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CONTENTS

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SOME THEORETICAL PERSPECTIVES ON CHILD LABOR AN ANALYTICAL STUDY

Dr. Nazia Husain
Assistant Professor, Department of History, Shri. Jagdish prashad Jhabarmal Tibrewala University, Jhunjhunu, Rajasthan.
Email ID: drnazz2018@gmail.com

Abstract.

There are a variety of hypotheses on child labor which uncovers hitherto unknown causes and consequences. These hypotheses are interesting in the sense that they offer new perspectives on child labor and that they can be put to retest time and again to verify their validity and usefulness. Some of these hypotheses and perspectives on child labor are: the substitution, subsistence, capital market and parental education hypothesis. The agricultural income shock argumentalso provides yet another new perspective on the causes of child labor. The purpose of this research paper is to review these perspectives and understand inferences from them. Helena Skyt Nielson and AmareshDubeyfound that there is a strong negative relationship between parental education, household income and child labor.Basu and Van (1998) had laid emphasis on the substitution hypothesis i.e. the substitutability between adult and child labor in production as an important precondition for child labor. The firm's demand for child labor is a function of child-adult wage ratio and productivity ratio. Grootaert and Kanbur (1995) have stated that the incidence of household child labor can be accounted by the substitutability between child labor and household adult female labor. As per the luxury principle put forward by Basu and Van (1998), a household will send children to work only if the non-child labor income of the household is very low. **This is known as the subsistence hypothesis.**

Parsons and Goldin (1989) and Ranjan (1999) have found that child labor acts as a consumption smoothening device for poor households in the absence of credit markets. The relation between child labor, credit markets and land ownership is explained by the capital market hypothesis.

Dessy (2000) has argued that child labor exists due to low human capital in poor countries and such countries are trapped in under-development with child labor and high fertility rate. This is known as the **parental education hypothesis**. This hypothesis is tested by establishing a relationship between the education of the household head and activities of the children in the household. The authors have considered that child labor and education makes competing claims on children's time and child labor hinders the development of human capital. On the basis of these assumptions, the authors have tried to find out if the four hypotheses stated above explain the activities of children in India.

Key Words: Child Labor, Subsistence, Substitution, Capital Market, Household Income.

Introduction.

There are a variety of hypotheses on child labor which uncovers hitherto unknown causes and consequences. These hypotheses are interesting in the sense that they offer new perspectives on child labor and that they can be put to retest time and again to verify their validity and usefulness. Some of these hypotheses and perspectives on child labor are: the substitution, subsistence, capital market and parental education hypothesis. The agricultural income shock argumentalso provides yet another new perspective on the causes of child labor. The purpose of this research paper is to review these perspectives and draw new inferences from them.

The Substituion, Subsistence, Capital Market And Parental Education Hypotheses On Child Labor.

[1]Helena Skyt Nielson and AmareshDubey made an empirical micro-economic analysis of these hypotheses. They were tested on the basis of macro-economic literature on child labor. Using four Indian data sets, the authors found that at most, two thirds of the increase in school enrolment from 1983 to 2000 was explained by an increase in both household incomes and in parental education. **There is therefore a strong negative relationship between parental education, household income and child labor.**

In order to test these hypotheses, the authors used Indian data for the years 1983, 1987-88, 1993-94 and 1999-2000 with each data set covering more than 70,000 households. Low household expenditure (subsistence hypothesis) and lack of parental human capital (parental education hypothesis) were the two main reasons responsible for child labor and poor enrollment in schools according to the authors. **Between**

1983 and 1999-2000, the incidence of child labor has reduced because of increase in household income and education.

Basu and Van (1998) had laid emphasis on the substitution hypothesis i.e. the substitutability between adult and child labor in production as an important precondition for child labor. The firm's demand for child labor is a function of child-adult wage ratio and productivity ratio. Grootaert and Kanbur (1995) have stated that the incidence of household child labor can be accounted by the substitutability between child labor and household adult female labor. The economic activities of children or child labor can be explained by the substitution hypothesis or the child-adult wage ratio. As per the luxury principle put forward by Basu and Van (1998), a household will send children to work only if the non-child labor income of the household is very low. **This is known as the subsistence hypothesis.**

Parsons and Goldin (1989) and Ranjan (1999) have found that child labor acts as a consumption smoothening device for poor households in the absence of credit markets. Land ownership also affects the economic activities of children. Land-holding is a factor determining the demand for child labor. **The relation between child labor, credit markets and land ownership is explained by the capital market hypothesis.**

Dessy (2000) has argued that child labor exists due to low human capital in poor countries and such countries are trapped in under-development with child labor and high fertility rate. This is known as the **parental education hypothesis**. This hypothesis is tested by establishing a relationship between the education of the household head and activities of the children in the household. Other variables such as the gender and age of the child, SC/ST status of the family, religion and size of the household and the number of dependents in the household were being considered by the authors. The authors have considered that child labor and education makes competing claims on children's time and child labor hinders the development of human capital. On the basis of these assumptions, the authors have tried to find out if the four hypotheses stated above explain the activities of children in India.

The Substitution Hypothesis.

The authors found that a higher child-adult wage ratio increased the probability of non-enrollment of children and the substitutability of child labor to adult labor. Working for wages, working at home and other activities were found to be comparable productive activities and children are used as substitutes for low wage heads of household in all these activities in regions of high child-adult wage ratio. The elasticity of non-enrollment to high child-adult wage ratio was 0.5 in the age group 5 – 9 and 0.2 in the age group 10 – 14. If the household head is female, the probability of non-enrollment decreases which means female head households are committed to the education of children. However, such a relationship is not found across age groups and time-series. The study indicated that there is a substitution effect between the working female household heads and children in household work as hypothesized by Grooteart and Kanbur (1995). Household heads working at home tends to reduce the probability of children working for wages. In other words, there is a tendency of unpaid household child labor in households where the heads are found to be working at home.

The Subsistence Hypothesis.

The subsistence hypothesis was tested by using per capita household expenditure at 1983 prices. Households with monthly per capita expenditure below Rs.150 were considered to be poor and those above were considered to be non-poor. When the monthly per capita expenditure was assumed to have increased by Rs.100, it was found that amongst the 10 – 14 year olds, 40 to 50 per cent of the children were enrolled in the school in all rounds of the survey. It means that child labor can be eliminated at a price of Rs.100 per working child. Between 1983 and 1999-2000, the median household expenditure per capita increased by 14 per cent and school enrollment increased from 48 to 72 per cent. A ten percentage point increase in the enrollment is explained by the expenditure growth (0.14*0.72).

[2]US Kambhampati&RajiRajan in their article "Economic Growth: A Panacea for Child Labor?" stated that economic growth leads to increase in the supply of child labor because at higher levels of national income, the demand for child labor increases. If we consider economic growth as a proxy for increase in household income, the inverse relationship between household income and child labor will be negated.

In India, poverty does not explain the reason behind increase in school enrollment during the entire period. Other factors such as norms and traditions may be as important as poverty in determining child labor in India.

The Capital Market Hypothesis.

For the 5 – 9 year olds in 1999-2000 and the 10 – 14 year olds in 1993-94 and 1999-2000, the authors found an asset effect because land holdings decrease the probability of wage work and other activities. However, the probability of work in the home increases for large land holdings thereby indicating that

children are needed at home for work in land owning households. In 1983, land holdings consistently increased the probability of non-enrollment.

The Parental Education Hypothesis .

The authors found a positive relationship between parental education and accumulation of human capital amongst children in all age groups.

Other Results.

The authors found that girls have a higher probability of engaging in non-school activity as compared to boys. In the 5 – 9 age group the probability of non-enrollment declines with age and the decline is slower amongst girls than boys. In the 10 – 14 age-groups, the probability of wage work and work at home increases with age and the probability is higher amongst girls. SC/ST children have higher probability of engaging in non-school activities with the exception of wage work. Muslim children were found to have a lower school attendance as compared to Hindu children. Large households decrease the probability of non-attendance indicating economies of scale. However, households with children below five tend to increase the probability of working at home. Thus a large household with older members decreases the probability of child labor and a household with younger members increases the probability of child labor.

[3]The incidence of female child labor as compared to male child labor is found to be high across all age groups and this has been brought out by other studies (Alessandro Cigno, FurioRosatiand ZafirisTzannatos 2001).

The main findings of the authors are that low household expenditure (subsistence hypothesis) and parental human capital (parental education hypothesis) are the two important causes of child labor and non-enrollment of children in schools. During the period under study, the authors have found that there has been a tremendous increase in school enrollment. In the 10 – 14 age group school-enrollment increased continuously from 48 to 72 per cent during the period. A ten percentage point increase in school enrollment was explained by income growth during the period. Better education of the parents also contributed to improvement in school-enrollment. The need to substitute adult labor with child labor has increased because more and more adult workers are working for a wage than staying at home. About 66% of the increased in school enrollment can be explained by improved parental education.

[4]**Kathleen Beegle, Rajeev H. Dehejia& Roberta Gatti, 2005** in their research paper **'Child Labor and Agricultural Shocks'**, have examined the relationship between household income shocks and child labor and whether household asset holdings reduce the effects of income shocks on child labor. The study is based on household panel survey in Tanzania. The authors also examine the effect of buffer stocks and borrowings on child labor. The authors have found that both the factors are significantly related to child labor. The authors examined whether child labor acts as a buffer against transitory income shocks and suggests that insurance or access to credit might reduce child labor. Secondly, the authors examine the role of asset holdings on household's response to shocks and relates to the role of credit constraints (Baland and Robinson, 2000; Ranjan, 2001) in explaining child labor and the buffer stock argument (Deaton, 1992). From the households' point of view, child labor offers a trade-off between immediate benefits (increased current income) and the accumulation of child's human capital (lower future earning potential). When households face a transitory shock, they use asset holdings either as a buffer or as collateral against credit to offset the shock. Thirdly, the authors relate their work to permanent income hypothesis and consumption smoothening (Zeldes, 1989; Townsend, 1994; Chaudhuri and Ravallion, 1997; Morduch, 1994, 1995, 1999). If households succeed in smoothening their consumption but lack buffer stock or are constrained by credit, they are forced to resort to other mechanisms such as child labor to face such income shocks.

