तथा संस्थाओं में अंशों का क्रय–बिक्रय हो सकता है फिर भी कम्पनी में वह पूँजी स्थायी रूप में विनियोजित बनी रहती है। सरकारी एवं अर्द्ध सरकारी संस्थाओं को भी विकास कार्यों के लिए पूँजी की आवश्यकता होती है जिसकी व्यवस्था में वे कोषागार बिलों, सार्वजनिक ऋणों, बाण्डों आदि के द्वारा देश के पूँजी बाजार से करती है।

इस प्रकार पिछले 60 वर्षों से भारतीय पूँजी बाजार का पूर्तिपक्ष तो सुदृढ़ हुआ है, साथ ही मॉग पक्ष भी अब पूर्ति पक्ष के मुकाबले पर आ गया है, जो कि औद्योगिक विकास के लिए स्वस्थ प्रतीक माना जाना चाहिए। पूर्ति पक्ष का प्रतिनिधित्व संगठित पूँजी बाजार के अनेक घटक करते हैं जैसे व्यक्तिगत विनियोक्ता, विनियोक्ता संस्थायें, विनियोग प्रन्यास तथा विनियोग कम्पनियॉ, विशिष्ट वित्त निगम ;औद्योगिक विकास बैंक, औद्योगिक वित्त निगम, राज्य स्तरीय विकास बैंक, राज्य औद्योगिक वित्त निगम आदिद्ध रिजर्व बैंक, स्टेट बैंक, राष्ट्रीयकृत एवं अन्य बैंक, सहकारी बैंक, यूनिट ट्रस्ट आफ इण्डिया, जीवन बीमा निगम, सामान्य बीमा निगम, अन्तर्राष्ट्रीय वित्तीय संस्थायें, भविष्य निधियॉ आदि।

निष्कर्ष एवं सुझाव :

पूँजी निर्माण की प्रक्रिया में तीन प्रमुख चरण हैं –बचतें, वित्त एवं विनियोग। ऐसी योग्यता, जिनके द्वारा सम्पत्तियों पर दावें भविष्य में अन्य प्रयोगों हेतु सुरक्षित कर दिये जाते हैं, बचतें कहते हैं। बचतों को गृहस्थों से एकत्रीकरण, विदेशों से प्राप्ति, बैंक जमाओं या मुद्रा के रूप में संग्रह करके अधिक लाभदायक विकल्पों के लिए निवेशक को सौंपने की प्रक्रिया वित्त है। विनियोग के अन्तर्गत साधनों को उत्पादन कार्य में नियोजन करने की क्रियायें शामिल हैं।

एक प्रगतिशील अर्थव्यवस्था के लिए एक प्रभावी एवं विकसित वित्तीय पद्धति अति आवश्यक है। वित्तीय संगठनों का विकास ही आर्थिक विकास की नीति है। ये वित्तीय संस्थान वित्तीय सेवाओं तथा प्रतिभूतियों द्वारा कोषों के हस्तान्तरण की सुविधा

तथा तीव्रता प्रदान करते हैं। वित्त किसी व्यवसाय का जीवन रक्त है। वित्त की आवश्यकता अल्पकालीन एवं दीर्घकालीन दोनों उद्देश्यों के लिए होती है। अल्पकालीन वित्त मुद्रा बाजार में सक्रिय विभिन्न घटकों से प्राप्त किया जा सकता है एवं दीर्घकालीन वित्त के लिए अंश तथा ऋण उपलब्ध है, अतः दीर्घकालीन पूँजी प्राप्ति के लिए व्यवसायिक इकाईयॉ जिस तन्त्र को अपनाती हैं उसे पूँजी बाजार कहते हैं, अतः दीर्घकालीन पूँजी की आवश्यकतायें पूँजी बाजार से पूरी की जाती हैं।

भारत के आर्थिक विकास का वास्तविक क्रियान्वयन 1990 के दशक से प्रारम्भ हो सका। व्यापक आर्थिक सुधारों एवं अर्थव्यवस्था के उदारीकरण एवं वैश्वीकरण करने के दौरान यह तथ्य महसूस किया गया कि इन सब का तब तक कोई अर्थ नहीं जब तक उनके उद्देश्यों के अनुरूप देश में औद्योगिक विकास की गति तेज नहीं होती जिसके लिए ऊँची दर से निरन्तर पूँजी निर्माण प्रथम शर्त होती है। निसन्देह पूँजी निर्माण में पूँजी बाजार की भूमिका अत्यन्त महत्वपूर्ण है।

सुधारकाल के 20 वर्षों में भारतीय पूँजी बाजार निश्चित रूप से कई बाधाओं जैसे हर्षद मेहता काण्ड, सी.आर.बी. घोटाला, एम.एम. शूज काण्ड, केतन पारेख काण्ड आदि के बावजूद पहले से बहुत अधिक संगठित, स्वीकृत, परिपक्व एवं आधुनिक होने के साथ–साथ अधिक वैश्विक होकर उभरा है। तकनीकि प्रयोग के विषय में तो भारतीय पूँजी ;इक्विटी बाजारद्ध विश्व के सर्वश्रेष्ठ बाजारों में से एक माना जाने लगा है। वर्तमान में कम्प्यूटर एवं संचार तकनीक के अत्यधिक प्रयोग एवं इन्टरनेट के सम्पर्कों ने सभी भौगोलिक सीमायें तोड़ दी हैं। अर्थव्यवस्था के उदारीकरण एवं वैश्वीकरण के परिणामस्वरूप इसमें विदेशी वित्तीय संस्थाओं तथा म्यूचुअल फण्ड्स आदि के आगमन से यह प्रतियोगिता दिन प्रतिदिन और अधिक कड़ी होती जा रही है। ऐसी परिस्थितियों में भारत देश के पूँजी बाजार के स्वस्थ विकास एवं नियन्त्रित क्रियाकलापों के दृष्टिकोण से भारत देश की बैंकिंग एवं अन्य वित्तीय संस्थाओं की भूमिका बहुत अधिक अहम हो जाती है। देश की बैंकिंग एवं अन्य वित्तीय संस्थायें ही सरकार/सेबी द्वारा लागू विभिन्न नियन्त्रणामक प्रतिबन्धों के बावजूद न केवल भारतीय पूँजी बाजार में स्वस्थ सक्रियता बढ़ा सकती हैं बल्कि आम निवेशक को पूँजी बाजार के प्रति विश्वास को भी और अधिक सुदृढ़ कर सकती हैं।

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STUDY OF THE ROLE OF CSR IN SKILL DEVELOPMENT IN INDIA

Sonika Dagar[1]

[1]Research Scholar, BarkatullahUniversity, Bhopal

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ABSTRACT: Corporate Social Responsibility is a concept through which companies tries to work in social domain. Due to the emergence of growth in every sphere there is a growing need of skilled manpower. In order to meet this growing demand of skilled workforce the CSR is focusing and working on skilling the youth. With this aim many companies are currently working and focusing on development skills of the youth to bring a positive transformation in India.

To name a few are ICICI Prudential Life Insurance Company, HDFC Bank Ltd, Larson and Troubo Ltd, NHPC Ltd and many more. There is a budgeted CSR investment in skill development. All these companies have their own target beneficiaries and through several projects they are working on bringing a transformation in skill set. The aim is to develop their soft and marketing skills, thus helping them to earn livelihood thus ensuring a good transformation by bringing a pool of high quality skilled manpower.

KEYWORDS: Responsibility, Prudential, Investment & Marketing.

INTRODUCTION

Corporate Social Responsibility is a concept through which companies tries to work in social domain. Due to the emergence of growth in every sphere there is a growing need of skilled manpower. In order to meet this growing demand of skilled workforce the CSR is focusing and working on skilling the youth. With this aim many companies are currently working and focusing on development skills of the youth to bring a positive transformation in India.

To name a few are ICICI Prudential Life Insurance Company, HDFC Bank Ltd, Larson and Troubo Ltd, NHPC Ltd and many more. There is a budgeted CSR investment in skill development. All these companies have their own target beneficiaries and through several projects they are working on bringing a transformation in skill set. The aim is to develop their soft and marketing skills, thus helping them to earn livelihood thus ensuring a good transformation by bringing a pool of high quality skilled manpower.

LITERATURE REVIEW

Skill development is essential ingredient for India's future economic growth. As a country it transforms itself into an intentionally competitive economy. Creating new jobs is only a part of equation for an employment in today's developing India as over 12 million youth are joining workforce each year and hence bridging the skill gap is of prime importance. India has to achieve target of skilling or up skilling 150 million people by 2022 India enjoys huge human capital resources and need to work towards skilled manpower with speed, standard and sustainability.

The review of literature shows that the studies have been taken with respect to CSR. There are papers discussing the most preferred areas of CSR,ongoing CSR projects in skills development in India. This paper focus on types of skill development activities conducted through CSR projects.

AIM OF THE STUDY

This paper examines the types of skill development activities that are undertaken in India.

- Types of skill development activities undertaken
- List of projects undertaken for skill development.
- Government agencies and their role in skilling manpower
- Funds utilization in CSR

RESEARCH METHODOLOGY

An exhaustive study is done through websites, online journals, several online seminars and reports inorder to work on the aims and objectives. The review of literature shows that the studies have been undertaken with respect to CSR and banking industry, telecommunication, chemicals and pharmaceuticals industries. There are also papers discussing different CSR models, origin, and impact on brand

TYPES OF ACTIVITIES UNDERTAKEN

- Educational programs and initiatives
  One of the most preferred choices of CSR initiatives in India is skill development thorough education.
- Constructional skill training

This project focuses on enhancing the construction skills of the workforce industry.

- Occupational Skill building programs
- Establishment of Vocational education and Training centers
- Employment opportunities through skill training and capacity building programs.
- Skill development through ISO Certified rural BPO
- Training programs as per the demand based needs
- Training schools for developing skills in hospitality management,Retail customer relationship management and Hospitality.
- Focus on employability and life skills

LIST OF PROJECTS UNDERTAKEN FOR SKILL DEVELOPMENT

Some of the organizations focusing on development of the skill set of the youth are:

NIIT: It basically focuses on providing vocational training skills in order to mobilize students and get them placed in several organizations. NIIT has set up several vocational training centers to benefit corporate, in remote areas. It specially focuses on meeting the need of the underprivileged sections of the society or people with special needs.

ACTIVITIES UNDERTAKEN ARE:

Establishing Skill Training Centers:

- **Airport Authority of India (AAI)**, a PSU, set up a skill training center in Mumbai in partnership with NIIT in 2011where more than 1,000 students have been trained as part of this CSR activity.
- **Jindal Stainless Steel Ltd.**, partnered with NIIT in 2011 to set up skill training centers at Hisar (Haryana) and Jajpur (Odisha). Till now, more than 1,000 students have been trained under this initiative.
- **Panasonic India Pvt. Ltd.** partnered with NIIT for its CSR activities in 2013. Currently, NIIT is supporting the set up and operations of two skills development centers in the Delhi NCR. Over the next

three years, the goal is to train 1,475 youth in both career as well as non- career courses.

1) STUDENTS SPONSORSHIP

- **Indian Oil Corporation Ltd.**, a PSU, sponsored 100 girl students to be trained on job oriented skills in 2011.
- **Tata Communications Ltd.** sponsored 100 students for job-oriented training.

In addition we also have tie-ups with companies like HCL Technologies, TCS and NDPL for CSR initiatives.

Larsen and tuobro ltd: A lot of Skill Training Institutes have been constructed to Implements its skill development program.It till L&T Ltd has set up eight Construction Skills Training Institutes (CSTIs) to meet the demand for quality craftsmanship in construction.It focuses on providing formal, free vocational training in construction skills for the largely unorganized workforce in the sector. The youth, especially the school dropouts and illiterate are taught skills like bar-bending, formwork carpentry, masonry, scaffolding, and welding. A stipend, hostel facility and Certificate of Proficiency on completion are given to the participants to add incentive to complete the course. These courses help to transform the once unemployable youth into skilled, self-dependent young men, who can join any organizations and achieve a standard of living.

HDFC BANK LTD

The Bank aims at imparting training and development to women and youth. It works on the need for several projects like capacity building, entrepreneurial events and agricultural and allied practices related skills thus ensuring skill-oriented training and placement. It basically focuses on meeting the specific needs to the community. The activities focus on ensuring a regular source of income, that may contributes to a developing economy. Approximately, 16,000 individuals have benefited from the Bank's efforts in skills-based training andhave supported more than 1,100 individuals to become entrepreneurs.

ICICI PRUDENTIAL INSURANCE COMPANY LTD

The Academy offers 12 weeks' occupational skill-building programs to build industry-relevant practical training in order to make help the youth in getting employed. The main aim is to create better livelihood opportunities for underprivileged youth. There are almost 24 training centers across the country. Some of the important areas of training are communications, knowledge in financial domain, and skills to adapt to an organized working environment. Though this initiative almost 64,000 youths have completed training with 100% placement. In the year 2017, more than 28,000 youths have been trained and placed with women representation across the centers at 41%.

NHPC LTD

The Company leads from the front when it comes to imparting education and skill development, especially to the poor and underprivileged sections of the society. Various Skill Development and Vocational Training Programs confirming to NSQF (National Skill Qualification Framework) have been initiated to improve quality of life of people living in the surrounding areas of various Projects/Power Stations. NHPC has also made a contribution towards setting up of Engineering Colleges at Bilaspur (HP) and at Takdah, Darjeeling (WB). A total of thirteen ITIs have been through Public Private Partnership (PPP)/ Vocational Training

Improvement Program/ Centre of Excellence Scheme (COE).The project has helped in bringing positive change in the lives of the beneficiaries.

IDEA CELLULAR

It aimed at imparting livelihood Education training that have dropped out from college or completed their Board level education. Through Vocational Education and Training (VET) centers. They are trained in the areas of sustainable and marketable skills for securing employment. The key activities include setting up a vocational center, identification of youth, imparting training, placement etc.Through this initiative, ten training programs with six Technical Service is conducted, namely, Household Electrician, Hardware & Mobile Technician, Field Technician CD & WG, Salon Executive, Tailoring, Logistics Operations Executive and four Service Sector Programs; Retail Stores Exec, BFSI Executive, Hospitality Executive and OA/DEO are provided to the candidates. The project has covered almost 1800 youngsters in several States.

OIL INDIA LTD

The Oil India Ltd. offers several short-term courses/trades certified by NSDC, Govt. of India. to enhance knowledge of construction industry (plumbing, carpentry, welding, etc.) sewing machine operator, housekeeping& hospitality, food &beverages. Itfocuses on providing skill trainingto the unemployed youths from OIL operational areas through various industry relevant placement linked skill training and capacity building programs. The project is implemented through MoUs with IL&FS Education & Technology Services (New Delhi), Construction Industry Development Council (New Delhi), Indian Institute of Entrepreneurship (Guwahati), PragatiEdutech (Guwahati), Gyanjyoti Foundation (Guwahati), Gram Tarang (Guwahati) and Downtown Hospital (Guwahati).Nearly around 8,560 candidates have been successfully trained and 6,669 have been placed in various industries across the country (placement percentage 78%). Further, entrepreneurship education programs for students and teachers of schools and colleges were conducted under the project benefitting 4290 participants

GOVERNMENT AGENCIES AND THEIR ROLE IN SKILLING MANPOWER

Some of the core initiatives taken by Government in Skill Development are:

- National Skill Development Corporation: It is an agency set by government that's provides funds to industries for skill training. It also matches the industries requirement with skills.
- All India Technical Education Council: Monitors and coordinates technical education at various levels.
- National Skill Development Agency: Working on the target to achieve skill development targets of five years plans.
- Ministry of labor and employment: Providing occasional training by establishing private industrial training centers.
- Ministry of Skill Development and Entrepreneurship: Focus on consolidating the efforts of several ministries in skill development.

In the present scenario, skilling is gaining momentum at a rapid pace. With the growing economy, there is an urgent need of skilled manpower. With this growing demand, several corporate organizations are focusing on skilling the youth. As a result, lot of initiatives

are being taken at own level or through tie ups with other organizations.

DATA PRESENTATION

As per one of the report, it its reported that CSR fund investment in India is set to cross Rs 50000/- Crore mark by March 2019.Education and skills development projects in the domain of CSR are likely to receive 15,000 crore, according to a report.

A research done by development sector platforms —CSRBOX and NGOBOX — (Tracking and projecting the CSR fund-flow of the first five years of compliance (FY14-15 to FY 18-19)) it is found that India has taken a lead in promoting the idea of concentrating on social responsible areas in boardrooms and engaging top-management with government's efforts. It is observed that 11,000-14,000 crore annual inflows for development interventions through CSR are allotted.

Education is the most preferred area for companies, especially having medium CSR budget.

A cumulative budget of Rs 9000 crore was allocated by Indian organizations towards their corporate social responsibility areas as per the report published based on primary databases. The most important areas among all are the education and skill development.

Approx, 37% of the funds allocated above was used for education and skill development training programs.

As per another report that came earlier,out of top 100 Indian firms, 59 met their CSR target and it is observed that educational projects,rural development and healthcare were the key focus areas of the company.

As per the data published, around 500 top companies have managed over Rs 11000 crore funds in fiscal year to undertake social initiatives.In year 2014-15 Education and skills development projects got major focus between however in year 2018-2019 healthcare, water and sanitation initiatives received substantial corporate attention due to the government's Swatch Bharat Mission. As per the latest report it is anticipatedfund of Rs14,000 crorefunds by March 31, 2019, according to the report.

CONCLUSION AND FINDINGS

With the emergence of the growing demand, the nation is expected to train current manpower to face future challenges of the economy. There is an urgent need to connect the relation between education, employment and skill development.Therefore; there is a need that vocational jobs and courses to be linked to a great extent to meet the growing demand.

Some of the steps that can be undertaken are:

- Special and regular training programs should be conducted to update and enhance the knowledge of trainers.
- The focus should be to provide skill based training through online or distance mode
- A cost sharing proportion between industries, schools and other organizations should be fixed.
- There should be encouragement given to teachers opting for vocational training.
- A separate department for skill development needs to be set up as per the growing requirements.
- To promote CSR related activities, companies should be given tax relaxations and awards.

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IMPACT OF DYNAMIC CHANGES IN TECHNOLOGY ON INSURANCE SECTOR IN INDIA

Professor Dr. C. K. Buttan[1]
[1]Principal
[1]Saifia PG College, Bhopal (M.P.)