The authors have used four rounds of data from the Kagera region of Tanzania to show that transitory income shocks such as accidental crop loss lead to significantly increased child labor. When faced with an income shock, households tend to use child labor by substituting adult labor in household activities such as gathering firewood and fetching water leading to poor school attendance. Dehejia and Gatti have found significant negative relationship between child labor and credit constraint. Guarcello and others have found that child labor increases in response to income shocks and credit rationing (using data from Guatemala).

Findings.

The authors have examined whether crop shocks are exogenous and are economically significant. The authors have also examined the effects of crop shocks on child labor and whether shocks have a smaller effect on households with higher assets.

1. **The effect of crop shocks on child labor.** The authors have found out a positive significant effect of crop shocks on child labor. Children in household experiencing shocks have increased child labor by

30%. The authors conclude that insuring agricultural households from crop shocks can significantly reduce the incidence of child labor. The authors have found that there is a positive relationship between household assets and child labor. Higher household asset holdings have the effect of offsetting shocks. Hence the shock effect is weaker on child labor with households having higher asset holdings.

2. **Crop shocks, asset holdings, child labor and education.** The authors have found a significant and negative relation between crop shock and education. Children in households affected by a shock are 20% less likely to be enrolled in schools. Further households with average (mean) level of asset holdings fully offsets the negative enrolment effect of a shock. Child labor on communal farms tends to increase in response to a shock. Child labor spent in collecting fire wood and other household activities tend to increase in response to a shock. Here again, households with average asset holdings are able to fully offset the effect of a shock. Thus agricultural shocks lead to increase in child labor and decrease in enrollment.
3. **Buffer Stocks and Access to Credit.** The authors have found that asset holdings substantially reduce the effect of a shock on child labor. They examined the effect of agricultural shocks on three types of asset holdings: cash, physical assets and durables. As a result of shock, the asset holdings across the asset types experienced a decline in poor households. However, wealthier households were able to fully buffer the shock without drawing down household assets and hence there was no need for child labor. Wealthier households are able to borrow against their asset holdings. Thus poor households draw down their assets in the event of a shock, resort to child labor and as a result there is reduced enrollment. In contrast, wealthier households are able to borrow against their assets and are able to neutralize the effect of shock without resorting to child labor and affecting enrollment.

   The authors have examined the link between agricultural shock, asset holdings and child labor. They have conclusively determined that crop shocks aretransitory shocks on householdincome, that shocks are significant relative to household wealth and households use assets as buffer stock and collaterals for borrowing. Shocks significantly lead to the use of child labor and assets are able to absorb 80% of the shock. Educational enrollment decreases as a result of shocks but wealthier households are able to fully offset the shock. Therefore, State policies that insure agricultural households from shocks will lead to decrease in child labor. Further, better access to credit during the times of agricultural shocks will also contribute to reduction in child labor.

Conclusions.

1. There is a strong negative relationship between increase in household income, higher parental education and child labor. Conversely, lower the household income and lower the parental education, higher will be the incidence of child labor and lower will be the enrollment of children in schools. Therefore, the subsistence and the parental education hypotheses are the two main reasons responsible for child labor and poor enrollment of children in schools in India (**Subsistence and Parental Education Hypotheses**).
2. Higher the substitutability between adult and child labor, higher will be the incidence of child labor. There is therefore a positive relationship between the substitutability of adult labor with child labor and the incidence of child labor. If the child-adult wage and productivity ratios are high, the demand for child labor will be high (**Substitution hypothesis**).
3. The substitutability between child and adult household female labor is an important cause of household child labor in India. There is a negative relationship between lower non-child labor household income and child labor i.e. lower the non-child labor household income, higher is the incidence of child labor (**Substitution hypothesis**).
4. The probability of enrollment is higher amongst households headed by females. However, evidence does not exist across age groups and time series. In households where females are found to be working at home for income, there is a tendency to involve unpaid child labor in home based work. If income transfer programs of the government are women focused, women will be economically empowered and the incidence of school enrollment will increase thereby reducing child labor; both unpaid domestic and paid external (**Subsistence hypothesis**).

5. In families with large land holdings, the incidence of unpaid child labor was found to be higher than with families with small holdings. The reasons for domestic unpaid child labor therefore need to be sought beyond the economic rationale (capital market hypothesis). There is a non-linear relationship between household income and child labor. Ownership of productive assets like land can actually increase child labor [5](Sonia Bhalotra and ZafirisTzannatos, September 2003).

6. The probability of non-school activity was found to be higher amongst girls across all age groups and it was found to be higher in higher age groups. The probability of non-school activity amongst SC/ST girls was found to be still higher. A higher percentage of Muslim girls as compared to Hindu girls were found to be involved in non-school activity. Thus, there are social, traditional and religious dimensions to the incidence of child labor in India.
7. India continues to be an agricultural country from the employment perspective. With more than 50% of the labor force employed in the agricultural sector and agriculture continuing to depend on the vagaries of monsoon, agricultural income shock is a relevant cause of child labor in India. Organized agricultural credit markets and crop insurance can significantly reduce the incidence of child labor in rural India.

REFERENCES.

1. Helena Skyt Nielson and AmareshDubey, The Indian Journal of Labor Economics, Vol.45, No.3, 2002.
2. Kambhampati, U. S. and Rajan, R. (2006) Economic growth: a panacea for child labor? World Develo pment, 34 (3). pp. 426 445. ISSN 0305750X.
3. Alessandro Cigno, FurioRosati and ZafirisTzannatos, 2001, Child Labor, Nutrition and Education in Rural India: An Economic Analysis of Parental Choice and Policy Options, Social Protection Unit, Human Development Network, The World Bank.
4. Kathleen Beegle , Rajeev H. Dehejia& Roberta Gatti, 2005, Journal of Development Economics 81 (2006) 80 – 96, www.elsevier.com/locate/econbase
5. Sonia Bhalotra and ZafirisTzannatos, September 2003, 'Child Labor: What have we learnt? Social Protection Unit, Human Development Network, The World Bank.

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MOOCs: INDIAN SCENARIO

Dr. Bhushan W. Ambekar
Librarian, Karmaveer Dadasaheb Deotale Mahavidyalaya, Chamorshi .Dist. Gadchroli.
E-mail :bhu.amb17@gmail.com

Abstract:

In some few years the enrolment is increased tremendously in MOOCs in India. After US India is dominating growth in enrolment. To full-fill the requirements of enrolments of Indian learner Govt. of India had taken some initiatives providing platform like NPTEL, mooKIT, IITBX, and SWAYAM. Implementing MOOCs in India there are some challenges which are discuss in this paper. With the launch of SWAYAM, some of these issues and challenges are addressed.

Keywords— MOOCs, MOOC in India, NPTEL, MooKIT, SWAYAM,.

Introduction:

There is tremendous change in the learning processes of learner due to advent of Information and communication technology and World Wide Web (WWW). First difference occurs when distance education which brought changes in delivery model of higher education by making possible for user to learn without attending classes with using specific course material delivered them. Now a days e-learning come into existence. Due to emergence of web 2.0 and Internet online learning is very popular and spreads all over rapidly in online education system. In year 2012 we saw a new model of delivery of higher education with world most prestigious institutions and Universities known as "Massive Open Online Courses" i.e. MOOCs,, which gives emergence as one of the interesting platforms which has gaining popularity in all disciplines in very short time span with depth impact on online education system in Higher Education With the boon of Digital age learning is converted into e-learning. MOOC is nothing but Massive Open Online Courses which is made available to global learner crossing the barrier of Space, language, money. "The term MOOC was coined in 2008 by Dave Cormier to describe the Connectivism and Connective Knowledge (CCK08) course led by George Siemens and Stephen Downes" (Massive open online course, n.d.).[i]

Some Definition of MOOCS is:

"A course of study made available over the Internet without charge to a very large number of people anyone who decides to take a MOOC simply logs on to the website and signs up" Definition from Oxford Press.[ii]

"MOOCs are courses designed for large numbers of participants that can be accessed by anyone anywhere as long as they have an internet connection, are open to everyone without entry qualifications, and offer a full/complete course experience online for free." [iii]

"A MOOC is an online e-course with the option of free registration, a publicly-shared curriculum, and open-ended outcomes. MOOCs integrate social networking, accessible online resources, and are facilitated by leading practitioners in the field of study. Most significantly, MOOCs build on the engagement of learners who self-organize their participation according to learning goals, knowledge, skills, and common interests."[iv]

So, we can say that MOOC as massive open online courses made available to masses for free(can charged for certificate) in online distance mode. One of the most important things of these coursesis that being offered online also for free of any fees learner can follow them at anytime, anywhereand get necessary education and skillswith a certificate of a reputed Institution/University which otherwise the learner even couldnot dream due to fee, time, distanceor other constraints of getting admission to reputed Universities or Institution.

Some of Common feature of MOOCs:

To satisfy Label of Massive: According to Wikipedia definition there may be unlimited number of participants in MOOCs course. It is fact that for smooth conduct of the course we have to set maximum

limit of participants and that is depend upon the resources and technology available with us. For admission of the course we have to set some criteria like "First come, first served" since it is open course.