Sanjiv Dwivedi[2]
[2]Sr. Vice president
[1]Investigation & Loss Mitigation, Bajaj Allianz General insurance co. Ltd

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ABSTRACT: Like every other industry, the global insurance sector, worth over $5 trillion, has undergone an immense overhaul because of disruptive technologies in recent years. Customer expectations have changed, and the digitally savvy people who have grown up in the last couple of decades are used to personalized interactions and instant gratification.

Admittedly, the insurance industry (risk, premium, claims) has been slow to keep pace with digitization and are only slowly beginning to grasp the power of becoming more customer-centric and offering faster response times, increased transparency. Legacy players are now forced to compete with "insurtechs" who are coming up with better, innovative ways to speak to the customer and provide satisfaction at a lower cost.

KEYWORDS: Insurance, Digitization, Transparency

INTRODUCTION

It is now well established that over the last 12-18 months, "technology" is at the front and centre of every industry. In many ways, it is now easy to conclude that every business is a technology company.

For the insurance industry, it is now at a wonderful inflection point. On one hand, the demand for new insurance products is ever growing – from the traditional life and health insurance to insurance against natural disasters and cyber-attacks. On the other hand, the industry is unable to keep up with the very same market potential and requires a disruptive change in technology in order to adapt faster than ever before – retaining customer loyalty and improving customer experience adds a third dimension to the already challenging landscape.

Direct digital interaction with customers: In the last few years, online insurance aggregators email and social marketing, search engine marketing and website + tele-assist based direct sales have established themselves as key digital marketing and distribution channels. Growth witnessed in these channels leaves no doubt about their potential. By leveraging analytics and advances in technology and digital infrastructure, direct digital interactions and marketing to the customers will become highly personalized, more engaging and automated using natural language processing.

The global trend of digitizing the core insurance processes of sales, claims settlement

as well as back-office operations is also gaining roots in India. A number of insurers have launched processes and apps for distribution partners and customers. Apart from productivity gains, digitization also helps improve process quality through standardization, process risk controls and lower manual involvement. For process digitization 2.0, insurers will leverage the rapidly developing digital infrastructure in the country as well as the latest technological advances.

LITERATURE REVIEW

A literature review is conducted to generate a theoretical and scientific analysis of a particular phenomenon and uncover what is known and the gaps related to that topic.

According to the Ernst & Young survey on frauds in insurance, the Indian insurance sector incurs a loss of more than 8% of its total revenue, the study indicates that the average ticket size of a single fraud ranges between INR25, 000 and INR75,000. Increase in frauds indirectly drives up the premiums collected from policy holders as insurers ultimately recover the losses by increasing the prices. Inclusion of Technology in the insurance fraud detection has reduced the fraudulent claims by 3%, further development of technology will surely help to increase the percentage of reduction of fraudulent claims.

Fraudulent and dishonest claims are a major hazard not only for the insurance industry but also for the entire nation's economy. Concrete proof as evidence including documentation, statements made by the customer and his family members and even neighbors are taken into consideration.

ROLE OF IOT IN INSURANCE SECTOR

The Internet of Things (IoT) will have its implications on claims servicing as well. Using big data, insurance companies will have improved their claims-processing capabilities. IoT improves turnover timefor initiation of claims by tracing the exact location and cause of loss. The early warning system can reduce the frequency and severity of losses. We will be able to identify and report events in a fast and effective manner. Claim assessment, too, can be automatically assigned based on the performance of the adjuster and complexity of the claim. The technology will also usher in an era of transparency and will help in minimizing frauds which otherwise would have gone unnoticed or been detected after a long time, with the culprit getting enough time to get away.

SCOPE &OBJECTIVE/ HYPOTHESIS

- The main objective of the study is to prevent the fraud in insurance sector with the help of technology.
- Let's reflect to a back. In 1995, I make a claim for my scenario a few yearsMaruti 800 and get my claim amount of Rs 20,000 within one-and-a-half months and I am happy.
- In 2005, I file for a claim for my Honda City and I am glad to receive my payment within 20 days. Today, if my car meets with an accident I expect my claim instantaneously. Is it possible to receive a claim within minutes? Has the insurance industry evolved out of its traditional mode to cater to today's customers or to the millennials who are looking at instant services and more contextual and personalized solutions? The moot question is whether the industry today is equipped to reach out to the hugely untapped potential that India offers. The insurance industry is undergoing a transformation today.

- Digitalization has opened up major opportunities for us. It has given us a breakthrough to deal with the challenges that we have been battling over decades. The advent of the insurance business in India dates back to 1818. The industry has had its presence in the country for over 150 years, yet its penetration is less than 3 percent of the GDP.
- A conventional approach, coupled with lack of infrastructure, has been the root cause of the industry's inability to realize its full potential and penetrate the Indian market. However, today, the industry is embracing digitalization and transforming the way business is done. It has affected all the areas of operation of an insurer, including employees, customers and business partners. Most importantly, it has helped us address some of our major challenge.

METHODOLOGY

Important technological methods impacting the the insurance industry in driving the growth and evolution of the sector.

- Blockchain
- IOT
- Artificial Intelligence
- Big Data
- Augmented Reality

BLOCKCHAIN AND ITS IMPACT ON THE INSURANCE INDUSTRY

Along with cutting down operational costs and ensuring fast, reliable, and secure applications, blockchain has the potential to disrupt existing business models in several ways.

With blockchain, the distributed ledger technology (DLT) which ensures that digital data is safe, there are fewer chances of identity theft or fraud.

IoT AND ITS IMPACT ON INSURANCE INDUSTRY

IoT devices, sensors, and telematics have been fast gaining adoption in the insurance sector. Several data streams and sources (wearables, sensors embedded in vehicles, location-based sensors, GIS) coupled with advanced analytics can help insurers improve risk assessment, price policies based on real data in real time, and proactively encourage customers to buy policies for loss prevention.

More usage-based insurance models for connected vehicles and precise actuarial models are expected with the huge amounts of data (or touchpoints) available thanks to today's amazingly connected world. In the auto insurance sector, for example, the data (speed, time, braking patterns, distance) gives buyers more say in their premiums; risky driving patterns can serve as warning signs.

ARTIFICIAL INTELLIGENCE AND AUTOMATION IN THE INSURANCE INDUSTRY

Automation and AI have transformed almost every sector across the world, and the insurance industry is no exception.Automation of more complex tasks (other than compliance checks or data entry) such as property assessment and personalized consumer interactions over the years has brought frictionless experiences and cut down redundancy.

Employing AI in the claims process has brought better quality and lesser time for handling (e.g. RightIndem, Shift Technology). AI algorithms can save millions lost to fraudulent claims by scouring data and identify errors and trends. The future is definitely touchless!

BIG DATA AND PREDICTIVE ANALYTICS IN INSURANCE

Although seemingly unmanageable amounts of data are churned out every day, advanced analytics has been helping insurers manage risk, drive profitability, settle claims, and price premiums better and faster. Extracting value from data using powerful analytics and data warehousing platforms have enabled evidence-based decision making.

According to a Willis Towers Watson survey, big data and predictive analysis will expand customer relationships, improve internal performance management, and enhance customer value proposition by about 20 to 30%.

In the claims cycle, using exception reporting, text mining, rules, and database searches, the predictive analysis identifies fraud more effectively. Claims and fraud analytics will better insurer profitability.

Identifying subrogation opportunities sooner using text analytics, loss expenses can be minimized, and loss recovery can be maximized.

AUGMENTED REALITY/VIRTUAL REALITY

AR apps-based tutorials and games can be valuable marketing tools and can help gather customer insights and reduce the cost of training by enhancing the learning experience.

It is important to note that one of the fastest growing insurance is Cyber insurance; mixed reality will bring a slew of new risks (health, behavioral, privacy, and information security risks) and new growth opportunities for insurers.

EXPECTED OUTCOME

Fraud Prevention: Fraud comes in all shapes and sizes. Insurance fraud costs companies billions of dollars per year across the globe. Insurance companies should establish a technology framework, tap into advanced automation and analytics, and take steps to prevent it.

Digital Signature Technology: Digital signature technology is without a doubt lowering fake insurance account activation and hence a fraud. for example, the case of claims on a said date when insurance is purchased after accident can be brought down with digital signatures verifying the purchase to be after the incident.

– Data analytics: The technology involves data mining tools and quantitive analysis. Data analytics can be applied to detect fraud. Predictive analytics helps improve the fraud detection process, helping prevent claims payouts. Analytics on claims and fraud transactions helps enhance risk management.

Lower underwriting cost: The number of internet-connected devices and sensors is projected to reach 50 billion by 2020, which will have a significant impact on the availability of real-time information that insurers can use for better pricing/underwriting. Drones are satellites on steroids at least as far as underwriting is concerned. Satellites have dramatically changed how home insurance policies are written due to fire. All sorts of things to come from drone footage underwriting: Houses that you can't even see due to trees.

Billing efficiency:

Billing systems are not only integrated but now can accept varied forms of payments allowing ultimate flexibility to the customer and thereby making the billing systems efficient. The automated systems can inform and remind customers of approaching due dates for premiums thereby lowering unintentional defaults.