To satisfy the Label Open: It describes the fact that it is open for all without discrimination except for any special requirement for specialized course. Course can be accessed by anyone and any whereas long as they have an internet connection.

To satisfy the label course MOOCs offers different level of courses with time limit and structure of the course like certificate, degree or diploma.

Types of MOOCs:

MOOCs are usually classified into C-MOOCs and X-MOOCs.

(i) C-MOOCs—these are based on connectivism.cMOOCs is based on a network platform and when the learner decided to learn he or she can used social media platform. There is no teacher or tutor and defined syllabus. As well as there no formal assessment is possible hence the learner have to themselves judge what and how they have learned. It is a creation for emphasizing connecting learners called as connectivist MOOC and build upon the idea and platform originally visualized by George Siemens.

(ii) X-MOOCs—They have their background in the evolution of open courseware and open educational resources. X-MOOCs are generally offered by universities in collaboration with a commercial organization/company whose aim is to gain profit. X-MOOCs are online versions of traditional learning formats (lecture, instruction, discussion, etc.) on proprietary specialist software platforms owned by independent firms.

MOOCs Potentials in India:

We have seen in recent years there is tremendous hike in the enrolment by Indian students in MOOCs all over the world. Our country is the leading country among the world in terms of enrolment of courses offered by many MOOCs provider including edX, Coursera and Udacity.

After United States India is second largest user of the edX, form the class central the growth of the learner is increased in 2019. The total number of learners on edX grew to 24 million, up from 18 million last year. Before that, edX was gaining 4 million learners a year.[5] Same from Udacity and Coursera grew up there learner.

"There is a lot of talent in India, but often there are not enough slots for qualified students in colleges, and not enough financial aid... EdX changes all of that..." AnantAgrwal CEO edX[6] edX has more than 6 million students from all over the world and more than 19 million course the students are enrolled.This is because of commitment of MOOCs provider to provide online education and desire to give the best to the student. Till MOOCs is emerging field and many more have to do. According to edX CEO AnantAgrawal India is the bigger market for MOOCs than US.

Facts about online Education in India:[6]

- Indian online Education market was $ 247 million in 2016 and expected to grow $ 1.96 billion in 2021. The compound annual growth rate is 52%.
- The students enrolled for various courses for e-learning is about 1.6 Million in 2016, which expected to grow about 9.6 Million in 2021.
- Near about 48% of population in India is about 15-40 age group which is high acceptability in e-learning student group. Hence the there is good market for e-learning.
- Due to cost effectiveness of e-learning, e-learning is more preferred than classroom teaching since classroom teaching will expected to grow 175% increase.

MOOCs Platforms in INDIA:

The Indian Government has taken many initiatives to provide and increasing support to the concept of open e-learning. The Indian govt. initially decided to provide open resources like repositories, libraries, e-books and made educational environment. These efforts made in terms of establishment of National Digital Repository of IGNOU, Sakshant giving e-content and Vidya-Vaheni integrating IT into the curriculum of rural schools by giving interactive training and development for communication. All the efforts made by Govt. to established these departmentreachable to many more learner. Some initiatives like Education and Research Network (ERNET) connecting various schools and colleges. The satellite launched for education

in India i.e EDUSAT, For dissemination of educational knowledge consortium of Educational Communication (CEC), For connecting University Libraries Information and Library Network Centre (INFLIBNET) These are the few example for initiatives towards open education but till education with information technology was out of their reach. In 2013, e-PG Pathshala run especially for postgraduate course launched by govt. and it is manage by INFLIBNET of UGC. Also, some more course providers are Bijus, e-Saral,Vadantu,Apna Course and myBskool.com, these are run in India. But these are being run for profit and clearly, providing open education is not among their motives. Thus govt. wants to set to develop some online courses on their own platforms. Now a day in India some Universities and Institution have the facilities to start or support such initiative, some of these organization are given below.

National Programme on Technology Enhanced Learning NPTEL

It is started in 2003 by seven Indian institutes of technologies along with Indian instituted of Science Bangalore.Its uses the open-source technology for offering courses. These courses are powered by Course Builder which is open source platform of Google that runs on App Engine and Compute Engine. This programme offers postgraduate and undergraduate courses of engineering. In its first phase 235 courses are develop in web/video format are developed. In the second phase (2009-2014) another 600 web and video courses are developed by NPTEL. On NPTEL website it is largest online repository in the world of courses in engineering, basic Science, humanities and Social Sciences subjects.[7]

Indian regulatory Educational bodies like UGC and AICTE are continually encouraging the faculty member of colleges and Educational bodies like Universities to adopt online course for credit transfer. Now a day's Students are using this programme to prepare for GATE exam and higher studies also.

mooKIT:

It is open-source MOOC management software developed and designed by IIT Kanpur in 2014. It is build up in such a way that its highly customizable and cost effective at any scale.[8]

Main features of mooKIT is

- Adaptable to varying bandwidth

  This feature is very helpful to rural area students where internet connectivity is low which is main constrain in India.
- Discussion: Forums for in-depth discussion, quick and real-time interactions.
- Internationalization: No barrier of language
- Assessments: for evaluation
- Certification
- Customizable: Can be customized according to local needs.
- Cost-effective
- Progressive app
- Digital Certification

IITBombayX:

It is non-profit MOOC platform developed by IIT Bombay using the open-source platform in 2014 with funding from National Mission on Education through Information and Communication technology and Ministry of Human Resource Development, Govt. of India.[9]

IITBombayX is operated in the basic version of the blended learning MOOC with co-operation with edX organization. Blended learning is nothing but it is combination of face-to-face classroom teaching and online education method. This model is also known as "Blended Learning – MOOC Model of IIT Bombay (BLMM)". In this learning course completion is compulsory not optional.

IITBombayX offer different types of MOOCs for various types of learning needs

- EduMOOCs
- SkillMOOCs
- TechMOOCs
- LifeMOOCs

Goals of IITBombayX:

- Wherever there is internet access there is quality education should spread.
- Quality education for learner in remote area.
- To improve quality education in campus and online.
- To updated and advance teaching and learning with help of research work.

Principls of IITBombayX:

- It is non-profit organization.
- It uses open-source platform
- Collaborative efforts are taken

Swayam:

SWAYAM is a Hindi language acronym that stands for "Study Webs of Active Learning for Young Aspiring Minds". SWAYAMprogramme was developed by Government of India to gate quality education accessible to all as describer in Indian Education policy. The main aim of Swayan to access, equality and quality. It is developed by Ministry of Human Resources and All Indian Council of Technical Education (AICTE) with the help of IIT Madras with the help of Google Inc. and Persistent Systems Ltd. to achieve their cardinal Principles of Education policy. All the courses available on this platform are interactive, made by the best teachers in the country and available to any learner. More than 1,000 specially chosen faculty and teachers from across the country have hard work for preparing these courses. This platform is competent of hosting 2000 courses and 80000 hours of learning with covering School, Undergraduate, post-graduate, engineering, law and other professional courses.

Challenges for MOOCs in INDIA:

India is very big market for MOOCs provider. Some of the major constrain regarding the implementation of MOOCs in India are, Digital divide and low rate of digital literacy and lack of power supply, lack of technological infrastructure, huge amount of investment, diverse population, Difference in educational status between MOOCs and traditional mode of formal education, Centralized mostly within the renowned and well developed universities, Lack of quality teachers.

- Digital Divide and low rate of digital literacy and power supply

  National Sample Survey Organization (2018), among the poorest 20 percent households, only 2.7 percent have access to a computer and 8.9 percent to internet facilities. In the case of the top 20 percent households, the proportions are 27.6 percent and 50.5 percent, respectively. These figures make it obvious that while moving classrooms online might ensure transferring information and guidance, they cannot be effective in ensuring social interaction unless the existing inequities are addressed. In 2018, The Telecom Regulatory Authority of India, internet density in India stood at about 49% of which 25% live in rural areas and 98% in urban area. A nationwide survey of villages in India by the Ministry of Rural Development in 2017-18, showed that 16 percent of India's households received one to eight hours of electricity daily, 33 percent got 9-12 hours and only 47 percent received more than 12 hours of power supply daily. [10]
- Lack of technological infrastructure

  High speed internet connection is required for accessing the content delivered by provider in their courses. Developing country like India, computer and Internet comes under luxury. Till now a date GST on Internet and computer is 18% charged by Govt. of India. And also this availability mainly in urban areas only.
- India is widely diversified country with different languages are spoken. MOOCs can be accepted on a common language like English. On another hand English is one of the language which is difficult to understand many more student in India. So language is one of the barriers for promotion of MOOCs.
- Quality

  In India there is lack of quality of teacher and the technical staff. There are also huge vacancies of the teacher and technical staff among the higher education.

Conclusion:

MOOCs is an effective tool to offer quality education in a diversified and open way and also is a major rising power to compete with the traditional form of regular education in schools, colleges, and

universities. MOOC platforms are offering online course worldwide and India is no exception. There are various platforms that are being used in India for offering the MOOC courses, such as, NPTEL, mooKIT, IITBX, and SWAYAM. SWAYAM is launched very in recent times. Therefore, to set up a ground for understanding including theoretical and technical aspects, a discussion is provided about each of these platforms with their features. Indian learner should develop technical skill among themselves to acquire science and technology education accessible to masses. The MOOCs is rapidly increasing among Indians and they have opted MOOCs for making global classrooms a reality. For Indianslearner, who has a desire for quality-based western education, MOOCs are proved outstanding in this direction.