Specialized insurance:

Each type of insurance is different from the other and the factors that are suited to one are not suited to the other. This requires the insurance agents to have specialized knowledge and the internet helps. however, Machine learning is vitally important here. It has the capability to learn and analyze billions of patterns and identify suitable underwriting clauses as well as identify specific customised plans for the customers based on the data provided. This can change the customer perception of the insurance company and provide an engaged customer who is likely to stay longer.

Emerging technologies have produced various opportunities for Insurers to walk with today's world, provide seamless customer experience to their customers and create new services and products.

CONCLUSION

Fraud detection will be done in dynamic manner and Technology will play a very important role in this.In conclusion, the rise in the insurance sector will be marked by a favorable demography, penetration opportunities, relevanttechnology, financial inclusion and risingfinancial literacy. To tap the penetration opportunities and increase profitability, thefocus should be on retail segments like motor, individual, health, as well as SME segments through agents, bank assurance products and banking correspondents. Additionally, for rural penetration opportunities, there is a need for large scale tie-ups with common service centers and public sector banks for distribution of micro insurance products. In the years to come, ease of insurance portability, competitive e-policy pricing and customized health insurance policies are expected to fuel the growth of the sector. The only way to benefit from these changes is to embrace them, prepare for them and to be equipped to respond effectively to them.

This is one of the very few industries that pursue a noble cause with social benefits as well as provide support to the nation and the Government; we as a society must collectively support its growth and development. The industry undoubtedly has a great growth potential and may very well double in size by 2020, but if some of the aspects outlined above play out favorably, they will be decisive in providing the right stimuli.

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COMPARATIVE STUDY OF ANTIOXIDANT DEFENSE MECHANISM UNDER SALINITY STRESS IN TWO WHEAT CULTIVARS WITH CONTRASTING SALT TOLERANCE

Dr. Deependra Singh Rajput[1]

[1]Assistant Professor

[1]Swami Vivekanand Adarsh mahavidyalaya Jabalpur (M.P)

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ABSTRACT: Abiotic stress like salinity causes negative impact on growth and production capacity of plants. The major reason for soil salinization is improper agricultural practices and poor quality of water.Production of reactive oxygen species is one major consequence of abiotic stress leading to ionic stress. Plants have evolved two types of antioxidant defense mechanism. Enzymatic (SOD, CAT, POX) and non-enzymatic osmolytes (sugars, proline). These two systemswork together to quench ROS. This study was aimed to perform an integrated analysis of role of antioxidants and their correlation to photosynthetic ability in two cultivars of wheatKRL1-4 and UP2338 atthree different levels of salinity (100, 200 and 300mM). Samples from 20DAS to 60DAS were studied forantioxidant enzyme assays and biochemical estimation of proline, sugar, chlorophyll and carotenoid was done to understand the defense mechanism of both the cultivars and its correlation with the photosynthetic pigments.The cultivar KRL1-4 showed higher activity of antioxidantenzymes like peroxidase, catalase and superoxide dismutase at high salinity. The cultivar UP2338 displayed increase in proline and sugar contents in parallel but strong reduction in photosynthetic pigment contents.Our data indicate that higher level of tolerance of KRL1-4 cultivar is related to simultaneous triggering of manyinterrelated physiological mechanisms like increased osmolyte production, prevention of photosynthetic pigments and oxidative protection by increased activity of antioxidant enzymes.

KEYWORDS: Salinity, Proline, SOD, Osmolyte.

INTRODUCTION

Soil salinity is among the foremost abiotic stresses for crop species. Saline soil is characterized by the presence of toxic levels of sodium and its chlorides and sulphates. Over a million hectaresof land throughout the world (6% of total cultivated land area) is salt affected either by salinity (397mha) or their associated condition of sodocity (434m ha) (FAO, 2005). It is a major constraint to food production by limiting the use of land previously uncultivated. Secondary salinization in particular exacerbates the problem. Sodium chloride is the most soluble and abundant salt released.

Salt in soil inhibits plant growth for two reasons. First it decreases the osmotic potential of soil solution and reduces the plant's ability to take up water which leads to slower growth as a result of the osmotic or water deficit effect. Secondly high salt concentration causes ion toxicity, because Na+ is not easily sequestered into vacuoles. Finally the interaction of salts with mineral nutrients may result in imbalances and deficiencies. Consequently membrane disorganization,

photosynthesis inhibition, generation of toxic metabolites and reactive oxygen species (ROS) and attenuated nutrient acquisition could occur, followed eventually by cell and whole plant death. Wheat is an important cereal crop and a salt sensitive glycophyte (Xueetal., 2004). Growth and grain yield of wheat are significantly reduced by salinity.

At cellular level plants have developed different mechanism that facilitates ion exclusion/sequestration (Yeo and Flowers 1983), accumulation of compatible solutes, allowing pressure potential maintenances (Serrano and Gaxiola, 1994) and detoxification of free radicals by antioxidant systems.Organic solutes like simple sugars (glucose and fructose), complex sugars (trehalose, raffinose and frutans), and methylatedionositol accumulate in the cyotosol acting as osmoprotectant. (Bohnert and Jensen 1996).

Even under optimal conditions many metabolic processes produce ROS like superoxide anion (O_2-),hydrogen peroxide (H_2O_2) and hydroxyl radicals(OH^-) particularly in choloroplast and mitochondria.(Mittler 2002, Masood et al 2006).The production of toxic derivatives increase as a result of all types of abiotic and biotic stresses .Plants possess both enzymic and non-enzymatic mechanism for scavenging ROS. The enzymicmechanisms are designed to minimize the concentration of O_2 and H_2O_2. The enzymes overproduced are superoxide dismutase (SOD), peroxidase (POX), catalase (CAT), glutathione reducatse (GR) and glutathione-synthesizing enzymes (Asada, 1992;;Prochazkova and Wilhelmova, 2007).

This study was aimed to perform an integrated analysis of role of antioxidants and their correlation to growth and photosynthetic ability in two cultivars of Wheat KRL1-4 and UP2338 at different levels of salinity.

MATERIAL AND METHOD

Plant material

Two wheat genotypes, i.eKRL1-4 (relatively salt -tolerant), UP2338 (relatively salt-sensitive) were obtained from Department of Plant Pathology, Narendra Dev Agriculture University

Healthy grains of wheat were surface sterilized with ethanol for 5 min followed by thorough wash with distilled water. Surface sterilized grains were inoculated with 96 h grown culture of Azotobacter (of equal densities (0.05 O.D. at 610 nm) for 24 hrs. at 25ºC to 30 ºC control sets were also maintained.

After 24 hrs. of soaking, the grains were sown in earthenware pots (30×30 cm) containing sterilized sand during winter. Saline water containing 100mM, 200mM, 300mM NaCl (Corresponding E.C was recorded as 9.83, 21.9 and 32.5 dS/m respectively) was supplied to these pots during the experimental set up at every seven day starting from 15 DAS . Hoagland's nutrient solution was given weekly. To maintain the salt level (300ml.) water was supplied to each pot daily. It also kept the sand moist. The plants grown in sand culture were taken for studies.

Plant sampling: The plants were sampled and observations were takenof antioxidant enzymatic (SOD, POD, and CAT) and non-enzymatic (proline, sugar, chlorophyll and carotenoids) parameters at 20-60 DAS at 10 day interval from wheat plants as describedbelow. For every treatment, three replications with five pots in each replication were maintained. The total number of pots was 240 (5 × 3 replications × 4 treatments × 4

genotypes = 240) and in each pot three plants were maintained for sampling. Primary leaves were taken for sample.

ASSAY OF ENZYME ACTIVITIES

The estimation of activities of enzyme such as peroxidase, catalase and superoxide dismutase were done in primary leaves at different stages of plant growth starting from 20 DAS to 60 DAS at ten day interval.

ASSAY OF PEROXIDASE ACTIVITY

The peroxidase [E.C.1.11.1.7] activity was determined in the primary leaves by the method of Shannon et al. (1966). The enzyme was assayed by the in-vivo method by using freeze thaw method. For this 200 mg fresh leaves were cut into narrow strips. Sliced leaves were placed in 10 ml capacity vials containing 3ml phosphate buffer (pH 6.8). The leaf strips were frozen for 3 hr. at -4^0C followed by thawing. The reaction was initiated by adding 1.0 ml enzyme extract to the assay mixture at 30^o C .The assay mixture contained 1 ml of 15mM pyrogallol, 1ml of 50mM H_2O_2 and 5ml distilled water. This reaction mixture was incubated for 15 minute at 25^oC, after incubation reaction was stopped by adding 0.5ml of 5% H_2SO_4.The amount of colour formed was determined by measuring the absorbance at 420nm in UV/VIS systronics spectrophotometer type No.118. The activity of peroxidase has been calculated in terms of µ mol H_2O_2 destroyed $h^{-1}g^{-1}$ fresh weight from standard curve prepared from H_2O_2.

ASSAY OF CATALASE ACTIVITY

The catalase [E.C.1.11.1.6] activity was determined in primary leaves by the modified method of Chance and Maehly, 1955. The enzyme was assayed by the in-vivo method. For this 200 mg fresh leaves were cut into narrow strips. Sliced leaves were placed in 10 ml capacity vials containing 3ml phosphate buffer (pH 6.8). The leaf strips were frozen for 3 hr. at -4^0C followed by thawing. The reaction was initiated by adding 1.0 ml enzyme extract to 2.0ml of 2.5mM H_2O_2 for 10 min at 37ºC inside an incubator. The reaction was stopped by adding 1ml of 1% Titanic sulphate (in 2.5% H_2SO_4 w/v) and the mixture was centrifuged at 10,000 rpm for 15 minutes. The intensity of yellow colour was measured at 410nm in UV /VIS systronics spectrophotometer No.118.