[i] Retrieve on 28 September 2020 at 3.28AM from https://en.wikipedia.org/wiki/Massive_open_online_course.

[ii] Retrieve on 28 September 2020 at 3.36 AM from https://www.google.com/search?q=definition+of+moocs&oq=dafination+of+MOOC&aqs=chrome.1.69i57j0l7.14507j1j7&sourceid=chrome&ie=UTF-8

[iii] Retrieve on 28 Sep 2020 at 3.42AM from https://www.openuped.eu/images/docs/Definition_Massive_Open_Online_Courses.pdf

[4] Retrieve on 2nd Oct 2020 at 5.23AM from https://plexuss.com/news/article/benefits-of-moocs

5Retrieve on 12th Oct 2020 at 4.28AM from https://www.classcentral.com/report/edx-2019-year-review/

6Retrieve on 12th Oct 2020 at 4.39AM from https://www.huffingtonpost.in/dipin-damodharan/our-mission-is-to-democra_b_8607538.html

6.Retrieve on 12th Oct 2020 at 5.39AM from https://eduxpert.in/online-education-india/

7 Retrieve 4th Oct 2020 at 3.24PM from https://nptel.ac.in/about_nptel.html

8 Retrieve 13th Oct 2020 at 4.37 AM from https://www.mookit.in/

9.Retrive 13th Oct 2020 at 5.11 AM from https://www.iitbombayx.in/about

10.Retrieve 15th Oct 2020 at 4.35 AM from https://www.indialegallive.com/special-story/indias-digital-divide/

11. Fizul, Nisha and Santhil, V Article *in* DESIDOC Journal of Library & Information Technology · April 2015, MOOCs: Changing Trend Towards Open Distance Learning with Special Reference to India

12. Chaunhan, Jyoti, International Journal of Computer Trends and Technology (IJCTT) – Volume 49 Issue 2 July 2017, An overview of MOOCs in INDIA.

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PLANNING OF RE-ENGINEERING OF LIBRARY SERVICES

Sudhir B. Sangole[1]Dr. (Ms.) Vaishali P. Gudhade[2]
[1]*Librarian,RamkrushnaMahavidhyalaya, Darapur.*
[2]*Associate Professor & Head, Deptt. of Library & Information Science, Sant Gadge Baba Amravati University, Amravati.*

Abstract

The development of Information Communication Technology (ICT) brought out new and faster tools and techniques for information and knowledge management. The development of ICT has impacted the services provided at library and information centers. Some of the library professionals adopted new technology in their library for enhancing quality in the service for user satisfaction. In this article, the author has focused on some of the advanced college libraries which underwent a reengineering process and provided new modern library and information services to the user. The author has also revealed the process of reengineering of college library services and the ICT-based newer college library services which are essential to meet present needs of the students and teachers. The effective model of reengineering college library services has been presented in this article.

Keywords: Re-engineering, College Library

Introduction

The phenomenal changes seen in library operations in the past five years have led to a review of traditional library organisation and management patterns in many libraries. All kinds of organizations are trying to help employees understand and keep up with organizational change (www.niscair.res.in). Institutes and workshops promise to help employees assess the current culture of the organization, determine needed changes, and then to prepare for the changing environment. The importance of organisational culture has increased in our society, characterized by its global perspective and technological bent. Hence, the traditional libraries and their managers are under tremendous organisational pressure and are facing the probable threat of extinction. Librarians today need to work like their counterparts in the business world. They should rethink how to manage and organise the library operations and activities to reengineer their processes in the new environment (Moren, 2001).

Libraries have been at the forefront of developments in automating their processes, from the development of the first computer-based circulation systems and catalogues. The new information technologies (IT) and new knowledge transfer processes based upon those technologies now offer libraries the opportunity to review their processes and indeed (Al Mashari & Zairi, 1999), require them to do so, Janson's (1996) analysis of the starting points for BPR is of interest in the context of libraries:

- ➢ Make the customer the starting point for change-by identifying customer wants and creating the infrastructure to support these expectations;
- ➢ Design work processes in light of organisational goals;
- ➢ Restructure to support front-line performance.

Concept Of Re-Engineering:

Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, and service and speed". According to Hammer and Champ Reengineering is about reinvention not improvement or modification. It is similar to starting from scratch. According to Hammer and Champ, "Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvement in critical, contemporary measures of performance, such as cost, quality, service, and speed". This definition focused on three keywords, i.e., fundamental rethinking, radical redesign, and dramatic improvement. As per the keywords, it may be described that reengineering is the process that forces one to form basic philosophy and change attention on the process of the task to achieve dramatic improvement for cost benefit, quality in service, and speed. "Reengineering is only the part of what is necessary in the radical change of processes; it refers explicitly to the design of new process. The term process innovation encompasses the envisioning of new work strategies, the actual process design activity & the implementation of the change in all its complex technological, human & organizational dimensions.

Impact Of Re-Engineering On Libraries:

Since the beginning of human civilization, the mankind started expressing in writing and strived for documented information and knowledge, the libraries came into existence. The activities of the libraries become multifunctional as the civilization flourished. Starting from libraries in the Monasteries in 7th century to the trendy virtual libraries in 21st century, libraries have made a smooth transition through clay tablet, papyrus, bhujapatra, paper and high tech audio-visual media. The functioning and services of libraries have changed drastically. With the development and application of ICT, whole scenario of libraries has been changed. Today's Library and Information Centre has passed a long evolutionary sequence.

Re-Engineered Library Services:

According to fifth law stated by PadmashreeDr S. R. Ranganathan Library is growing Organism, Every library grows in terms of collection, equipment, technology and users etc.in course of time. Presently there is a change in the specialized needs and interest of the users, computerized services being expected with high speed. There are some major needs to re-engineer the conventional library services to provide effective library services, such as:

➢To cater to the users' need of information.

➢ Cost effectiveness.

➢ Changing needs of the user.

➢ Users' expectations from library.

➢To make library system capable of achieving the aim and objectives and face the future challenges.

➢To improve the quality of service.

Among many possible solutions to survive the change one is the re-engineering of library services. Re-engineering is about changing to the way we do things. Change is the basic need of reengineering means starting over.

Process Of Re-Engineering:

The process of reengineering falls under the planning process. The simple steps, explained here, for reengineering are applicable to library services based on the seven principles of the reengineering given by Hammer and Champy (1993).

➢ Understand the concept: Study the concept and review the advantages and disadvantages while going through the reengineering process.

➢Set up objectives of reengineering: Study users' expectations and decide what types of changes are required. If you have decided to reengineer the library services, set up its objectives which are to be achieved.

➢ Training and instruction to staff: Involve the staff and make a team to reengineer the library services. Training should be provided to the staff to handle new tools and techniques.

➢ Effective change management: Reengineering is for drastic change and the change should be managed effectively with the involvement of all staff.

➢ Pilot study: Before implementation, check the new mode of library and information services. In the pilot study you may predict its results.

➢ Involvement of all stakeholders: Make your stakeholders aware about innovative services and utilization by conducting library orientation programme.

➢ Implementation: At the final stage, implement the new way of services and check whether the objectives are proved or not.

Advantages Of Re-Engineering In Academic Libraries:

Re-engineering is beneficial to academic libraries like;

➢ Users expected library services

➢ Increase the library users and library use.

➢Save the time of users

➢ Change in traditional practices which are replaced by using technology

➢ Better Library Management

➢ Greater library cooperation

➢ Protection of records

➢ Report production

Disadvantage Of Re-Engineering Library System:

➢ Costly as compare to traditional pattern.
➢ Re-engineering obsolescence (Hardware and Software).
➢ Storage Media.
➢ Dominance of data creators and publishers.
➢ Trained manpower.
➢ User education and training.
➢ Security against hacking and sabotage

Skill Requirement For The Library Professionals In Reengineering:

The re-engineering environment made the librarians to acquire new competencies and skill regarding:

➢New re-engineering innovations such as INTERNET,
➢ Professional skills with practical approach,
➢Cataloguing of web resources using metadata standards,
➢ Web page designing and maintenance,
➢ Preservation of Re-engineering resources,
➢ Data base creation and various models of it,
➢Attending to the trouble shooting systems,
➢ Scanning, indexing, conversion and linkage issues,
➢To work in the re-engineering environment by using it today,
➢Turning to the new environment by using IT tools,
➢ User awareness to the library resources and services,
➢ Accessibility of on-line information,
➢Improving the communication skill among the staff, with user and the top management,
➢Strengthening of librarians skills in dealing with copyright and negotiating with publishers,
➢ High priority must be given to staff development,
➢Through task skill training, boot camps, workshop on different themes, and
➢ Demonstration of IT. Products, Seminars and Webinars on staff competency

Re-Engineered Plan For Academic Library:

Nowadays, the funding problem is not a barrier to creating digital library/institutional repository. Several freeware software is available for designing the digital library. LIS professionals may use free Google sites, wordpress.com, and so on. As per the needs and expectations of the college teachers and students, the library professional must provide the following library and information services via online mode.

- Institutional repository
- Audio/Video Lectures
- Information Literacy
- Web OPAC
- Online Library Tour
- Translation
- News Clipping
- Bibliographic Service
- Career Guide
- Subject Portals
- Indexing and Abstracting
- E-Books
- E-Journal
- Online circulation (request via e-mail and send the book via courier)
- E-database
- E-Notes
- E-Newspaper
- E-Reference Service
- Document Delivery Service
- Current Awareness Service
- Online Exhibition
- E-Syllabus
- Instructions
- Photocopying Service
- New Arrivals
- Library Chat

Conclusion:

Reengineering system is rapidly changing the whole world, creating new challenges and opportunities. Today Reengineering has brought revolutionary changes in the whole world of information at each and every moment. Library professionals have to face many complex challenges, make use of the technological opportunities and respond to all these changes positively. It has been observed that many libraries have websites and these are successfully operational in providing maximum information services in the field of education and research and development. Libraries in general and academic libraries in particular worldwide are seriously trying to enhance the provision of information. However, the changes both in information technology and information needs of users make it necessary to reassess and

reengineer the work processes of the libraries to enable them to achieve their institutional goal. Reengineering is the need of today's college libraries to reduce the gap between users' expectation and actual service provided. Considering the importance of reengineering in the college library, it is necessary to rethink on this serious issue and how it will apply to the library for providing better services to fulfil multidimensional needs of the today's users. Librarians must possess the knowledge and skills about use of technology and they must provide training to other staff to develop their skills. As the library automation and the virtualization of the library resources and services are underway, the authority of the college library should give proper importance to library reengineering

References:

1. Ali, Amjad. Encyclopedia of information technology. New Delhi, Galgotia, Vol 2(M-Z) 2005.
2. Bhardwaj Rajesh K and Shukla R K. 2006. Re-engineering of library and information services through web modeling at Delhi College of Engineering. International Conference on Digital Library, pp. 8–10.
3. Devarajan, G., &Rahelamma, A. V. (Eds.). Library computerisation in India. New Delhi: EssEss Publications
4. Gohain, H.K. (2009). Digitization of library: from traditional to digital. In: Lahkar, Narendra and Singh, Sanjay Kumar (eds), Digitization and networking of library and information centres in north east India. Published by Dept. of Library and Information Science, Guwahati University, Assam, pp. 303-304
5. Grover Varun ,MalhotraManoj K., Business Process Reengineering : A tutorial on the concept ,evolution ,method ,technology and application , Journal of operations management 15 ,1997,pp. 193-213
6. Hammer Michael and Champy,James. 1993. Reengineering the corporation: A manifesto for business revolution. Harper Collins: New York.
7. Lowentha, Jeffrey N. 1994.Reengineering the organisation: a step by step approach to corporate revitalisation. Dew Delhi: Tata McGraw Hill: 21-25

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STUDY ON LACTIC ACID BACTERIA FROM GREEN WASTE

Ankita Suvagiya[1] Dr. Gira P. Mankad[2]
[1]Juangadhagriculture University, junagadh [2]M.V.M. home science and science college, Rajkot
E. mail Id- ankitamicro1627@gmail.com
E. mail Id- giramankad@gmail.com

Abstract
Lactic acid bacteria (LAB) are used in the food industry to produce flavors, dyes, thickeners, and to increase food value, because bacterial fermentations favor the obtention of different metabolites such as food additives and different nutritional compounds in food. Green waste to wealth is a common trend in the world today. This work reports the utilization of waste fruit peels like orange peel, mango peel, banana peel, spoilage of grapes for production of lactic acid using autochthonous lactic acid bacteria. Green waste and byproducts are generated along the entire food dispensation and storage cable. The large amount of green waste deriving from the whole process represents not only a great economic loss but also an important ethical and environmental issue in terms of failure to recycle potentially reusable materials. This review gives an overview of the biological approaches used so far to exploit green wastes and byproducts. The application of solid-state fermentation by different microorganismsto produce several value-added products was analyzed, focusing on the exploitation of lactic acid bacteria as workhorses for the production of flavoring compounds, biogas and bioenergy.
Key word: Lactic acid bacteria, food additives, Green waste

Introduction

Green waste based industry produces a large capacity of solid and liquid waste. These poses increasing disposal and pollution problemsand represents loss of valuable biomass and nutrients (Mridul&Preethi, 2014).This particularly occurs where there is a lack of legislation and their enforcement on waste disposal (Omojasola*et al.*, 2009). These wastes directly affect environmental interventions and municipalities because green waste is a primary source of methane gas in landfills (Gunders, 2012). Recycling green-waste to develop new products has received much attention lately. Organic waste treatment processes (Purkayastha, 2012) and anaerobic digestion processes (Shin *et al.*, 2010; Dai *et al.*, 2013; Bernstad*et al.*, 2013) are two promising technologies used in this regard. Presently, the main use of such domestic green waste is the production of valuable compounds by the controlled break down of the waste by microorganisms (Rounsefell*et al.*, 2013). Due to the importance of this organic acid, there are ongoing research efforts related to its production (Hofvendahl& Hahn- Hägerdal, 2000).Variations in temperature, pH and nitrogen sources affect lactic acid production (Pavezzi*et al.*, 2008; Jörissen*et al.*, 2015). Lactic acid (LA) fermentation is considered a simple and useful form ofbiotechnology to keep and/or enhance the safety, nutritional, sensoryand shelf life properties of vegetables and fruits (Demir *et al.* 2006).

Carnobacterium, *Enterococcus*, *Lactobacillus*, *Lactococcus*, *Leuconostoc*, *Streptococcus*, *Clostridium* and *Weissella*have been reported to produce lactic acid (Bogaert&Coscach, 2000).

Due to the importance of this organic acid, there are ongoing research efforts related to its production (Hofvendahl& Hahn- Hägerdal, 2000). Variations in temperature, pH and nitrogen sources affect lactic acid production (Pavezzi*et al.*, 2008; Jörissen*et al.*, 2015). The aim of this study was to evaluate the effect of physical, chemical and nutritional parameters on the production.

Lactic Acid Bacteria

Lactic acid bacteria are Gram-positive, non-spore-forming, non-respiring but aerotolerant, which produce lactic acid as one of the key fermentation products by utilizing carbohydrates during fermentation. These bacteria produce lactic acid as an end product of carbohydrate catabolism and also make organic substances that contribute to the flavor, texture, and aroma that result in unique organoleptic characteristics. Orla Jensen (1919)The genus Lactobacillus has recently been reclassified by scientists into 25 genera. This reclassificationwas necessitated due to the extent of how diverse the original genus was, which made it very challengingto classify, name, and distinguish between different lactobacilli. The new genera are *Lactobacillus*,*Paralactobacillus* and the 23 novel genera. The twenty-three novel genera include: *Amylolactobacillus*,*Acetilactobacillus*, *Agrilactobacillus*, *Apilactobacillus*, *Bombilactobacillus*, *Companilactobacillus*, *Dellaglioa*,*Fructilactobacillus*, *Furfurilactobacillus*, *Holzapfelia*,

Lacticaseibacillus, Lactiplantibacillus, Lapidilactobacillus,Latilactobacillus, Lentilactobacillus, Levilactobacillus, Ligilactobacillus, Limosilactobacillus, Liquorilactobacillus,Loigolactobacilus, Paucilactobacillus, Schleiferilactobacillus, and Secundilactobacillus

History Of Lactic Acid Lactic acid was first found and discover in sour milk by Karl Wilhelm Scheele (1742-1786) in 1780. The German physician-chemist Johann Joseph Scherer (1841-1869) demonstrated the occurrence of lactic acid in human blood under pathological condition in 1843 and 1851.

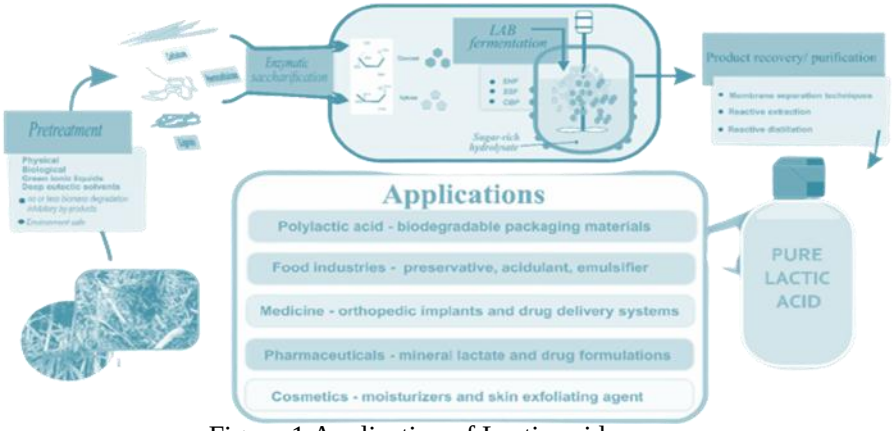

Figure-1 Application of Lactic acid

Market Overview Of Lactic Acid

Universal lactic acid market is projected to grow at a CAGR of 4.2% during the prediction period.

- Lactic acid is available in various grades depending upon its purity and its application.
- Lactic acid demand in the food & beverage market is growing with the emerging technology and the growing mandate in applications. Due to various functional properties of lactic acid, it is used as a key component in food & beverage products.
- The major drivers for the lactic acid market are increased demand in food applications of lactic acid, availability of cheap raw materials, various functional properties of lactic acid and the controlling approval by international regulations.

Deprivationand Employment Of Green Waste

One-third of food intended for human consumption is lost or wasted globally at all steps from initial agricultural production to final household consumption. It amounts to about 1.3 billion tons per year. green wastes are mainly composed of carbohydrate polymers, such as starch, cellulose and hemicelluloses, plus lignin, proteins, lipids, organic acids and inorganic remainder. Total sugar and protein contents are in the range of 35.5–69 and 3.9–21.9%, respectively.Among the different food sectors, it is estimated that fruit and vegetables represent a large part of green waste production, notably in the detail that about 45% of the total produced amount is lost in the production and consumption chains, generating a great quantity of waste material. Green wastes and byproducts can be classified into four source groups, according to the step of the agri-food chain in which they are generated: (i) in the fields,

before harvesting, due to pest infestation and crops damaged by unfavorable weather conditions; (ii) in post-harvest and transport, where spoiled and bruised fruit and vegetables are discarded; (iii) in the different manufacturing steps process such as peeling, washing and slicing; (iv) in retail and the markets, due to natural spoilage at the end of shelf life LAB may grow in any environment rich in carbohydrates, so that they can be found in various food products (milk, meat and vegetables), plants, as part of the normal human and animal microbiota. Food wastes are potential sources of nutrients for growth of LAB and production of valuable compounds.