ASSAY OF SUPEROXIDE DISMUTASE ACTIVITY

The superoxide dismutase (SOD, EC 1.15.1.1) activity was measured in the primary leaves by the modified method of Giannopolites and Ries (1977). The enzyme was assayed by the in-vivo method. For this 200 mg of fresh leaves were cut into narrow strips. Sliced leaves were placed in 10 ml capacity vials containing 3ml phosphate buffer (pH 7.8). The leaf strips were frozen for 3 hr.at -4^0C followed by thawing. The reaction was initiated by adding the 0.1 ml enzyme extract to the incubation mixture at 30ºC. The assay medium contained, 13mM methionine, 75µM p-nitrobluetetrazolium chloride, 2µm riboflavin, 0.1mM EDTA. In last Riboflavin was added and the test tubes were placed under two, 15 W fluorescent lamps. The reaction was stopped after 10 min by removal from light source. The absorbance was read at 560nm. A non-irradiated reaction mixture did not develop colour and served as control. The reaction mixture lacking enzyme develop maximum colour as a result of maximum reduction of NBT. One unit of enzyme activity was determined as the amount of the enzyme

to reach an inhibition of 50% NBT reduction rate.

BIOCHEMICAL ESTIMATION

The biochemical estimation included proline, reducing sugar, in dry sample of leaveswhereas chlorophyll and carotenoids in fresh primary leaves. Fresh sample of leaves were harvested on the same days on which enzyme activity was measured. The plant samples were dried in an oven at 60±2°C for 48h. The dried samples were powdered and used to estimate the desired metabolite. Proline was estimated by the method of Bates et al (1973).Total reducing sugar was estimated by Somogyi's method (1952) from dried leaf sample.The amount of Chl'a' and Chl'b' and total chlorophyll was measured in the primary leaves by the method of Arnon(1949) and calculated in terms of mg per gram fresh weight of leaf by the following formulae.

Chlorophyll 'a' = $[12.7(D_{663})-2.69(D_{645})] \times \frac{V}{1000xW}$

Chlorophyll 'b' = $[22.9(D_{645})-4.68(D_{663})] \times \frac{V}{1000xW}$

Total Chlorophyll = $[20.2(D_{645})+8.02(D_{663})] \times \frac{V}{1000xW}$

Where,

D = is the optical density observed for chlorophyll

Extract at the particular indicated wavelength.

V = Final volume of the chlorophyll extract in 80%

Acetone.

W = Fresh weight of leaves in mg

Carotenoid = $O.D._{440} \times \frac{V}{196xW}$

The data have been statically analyzed. Least Significant Difference (LSD) has been calculated for data where F test was found significant.

RESULT:

The enzyme activity was measured from day 20 up to day 60 at ten day interval for all treatments and in both cultivars of wheat. The activity of enzyme increased up to 40DAS. A significant variation was observed in superoxide dismutase activity in the leaves of salt treated plants. The activity of enzyme superoxide dismutase increased gradually with increase in salt concentration in both the cultivars. However the tolerant cultivar showed maximum activity of enzyme at 200mM conc. of NaCl, at which the activity of the enzyme in sensitive cultivar had declined. The highest SOD 90.23+_0.45was recorded at 200 mM on 40DA in tolerant whereas in sensitive highest activity 80.67+ 1.2 was recorded at 100mM on 40DAS.(Fig 1a&1b).

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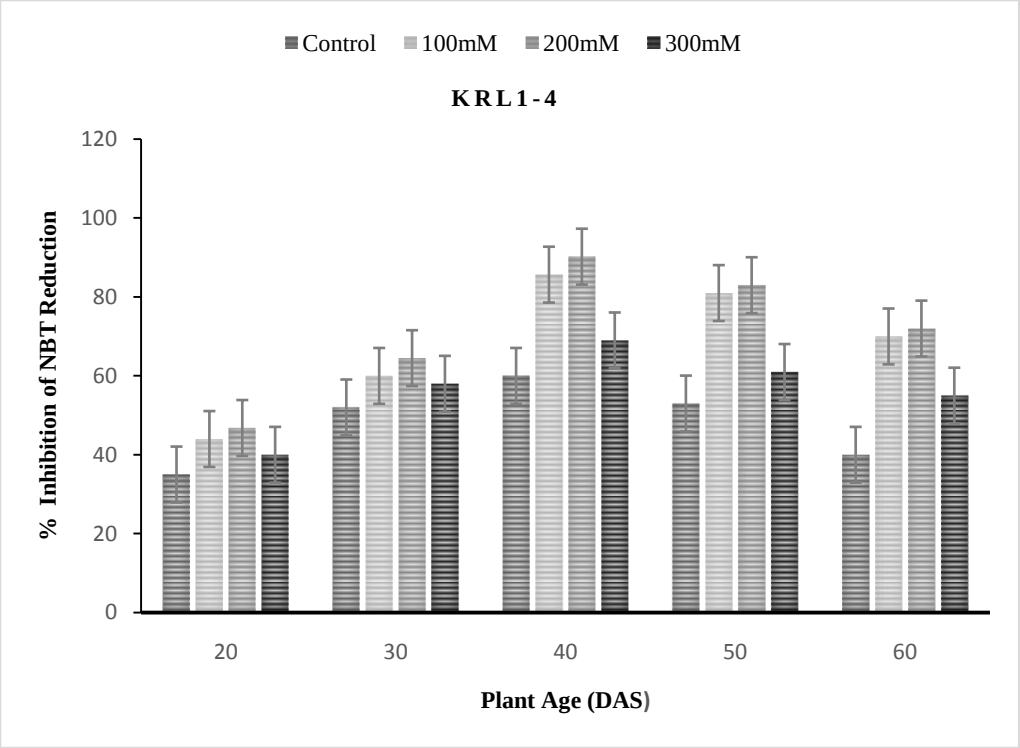

Fig. 1a. Superoxide Dismutase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

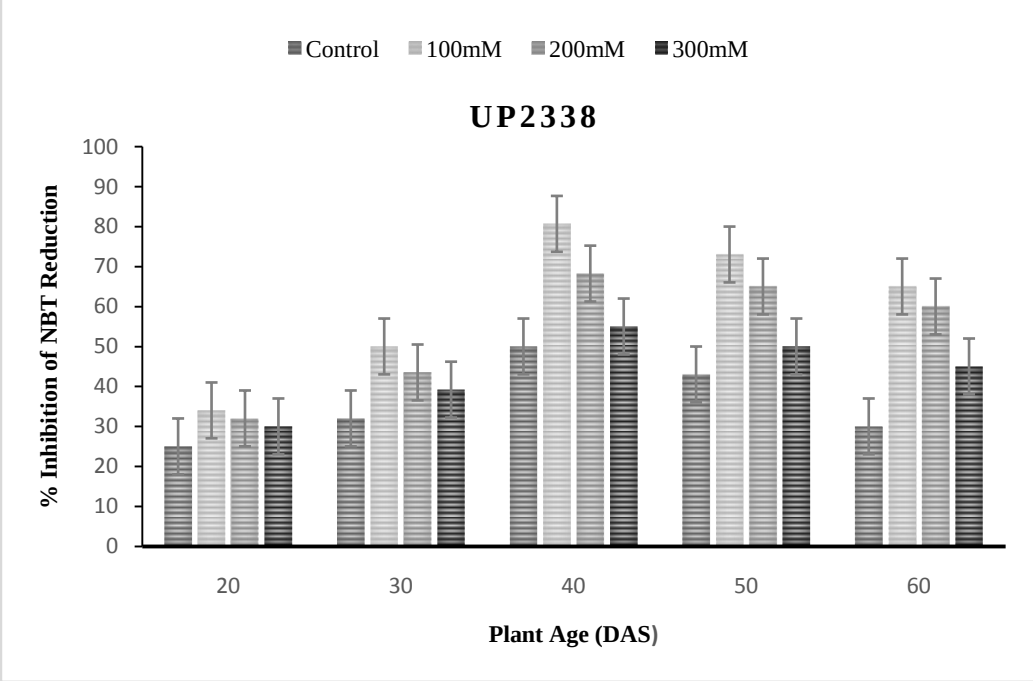

Fig. 1b. Superoxide Dismutase activity of plants at different age of growth in UP2338cultivar under different NaCl concentrations

The activity of Catalase enzyme was higher in tolerant cultivar compared to sensitive at all levels of salt concentration. In the sensitive cultivar the activity of catalase declined after 100mM where as in tolerant cultivar catalase activity increased till 200mM concentration. (Fig.2a&2b).