Large volumes of green waste generated by fishing, aquaculture or food processing are dumped into the sea without pretreatment. It causes grave environmental problems. This challenge can be met by introducing rich organic nutrients in the formulated optimum media for microbial cultivation. Enzymatic hydrolysate of octopus processing wastewater served as a good source for LAB growth (*L. lactis* and *Pediococcusacidilactici*) and synthesis of bacteriocins (nisin and pediocin, respectively). The recovery and management of these wastes are not trivial. Seasonality, distribution across a territory, and perishability due to the high content of water and nutrients and the heterogeneity of the products may represent possible difficulties and problems for green waste management.

The maximal production of biomass and nisin by *L. lactis* was observed in the media with low concentration of enzyme papain and short time of hydrolysis (4 h). In case of pediocin, the highest

production was attained in the media hydrolyzed with papain, trypsin and pepsin within 10 h period. Consequently, marine peptones are promising alternative nutrients in the media and their fermentation is a possible solution of wastewater problem. Fish viscera waste can be used in preparation of silage intended as animal feed. Application of LAB makes bio-silage process simpler, faster, more environmentally friendly and cost-efficient than chemical technology. LAB strains produce metabolites and adjust pH values for bio-silage fermentation and preservation. A feasible and economically sustainable green waste recycling program requires large volumes of raw materials concentrated in the same area, a high degree of homogeneity, and a careful analysis of downstream costs.In keeping with this, industrial symbiosis could be a productive and useful strategy. The FWs generated by diverse companies could be transferred to other industries, which could transform them for other purposes in acircular economic model. These are important steps in recycling hatchery by-products into feed ingredients instead of landfilling waste. Rations with fermented hatchery wastes showed no negative effect on broiler chicken. Their body weight gain and feed conversion at all stages were comparable to the control. In some cases, the parameters such as ready to cook carcass and wing yield significantly exceeded control values.The theory of waste valorization is strictly associated with sustainable technologiesfor recycling and reuse. The concept behind waste valorization is to enhance the value of aproduct by converting waste into other resources providing an added value. The resultingproducts could include new chemicals, materials, fuels, and energy, just like a lot of otherproducts advantageous to local and global economies.

Brown juice, waste of the green crop drying industry, contains nutrients such as carbohydrates, organic acids, vitamins and minerals suitable for production of L-lysine. Pretreatment is required to convert brown juice into a stable, storable product that can be used for microbial fermentation. Traditional heat sterilization at 121°C for 20 min in batch procedure or at 140°C for a few seconds in continuous process inactivates valuable enzymes and consumes a lot of energy. When LAB deplete the constituent carbohydrates, the juice can be heat sterilized and used as a nutrient and water source for L-lysine production by *Corynebacterium* after addition of a carbon source and neutralization of the lactic acid by, e.g., ammonia. Alternatively, the lactic acid present in the medium can be utilized by *Corynebacterium* and converted to L-lysine.Furthermore, the valorization and recycling potential of green wastes and byproductscan ensure sustainable food production and at the same time guarantee food security.Interestingly, some materials derived from the food industry can be reused thanks to theirdistinctive properties, exploitation of their physic-chemical characteristics can occur inmany different industrial sectors. Lignocellulosic byproducts like soy and corn stalks orwheat straw could be used in the paper industry or as reinforcement in biodegradablepolymer matrices to prepare building products with high strength.

Conclusion

LAB represent a versatile group of microorganisms. Owing to their valuable properties, LAB have been used in food production since ancient times. Development of natural sciences led to discovery of LAB as normal part of human and animal microflora. LAB is recognized as safe microorganisms and they are mainly applied in food industry for production of dairy, meat, bread, fish and vegetable products and in medicine as probiotics. LAB is known to synthesize a wide range of compounds consumed in various areas. LAB produce bacteriocins, vitamins, low calorie sugars, EPS and other valuable substances regarded as additives improving safety, quality and flavor of foodstuffs. However, one of the main LAB products is lactic acid used in food processing, pharmaceutics, cosmetics and other industrial sectors. Steadily growing market demand for this commodity urges researchers and manufacturers to seek less expensive substrates for its synthesis. Many studies deal with industrial and household green wastes as appropriate sources for lactic acid production.

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Referance

1. Quinto, E.J.; Jimenez, P.; Caro, I.; Tejero, J.; Mateo, J.; Girbes, T. Probiotic Lactic Acid Bacteria: A Review.Food Nutr. Sci. 2014, 5, 1765–1775.
2. Sadishkumar, V.; Jeevaratnam, K. In vitro probiotic evaluation of potential antioxidant lactic acid bacteriaisolated from Idli batter fermented with Piper betle leaves. Int. J. Food Sci.Technol. 2017, 52, 329–340.
3. Hayek, S.A.; Ibrahim, S.A. Current limitations and challenges with lactic acid bacteria: Areview. Food Nutr. Sci.2013, 4, 73–87.

4. Hayek, S.A.; Gyawali, R.; Aljaloud, S.O.; Krastanov, A.; Ibrahim, S.A. Cultivation media for lactic acidbacteria used in dairy products. J. Dairy Res. 2019, 86, 490–502.

5. Orla-Jensen, S. The Lactic Acid Bacteria; Andr Fred Host and Sons imp: Copenhagen, Denmark, 1919.
6. Parvez, S.; Malik, K.A.; Ah Kang, S.; Kim, H.Y. Probiotics and their fermented food products are beneficialfor health. J. Appl. Microbiol. 2006, 100, 1171–1185.
7. Mokoena, M.P. Lactic Acid Bacteria and Their Bacteriocins: Classification, Biosynthesis and Applicationsagainst Uropathogens: A Mini-Review. Molecules 2017, 22, 1255.
8. Sharma, A.; Kaur, J.; Lee, S.; Park, Y.S. Tracking of Intentionally Inoculated Lactic Acid Bacteria Strains inYogurt and Probiotic Powder. Microorganisms 2020, 8, 5.
9. Ni, K.;Wang, Y.; Li, D.; Cai, Y.; Pang, H. Characterization, identification and application of lactic acid bacteriaisolated from forage paddy rice silage. PLoS ONE 2015, 10, e0121967.
10. Zheng, J.; Wittouck, S.; Salvetti, E.; Franz, C.M.; Harris, H.M.; Mattarelli, P.; Watanabe, K. A taxonomic noteon the genus Lactobacillus: Description of 23 novel genera, emended description of the genus LactobacillusBeijerinck 1901, and union of Lactobacillaceae andLeuconostocaceae. Int. J. Syst. Evol. Microbiol. 2020, 70,2782–2858.
11. Abdel-Rahman, M.A.; Tashiro, Y.; Sonomoto, K. Lactic acid production from lignocellulose-derived sugarsusing lactic acid bacteria: Overview and limits. J. Biotechnol. 2011, 156, 286–301.
12. Martins, S.; Mussatto, S.I.; Martínez-avila, G.; Montañez-saenz, J.; Aguilar, C.N.; Teixeira, J.A. Bioactive phenolic compounds:Production and extraction by solid-state fermentation. A review. Biotechnol. Adv. 2011, 29, 365–373.

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IN INNOVATION TECHNOLOGIES AND LIBRARY SERVICES AN SCENARIO

Smt. Sarika Rengunthwar
Librarian, Kohinoor Arts,Commerce and Science College, Khultabad, Tq. Khultabad Dist. Aurangabad.
Emial ID : sbrengunthwar555@gmail.com

Abstract:

Librarians should lead the way in technology among fellow residents and gain more time important activity time is rapidly running out for librarian the ethical issues inherent to social media. Social Media involves social relation people who have some type of relationship it encompasses Blogs, Facebook, so podcasting mash-up , YouTube , RSS Flick Folksonomy, Wikis, MySpace Twitter among may be conceptualize as social technical incorporating technologies.

Keywords: Innovation Technologies, Library services, social media.

Introduction:

Librarians should lead the way in technologies among fellow residents and gain more time important activity. Helping patrons, since mission of most libraries is to offer equality information for every citizen,then trendsetter in digital use and implementation technologies and services in libraries.

We focus on the technologies apply the library and not on the potential budget of said technologies i.e. Big data, RFID technology, code technology social media use in library social media.

The growing use of social media such Facebook, twitter, Google etc., by users century social media play a vital role in providing new challenges for libraries to keep the growing needs of their users.

The role of social media in libraries data can be accessed from anywhere , at any borders social media involves social relation people who have some type of relationship it encompasses Blogs, Facebook , so podcasting , mash-up conceptualized as so ciao- technical a incorporation technologies that support social media ethical concern include surveillance, friending and user exploitation .

Today libraries are using latest trends services popular & user friendly especially countries. These Trends are new also catch Indian library professionals everybody is about lib.2.0 application.

Librarians Role on social media

Time is rapidly running out for librarian the ethical issues in hernet to social media of the information user's social mediums by third parties. They represent a space who create the parameters for what is possible MySpace where users can use html to profile features, including adding new Videos, there are limits to how much while most libraries do not have for services advertisements many library.