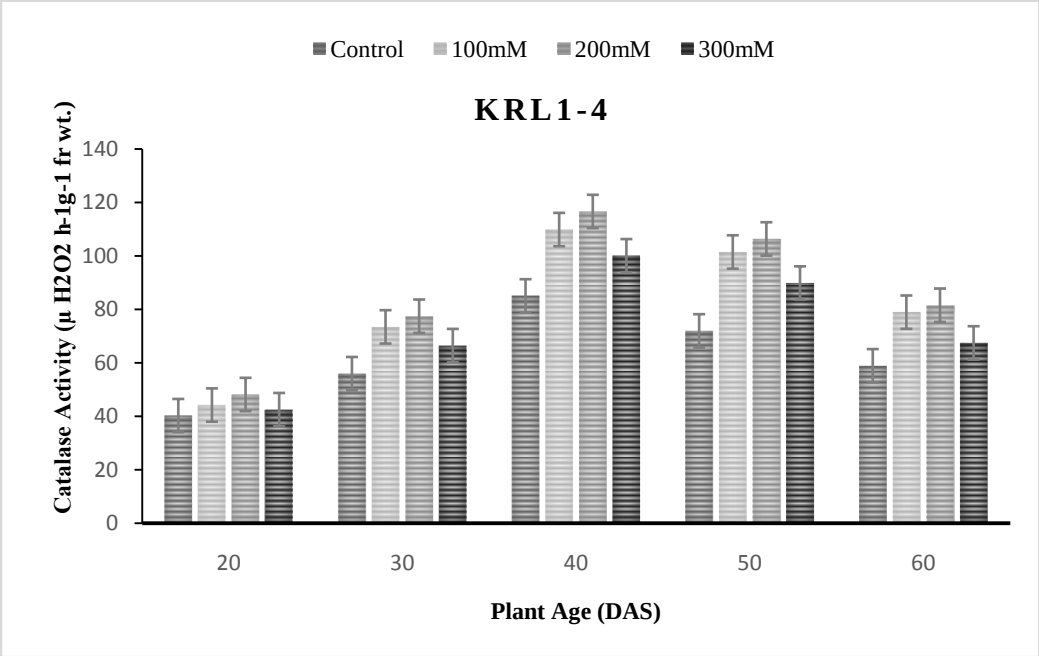

Fig. 2a. Catalase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

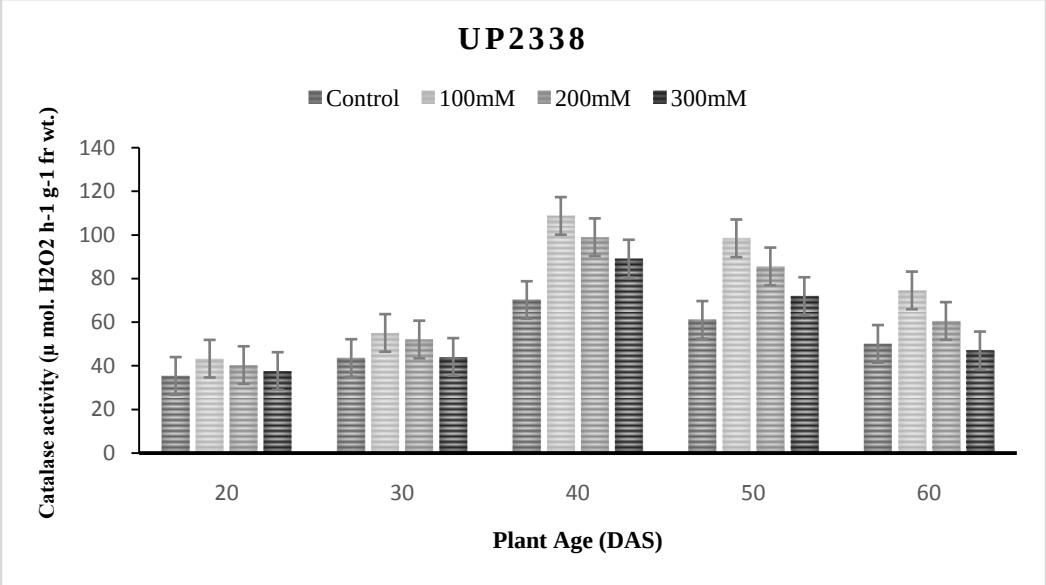

Fig. 2b. Catalase activity of plants at different age of growth in UP2338cultivar under different NaCl concentrations.

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South Asia Journal of Multidisciplinary Studies SAJMS August 2020, Vol. 6, No 7

The activity of Peroxidase followed the same trend. (Fig. 3a &3b). The maximum increment of peroxidase in tolerant cultivar in 200mM was about 40% than control plants whereas in sensitive the increase was 31.1%.

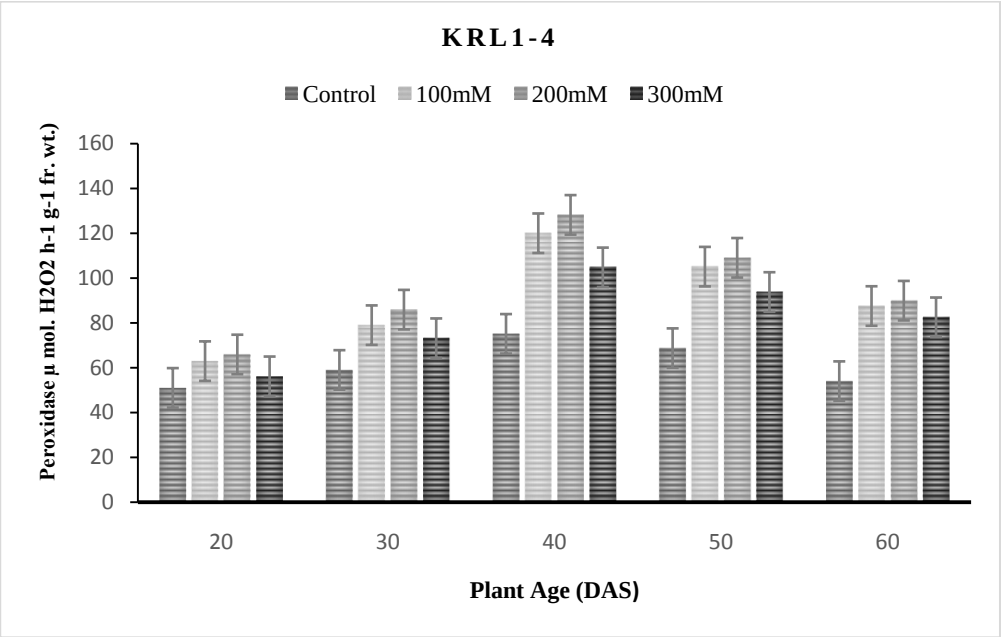

Fig. 3a. Peroxidase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

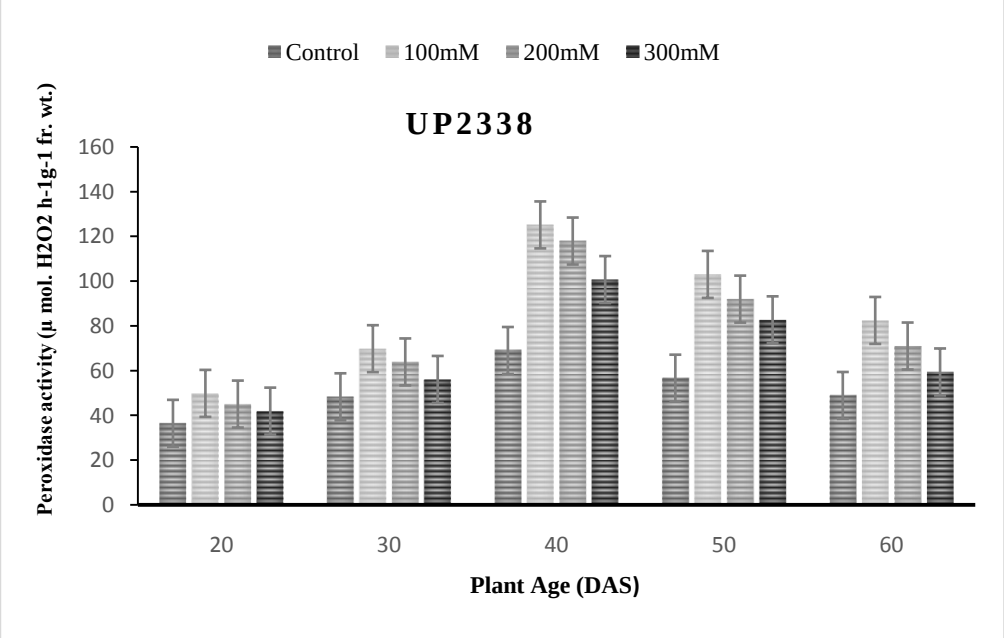

Fig. 3b. Peroxidase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations

In the present study proline showed a gradual increase from 20 DAS to 40DAS followed by a gradual decline till 60 DAS. The study indicates higher levels of proline and reducing sugar in both the cultivars at each salt concentration. Shoot proline content increased by 35-65 % in KRL1-4 and 25-60% in UP2338 cultivar. Maximum shoot proline was reported in KRL1-4 at 300mM concentration. (Fig 4a & 4b).

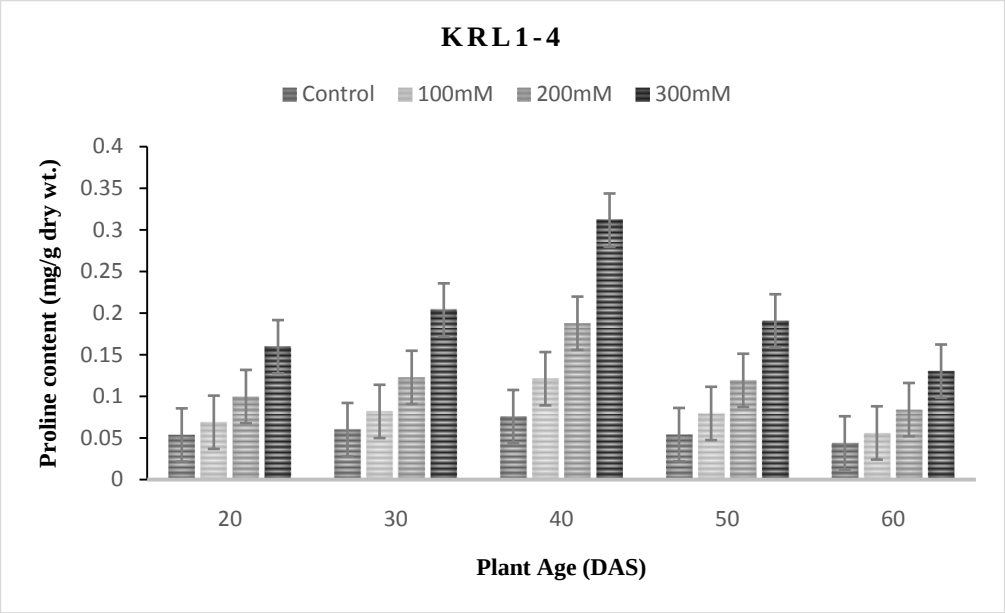

Fig. 4a. Proline content of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

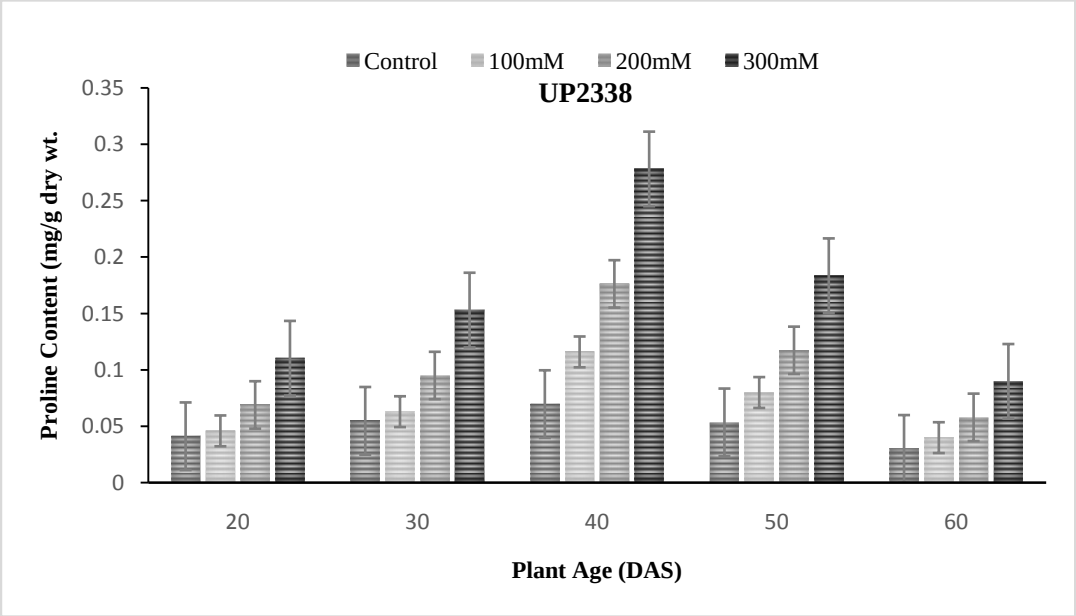

Fig. 4b. Proline content of plants at different age of growth in UP 2338cultivar under different NaCl concentrations.

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In the tolerant cultivar the amount of sugar was higher at high salinity compared to the sensitive cultivar. The maximum sugar content in sensitive cultivar at 200mM whereas in tolerant highest sugar was reported in 300mM salt concentration. (Fig 5a & 5b).

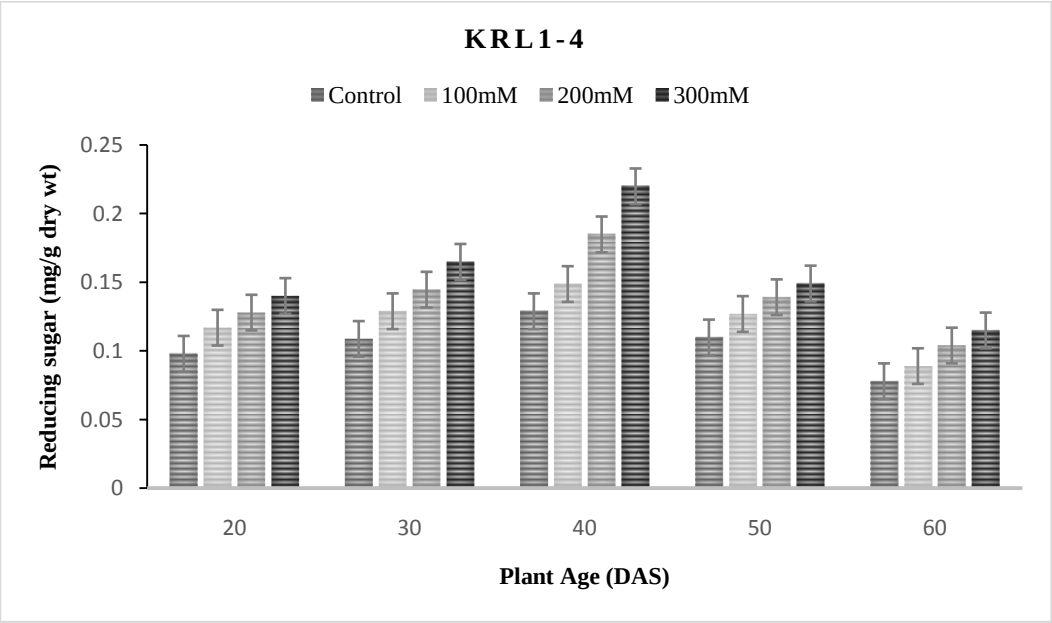

Fig. 5a. Reducing sugar content of plants at different age of growth in KRL1-4cultivar under different NaCl concentrations.

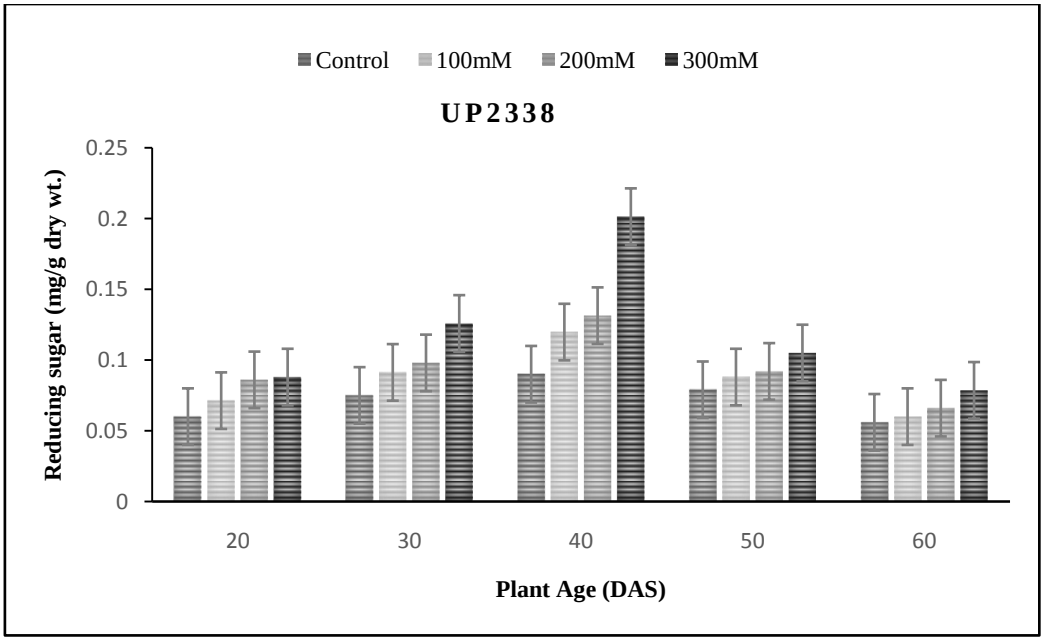

Fig. 5b. Reducing sugar content of plants at different age of growth in UP2338cultivar under different NaCl concentrations.

Chlorophyll 'a', 'b' and total chlorophyll increased up-to 40 DAS and then decreased till 60 DAS at all NaCl concentrations. In tolerant cultivar (KRL1-4) the decrease was less compared to the sensitive cultivar (UP2338). (Table 1a and 1b). Higher chlorophyll content in tolerant cultivar indicates its superior defense mechanism.

Table 1a: Chlorophyll 'a' Chlorophyll 'b' and total chlorophyll content (mg/gm) at different age of growth in KRL1-4 cultivar treated with different NaCl concentration.