The librarian can make groups on social marketing library events on social media to professionals about library seminar, workshops.

Social Networking sites (SNS) and Libraries.

Social Networking sites are usually use in touch friends and females by posting the photos, blogs, chatting and also for enjoy relaxation but the schools and libraries together to integrate positive uses of social their classroom, programs, and serve.

Use of Social Networking sites for marketing

The social networking sites (SNS) a platform that allows users to create a public inter act with other users on the web networking sites usually have a new user in people with whom they share a connection a the people on the list of confirm or deny the after connections are established, the search the networks of his connections. A social Networking site may as a social media users can market of educational events like seminars, workshops etc. through social digital era. For example users can market of conference, seminar on social LinkedIn, Facebook, LISLINKS, and Twitter. Innovate technologies to implement at the library of the future.

This article presents a range of relevant and useful innovate technologies to implement at the

Library we focus on the technology to implement at the library. We focus on the technology applicability and the benefits it could bring to the library. What are the current technology trends in libraries from digital storytelling, UR to Kinetic bikes and RFID technology?

John Garland helps us look at how libraries are using technology to improve services for customers today. How can big data be used by libraries? Big data can improve the libraries activity overall by simply having access to more sights. In to the users mind in an article written on public libraries about the use of big data in libraries.

Libraries can use core customer intelligence to better reach customers, create a better connection with the community and become more relevant and stay more flexible and adaptable to all the environment changes. Furthermore, libraries can use big data to create a personalized user experience by offering content and resources based on each individual wish, but at the same time, libraries must consider the privacy issues coming with any access to personal data.

2) Artificial Intelligence

Artificial intelligence is no longer a futuristic technology as it is gaining more and more traction in our everyday activities time she adds that the intelligence is artificial not human libraries can connect people to information and more importantly to other people.

Adding an intelligent side to all applications at the library is a real opportunity to understand the pattern in user behaviour and adapt to their needs.

3) Block chain Technology

Block chain technology has been one of the most discussed technologies in the past year as bit coin has gained more and more power. Block chain technology represents decentralized database that keeps records of pseudonym zed digital transactions that are visible to anyone within the highlights in an article for edsurge that blockgaintechnology.

4) Internet of things

Since having connection to the internet has become a necessity more than a Luxury .The internet of things receives more and more attention just like the RFID Radio Frequency Identification technology.

5) Library Bookmark apps

In his article on the eBook friendly website Port Kowalclczyk gives a few examples of technologies that could be used in the future. The author mentions an interesting device from a chines design company to out that acts as a regular design company to out that acts as a regular bookmark but also has additional features that facility the user's activity related to finding books.

6) User-Focused interfaces and application

One of the future perspectives of library services is a personalized interaction between the system and the user. Whether this is an interactive game projected onto the floor for children to interact with, digital exhibition featured on screens, big screens in libraries that can be used to offer different kinds of for example, the state library of Queensland has recently created Untracked a new way of digitally visualizing the state library's collection. In her interview with pinch Jane Cowell explains more about the new project untracked continuously updates to reflect the real- time searching of users as they search the library catalogue. She adds that there is an amazing content remains hidden. This visual showcase of the items in the library's collection is curated by the user and is continually updating and it is hoped that it will motivate and inspire users to explore the collection more widely.

7) Digital interfaces for printed books

A combination of the real with the digital is a development we are all impatiently waiting for especially when we talk about physical objects Everyone loves the copy and find functions of an e-book and practice of highlighting all the important excerpts from documents.

Finger Link is a prototype developed by Fujitsu that provides all the digital functionalities on a printed book (see the showcase video here) it detects the users fingers and what it is touching and creates an interactive touching and creates an interactive touchscreen where they can select the part they want to and transpose it in a digital form where it can be processed.

8) Driverless cars

Driverless cars still seem just a depiction of the sic-fi movies we have all seen when growing up. But according to Ida Joiner, writer of the recently published book called Emerging Library Technology Vehicles that can travel between destinations without a human driver canbe of high importance for libraries in the future

Schools, companies and workforce agencies that are spreading this technology and offer different possibilities to the users such as arranging internships, mentor opportunities for students, host career fairs or workshops to learn about the technology.

9) Drones

The small flying devices remotely controlled are another trendsetter in science nowadays. Either by adding a new technology at the library or creating workshops for users

Where they can learn to build and use a drone, the libraries can benefit a lot from its use.

Furthermore, drones can be used for creating content for the library, collecting data or as Pitotrmentions in his article; the drone can be used for delivery service for the library users who don't have possibility to go to the library, be it because of a disability, or because of the long distance to the library.

Impossible, you'd think. But the book delivery is already happening. Only not in libraries. The Australian start up Flirty has made its first demonstration of book delivery for a book rental service called Zookal. You can watch it here. The service might be too much for a library but in an era where the users want to have everything at their.

10) Innovative technologies to implement at the library of the future

Given that the main mission of libraries is to offer equality of access to information for every citizen then why not be a trendsetter in digital use and implement more emerging technologies? As Mogens Vestergaard.

References

1. Veeranjajaneyulu K. and Singh Sonal (2001) Impact of information technology on library and information science education 1493-4)pp.135-137.
2. Backland, Michael K. (1986), Education for librarianship in the next country library trends 34(4) pp.777-787.
3. Gupta Dinesh Kumar and Jain S.L. (1996), Managing changes in libraries ILA Bulletin 32(1-2) pp. 139-147.
4. Kaula, P.N. (1995) Restricting library and information science curriculum, university news 36(38) pp.8-11.
5. Veeranjuaneyalu K. and Pramesh, LSRCV professional education for library and information network for the next decade .An overview in Sardana J.L. et.al. Libraries and information services in the electronic information era; seminar paper of the 44th all India Library conference, New Delhi Indian Library Associationpp.507-511.

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RIGHT TO UNPOLLUTED WATER AND ROLE OF STATE, INDUSTRY AND COMMUNITY

Dr.Ashwini Dalal
Assistant Professor Department of Law, N.M.D.College,Gondia

Abstract:
Water is an important natural renewable resource and sine quo non for all living organism to survive on earth. Due to industrial and technological inventions thereby setting up of huge industries by flouting the rules and regulations has great cause of degradation of available water recourses. Untreated and unregulated waste water (both domestic and industrial) was and still causing serious harm to the fresh water streams and water bodies above and beneath ground. To live life with dignity as assured under Article 21 of the Constitution is an important fundamental right, simultaneously imposed a fundamental constitutional duty on the State to take proactive role and see to it that potable water be available to all. In this paper the researcher is going to discuss the value of water and its importance for sustenance of life on the earth. Also the Role of State, Industries and community at large towards its conservation for present and future generation.

Key words-Water, Pollution, Fundamental Rights

Water Pollution and Scarcity-Scary face of future

Every year 22nd March is 'World's Water Day celebrated across globe. This year United Nation has slogan on saving water as "**Groundwater, making the invisible visible**"[i] The aim behind this is to understand the importance of freshwater. The Central Pollution Control Board (CPCB) in 2018 identified 351 polluted river stretches in India. Maharashtra has the highest number of polluted rivers at 53[ii]. Discharge of toxic elements from industries and landfills and diffused sources of pollution like fertilizers and pesticides over the years has resulted in high levels of ground water with the level of nitrates exceeding permissible limits in more than 50% districts of India. Along with the other harmful contaminants like fluoride, iron, arsenic and heavy metals are found beyond their permissible limits[iii].

Besides the water contamination when we look at the geographical area we realized that deforestation, massive industrialization, population explosion, untreated waste water and unaware the benefits of rain water harvesting are the major causes which aggravated water scarcity across India. The National Institute for the Transformation of India (NITI) Aayog officially revealed in its Report published in the year 2018, that about 600 million Indians facing high to extreme water stress.[iv] These water crises are going to get worse by 2030. 40% of the population will have no access to the drinking water by 2030, the report predicted.

Water is an important natural renewable resource and sine quo non for all living organism to survive on earth. Due to industrial and technological inventions thereby setting up of huge industries by flouting the rules and regulations has great cause of degradation of available water recourses. Untreated and unregulated waste water (both domestic and industrial) was and still causing serious harm to the fresh water streams and water bodies above and beneath ground. It's high time to take timely action to prevent this to survive living being on the earth. Otherwise living organism will die not by war but by unpolluted water or by lack of drinking water.

Fundamental Right to get unpolluted water and fundamental duty to preserve the natural resource: National and International Perspective

Rights and duties are correlative. This legal principle is equally applicable relating to the water. As water is an essential for life. One has to get unpolluted water is his natural fundamental right and at the same time mandatory duty on the civilized State to make it available. But this duty is not only of the State but of every individual too. This natural resource need to be preserve by community action. As Article 51 A (g) & (i) specifically imposed duty that every citizen have to Protect and improve the natural environment including lakes, wildlife, rivers forests etc and to safeguard all public property (as water is public property) . And its violation, deemed to be contempt of the Constitution which is punishable under the Prevention of Insult to National Honour Act, 1971.As water is natural resource and public property too. Also through Article 39 (b) of the Constitution directs the State that 'the State shall, in particular, direct its policy towards securing that the ownership and control of the material resources (water) of the community are so distributed as best to sub serve the common good.' Article 47 specifies duty of the State to raise the

level of nutrition and the standard of living and to improve public health. The State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties.

Let us understand the States obligations through the lens of Article 21 of the Constitution. The Concept of Right to Life as veiled in Article 21 of the Constitution of India has very wider horizon cast a positive obligation on the State to build a safe environment for people, where they can grow and live a gratifying life. That means they should holistically grow and be provided with nutrition, clean air, clean water, education, etc. for their survival as well as sustenance and development.