Treatment (NaCl)	Chlorophyll	Chlorophyll content mg/g fr. wt.x10^{-3}				
		Plant age (Days)				
		20	30	40	50	60
Control	Chl 'a'	1.96±.010	2.20±.020	2.60±.030	2.10±.026	1.60±.026
	Chl 'b'	0.76±.020	0.79±.026	0.84±.010	0.73±.052	0.53±.040
	Total Chl	2.72±.020	2.99±.010	3.44±.026	2.83±.026	2.13±.030
100mM	Chl 'a'	1.93±.021	2.10±.017	2.40±.021	2.06±.034	1.50±.030
	Chl 'b'	0.74±.020	0.76±.020	0.81±.026	0.62±.036	0.52±.020
	Total Chl	2.66±.020	2.82±.017	3.21±.020	2.68±.026	2.02±.045
200mM	Chl 'a'	1.88±.030	2.05±.010	2.25±.035	2.03±.017	1.20±.030
	Chl 'b'	0.71±.030	0.73±.010	0.76±.030	0.60±.036	0.51±.030
	Total Chl	2.59±.010	2.78±.020	3.01±.036	2.63±.021	1.71±.036
300mM	Chl 'a'	1.71 x10^{-3}	1.97 x10^{-3}	2.10±.020	1.87±.020	1.01±.025
	Chl 'b'	0.71 x10^{-3}	0.69 x10^{-3}	0.66±.020	0.56±.026	0.49±.034
	Total Chl	2.41x10^{-3}	2.60 x10^{-3}	2.76±.050	2.40±.034	1.50±.017

Table 1b: Chlorophyll 'a' Chlorophyll 'b' and total chlorophyll content (mg/gm) at different age of growth in UP2338cultivar treated with different NaCl concentration.

Treatment (NaCl)	Chlorophyll	Chlorophyll content mg/g fr. wt. x10^{-3}				
		Plant age (Days)				
		20	30	40	50	60
Control	Chl 'a'	2.02 ±.017	2.35 ±.020	2.54±.040	1.80±.020	1.40±.020
	Chl 'b'	0.59± .010	0.65 ±.043	0.65±.020	0.56±.026	0.48±.026
	Total Chl	2.61±.010	2.99 ±.040	3.19±.050	2.35±.060	1.80±.026
100mM	Chl 'a'	1.94±.017	2.14±.034	2.05±.043	1.70±.052	1.21±.036
	Chl 'b'	0.54±.026	0.59±.045	0.56±.010	0.49±.026	0.44±.026
	Total Chl	2.48±.026	2.72±.036	2.60±.060	2.19±.044	1.67±.020
200mM	Chl 'a'	1.83±.030	2.07±.036	1.92±.030	1.34±.020	1.00±.045
	Chl 'b'	0.53±.026	0.56±.030	0.54±.034	0.44±.020	0.38±.050
	Total Chl	2.35±.043	2.63±.020	2.45±.052	2.22±.026	1.38±.034
300mM	Chl 'a'	1.69±.040	1.65±.020	1.51±.026	1.00±.036	0.94±.026
	Chl 'b'	0.49±.036	0.48±.036	0.42±.020	0.38±.043	0.30±.043
	Total Chl	2.18±.036	2.13±.030	1.93±.020	1.38±.035	1.23±.026

The carotenoid content decreased with increasing salt concentration in both the cultivars when compared to control however the tolerant cultivar KRL1-4 showed higher carotenoid content than UP2338 at all levels of salt concentrations.(Table 2a & 2b).

Table 2a.Carotenoid content in mg/gm at different age of growth in KRL-14 cultivar under different NaCl concentration.

Treatments (NaCl)	Carotenoid Content mg/g fr.wt x10^{-3}				
	Plant age (Days)				
	20	30	40	50	60
Control	0.613±.003	0.623±.003	0.653±.003	0.542±.002	0.342±.003
100mM	0.593±.003	0.602±.004	0.630±.002	0.510±.004	0.314±.004
200mM	0.570±.005	0.577±.002	0.604±.003	0.484±.002	0.284±.003
300mM	0.540±.005	0.546±.001	0.572±.003	0.448±.001	0.252±.003

Table 2b. Carotenoid content in mg/gm at different age of growth in UP2338 cultivar under different NaCl concentration.

Treatment (NaCl)	Carotenoid Content mg/g fr.wt x 10^{-3}				
	Plant age (Days)				
	20	30	40	50	60
Control	0.567±.004	0.577±.002	0.610±.004	0.495±.004	0.295±.002
100mM	0.542±.004	0.551±.003	0.582±.001	0.465±.003	0.269±.003
200mM	0.512±.001	0.518±.003	0.549±.002	0.431±.003	0.236±.002
300mM	0.479±.003	0.487±.002	0.480±.003	0.355±.003	0.165±.002

DISCUSSION

To maintain the disruption of osmotic and ionic balance caused by salinity stress, tolerance mechanism of plants is comprised of redox, osmotic and ionic homeostasis. (Nahar 2016). The Reactive oxygen species homeostasis is done by creating a balance between quenching and production of ionic molecules through antioxidative defense system. (Caverzan et al. 2016, Aldesuquy et al. 2015). AOS, particularly hydrogen peroxide, is likely to act as critical signals for plant adaptation to biotic and abiotic stresses (Mittler et al. 2002; Karpinski et al. 1999). Therefore, under the stress conditions, AOS may play two very different roles: damaging the cellular components or signaling the activation of defense responses. (Dat et al. 2000; Grant &Loake 2000). Plants may form one or the other species by either accumulating H2O2 by activating superoxide dismutase or by scavenging H_2O_2 with antioxidants.

In our present research higher productivity in the tolerant cultivar may be because of better SOD performance that may protect the plant, by conversion of highly reactive superoxide radical to peroxides thereby preventing lipid peroxidation and weakening of cell membranes resulting in better photosynthetic ability. The SOD activity was found to be upregulated during salt stress in many plants like chickpea (Eyidogan and Oz, 2007) and tomato (Gapinska et al., 2008).

Catalase is responsible for catalyzing the dismutation of H_2O_2 into H_2O.The increased activity of CAT is due to certain stress inducible genes like SOS3 which activates enzymes that help in effluxing excess sodium ion creating ionic homeostasis. (Prajapati and Vadassery 2016). In our study higher activity of catalase in the tolerant cultivar is in accordance with Simova-Stoilova et al., 2010 who reported increase in catalase activity in wheat under drought stress. While catalase scavenges hydrogen peroxide in peroxisomes, in the cytosol and chloroplast peroxidase catalases the reaction. Due to wide distribution and better affinity for H_2O_2, peroxidase is better efficient scavenger of peroxide at the time of stress. (Kaushik and Aryadeep2014).It is supposed that higher activity of peroxidase in KRL1-4 helps in efficient breakdown of hydrogen peroxide generated.

The ability of the resistant genotypes to increase peroxidase activities suggest that genotypes with a higher level of resistance would either have a higher upregulation capacity for defensive enzymes or have a more sensitive upregulation response or both.(Gulsen O et al., 2010)

Proline acts as an osmolyte, and performs three major roles during stress, i.e., as a signaling molecule, metal chelator, and an antioxidative defense molecule. (Shyamul Hayat et al 2012, Sharma A et al. 2019). In current research proline increased in both the cultivars but maximum shoot proline was reported in tolerant cultivar is in accordance with Rayyan Khan et al 2019). The increase in proline may be either due to decrease in breakdown or increased production.

Soluble sugars are a key player in plants under stresss. Acting an osmoprotectant and signaling molecule in gene regulation that may be involved in the upregulation of growth-related genes and downregulation of stress-related genes (Yuanyuan M., et al. 2009). At high salinity levels, more accumulation of sugar was recorded in tolerant cultivar in comparison to susceptible one.

More accumulation of sugar decreases the osmotic potential of the cytoplasm and increases the ability of the cytoplasm to retain water under reduced water supply in tolerant genotypes. (Abede et al., 2003).Other studies also suggest that sugar is an important osmoprotectant. (Wu G.Q et al.2016)

At higher salinity both the cultivars showed reduction in total photosynthetic pigment. The reduction in chlorophyll might be due to enhancement of chlorophyllase activity at higher salinity levels or due to reduction in de novo chlorophyll synthesis. (Sudhakar etal., 1997, Desingh and Kaenagaraj, 2007) presumed that the decreased activity of photosystems is due to loss of integrity of chloroplast by damaging the chloroplast lamellar system due to saline condition. However in KRL1-4 the reduction was less indicating better membrane stability due to efficient antioxidant system.

Carotenoids protect the photosynthetic machinery byscavenging oxygen free radical and producing heat as a by-product. Higher content of carotenoid in tolerant is in accordance with Weiwei He et al.,(2020) they suggested that accumulation of carotenoid due to increased expression of related carotenogenic genes and increased antioxidant capacity in germinated yellow maize kernels under NaCl stress.

This study suggests that the relative salinity tolerance in KRL1-4 may occur by a) reducing osmotic stress due to more accumulation of osmolyte like proline and sugars and b) by reducing oxidative stress due to efficient antioxidant enzyme system. This led to better photosynthetic ability of KRL1-4 compared to UP2338. Presented study can contribute in understanding tolerance mechanism of wheat that can be further use in breeding abiotic stress resistant crops.

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