Right to Life under Article 21 impliedly guarantees right to get unpolluted water. It is negative right cast a duty on the State to get it available .The Hon'ble Apex Court in catena of its judgments reassured this expressly. In *Subhas Kumar v. State of Bihar*[v], the Supreme Court recognized that Right to Life includes the right to enjoyment of pollution free water and air for full enjoyment of life. In *Narmada Bachao Andolan v. Union of India*[vi]the Hon'ble Supreme Court stressed on the importance of water for survival, *'Water is the basic need for the survival of human beings and is part of right of life and human rights as enshrined in Article 21 of the Constitution of India*'

Apart from provisions in Municipal Law wholehearted efforts taken at international levels also. The United Nations General Assembly explicitly recognized the human right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights. The Resolution calls upon States and international organisations to provide financial resources help capacity-building and technology transfer to help countries, in particular developing countries, to provide safe, clean, accessible and affordable drinking water and sanitation for all.

In November 2002, the Committee on Economic, Social and Cultural Rights adopted **General Comment No. 15** on the right to water. Article I.1 states that, *"The human right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights".* It also defined the right to water as the right of everyone to sufficient, safe, acceptable and physically accessible and affordable water for personal and domestic uses.

Now it's an established fact that access to safe drinking water and sanitation is a human right which is part of the right to adequate standard of living, enshrined in article 11 of the International Covenant on Economic, Social and Cultural Rights. It has been explicitly recognized by the General Assembly of the United Nations and by the United Nations Human Rights Council. States are therefore legally bound to ensure access to water and sanitation for all and have to take steps toward the full realization of the right[vii]

At national and international documents the right to get unpolluted water is recognized as basic human rights.

Legal Provisions and Government Policy

According to Schedule 7 of the Constitution of India water is primarily a State subject, but it is an increasingly important national concern in the context of the right to water being a part of the fundamental right, right to life. Being a State subject Parliament has no power to make law for the State with respect to any matter mentioned in State List. Due to growing concern of water issues, Parliament in the year 1974 in pursuance of clause (1) of Article 252 of the Constitution, resolutions have been passed by all the Houses of the Legislatures of the States of Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tripura and West Bengal to effect the regulation and control of water pollution by enacting law in those States by Parliament. The Water (Prevention and Control of Pollution)Act,1974 came into force.The very object of this Act is to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water by setting up of Central and State Pollution Control Boards for prevention and control of water pollution and carry out a variety of functions such as establishing quality standards, research, planning and investigation to promote clean streams and wells etc,. Consent of the Boards are mandatory for establishing industries which will eventually discharge sewage and trade effluents, This act empowers state boards to issue directions to any person, officer or authority, including orders to close, prohibit or regulate any industry, operation or process and to stop or regulate the supply of water, electricity or any other service. In that way State has trying to prevent water pollution across.

Further, to strengthen the water regime in the country, Parliament enacted the Water (Prevention and Control of Pollution) Cess Act in the year 1977 thereby initiated a positive economic incentive for controlling water pollution by levying tax on water consumed by certain industries and local authorities. The Main purpose of enactment of the Act is to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and

Control of Pollution) Act, 1974.In that way strong system is set up to further the objective as enshrined in Air, Water and Environment protection Act.

In the earlier statute like, Section 7 of the Easement Act, 1882 provides that every riparian owner[viii] has the right to the continued flow of the waters of a natural stream in its natural condition without destruction or unreasonable pollution.

The Environment (Protection) Act, 1986 extends to water quality and the control of water pollution. Section 2(a) of the Act defines the environment to include water and the interrelationship which exists among and between water and human beings, other living creatures, plants, microorganisms and property. The Act authorizes the Central Government to establish standard for the quality of environment.

Apart from this legislation the Central Government published its first National Water Policy (NWP) in the year 1987 in response to a severe drought. This NWP was further amended in 2002 and recognized that there was a role for private sector to play. The MWP, 2012 address the problem of water scarcity and instructed optimal use of water resources. . It says *"large parts of India have already become water stressed. Rapid growth in demand for water due to population growth, urbanization and changing lifestyle pose serious challenges to water security."*

Ministry of Jal Shakti was formed in May 2019. This was formed by merging of two ministries; Ministry of Water Resources, River Development & Ganga Rejuvenation, Ministry of Drinking Water and Sanitation. The ambit of the ministry encompasses issues ranging from international and inter-states water disputes, the Namami Gange project, the flagship initiative to clean the river Gange, its tributaries and sub-tributaries and to provide clean drinking water to all. While forming the new ministry, government claimed that *"All the water related works has been merged in one ministry,"* Government of India has recently set the ambitious target as '*Jal Jeevan Mission'* of providing piped clean drinking water to all rural households by 2024.In that way the State is discharging its duty holistically.

Role of State, Industry and Community:-A step forward to achieve sustainable development.

Due to massive industrialization, urbanization, population explosion leads to the perception of a water crisis, and mounting pressure on a finite resource. The threat to this vital resource by the massive generation of untreated waste by industries caused the severe pollution and contamination.

As mentioned in the above paragraphs, State is playing important role of catalysts to prevent mother earth hence various Act and policy enacted and framed towards achievement of the goal of right to water. Under Water Act and Air Act, the State board has established and also empowered in this behalf.

No doubt Law and principles enacted trying to regulate the Industries and its affairs. But in most of the cases it is found that the industries are not following the rules consistently thereby causing harm to the water and water bodies. Effective implementation of laws and policy is lagging behind the reason may be wide range of corruptions and patriotism. Massive awareness and stringent policy towards its effective implementation are need of the hour. Apart from State and Industries, it is equally important to involve community at large. Handful of government agency cannot control water pollution unless and until each and every person get involve himself /herself towards the campaign of "save water save life"

Following Strategies can be adopted towards achieving goal of potable water above and beneath the surface.

1. Strong mechanism for recycling of waste water industrial as well domestic 2. Creation of Eco-friendly sanitation system is the first step towards treating water contamination 3. Set up of Pilot project for the treatment of ground water. 4. Research in the area of recycling of water at source. 5. Community involvement by shouldering statutory responsibilities through enactment of punitive legislation may lead some positive result.

Reference

1. The idea for this international day goes back to 1992, the year in which the United National Conference on Environment and Development in Rio de Janerio took place. That same year, the United Nations General Assembly adopted a resolution by which 22 march of each year was declared World Day for water, to be observed starting in 1993
2. https://www.downtoearth.org.in/news/water/351-polluted-river-stretches-in-india-a-list-across-states-78083#:~:text=These%20states%20%2F%20UTs%20have%20to,Bengal%20and%20Karnataka%20(17).
3. http://timesofindia.indiatimes.com/articleshow/65204273.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
4. Composite Water Management Index report June 2018 NITI Aayog
5. 1991 AIR 420

6. AIR 2000 SC 3751
7. https://unece.org/fileadmin/DAM/env/water/publications/PWH_equitable_access/1324456_ECE_MP_WP_8_Web_Interactif_ENG.pdf
8. Someone who owns the land adjoining a river or water stream) to unpolluted waters.

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AN INVESTIGATION FOR PROTECTIVE EFFECT OF RHIZOME EXTRACT OF IRIS PSEUDACORUS L. AND SEED EXTRACT OF DOLICHOS BIFLORUS L. IN ETHYLENE GLYCOL INDUCED UROLITHIASIS IN RAT MODEL

SARITA SHARMA[1], Dr. (Prof) AMIT J. RAVAL[2], Dr. (Prof) RAJU KONERI[3]
[1]PhD Research Scholar, Pacific Academy of Higher Education and Research University, Udaipur, India
[2]Professor, Pacific Academy of Higher Education and Research University, Udaipur, India
[3]Professor and Dean, Karnataka College of Pharmacy, Bangalore, India

Abstract

The aim of our presented study is to assess the effect of Rhizome extract of Iris pseudacorus L. and seed extract of Dolicos biflorus L. as preventive agent in experimentally induced urolithiasis model in rats. Rats were administered Ethylene glycol (0.75%v/v) in drinking water for 28 days *in drinking water.* In addition to this, Saponin extract of Iris pseudacorus and Dolicos biflorus of low dose and high dose were administered along with ethylene glycol on 14-28th day. After the experimental period, blood samples were collected by cardiac puncture to analyse for Creatinine, Calcium, Blood Urea Nitrogen (BUN), Phosphorus, Uric acid, Alkaline Phosphate, Potassium, and Alanine Amino Transferases followed by various antioxidants and kidney histopathology. The ethylene glycol feeding resulted in an increased level of all parameters evaluated compared to normal rats. All these conditions were reversed with plant extract treatment. Histopathological analysis also showed that rats treated with ethylene glycol had large deposits of calcium oxalate crystals, and that deposits were reduced in rats treated with plant extract. Results were also compared with the marketed product cystone as a standard. These data suggest that Iris pseudacorus and Dolicos biflorus Saponin extracts has a protective activity against urolithiasis.

Keywords: Calcium oxalate, Kidney stone, Antiurolithiatic, Iris pseudacorus, Dolicosbiflorus.

Rationale Of The Study:

The widespread usage of herbal remedies in recent years has presented India with an excellent opportunity to search for therapeutic lead compounds from an old system of medicine, namely Ayurveda, that can be used in the development of novel drugs. Natural products account for more than half of all modern medications, and they play an essential part in the pharmaceutical industry's drug research programmes.[1]

Urolithiasis is a widespread issue that has afflicted humans for generations. The production of urinary calculi in the urinary system is known as urolithiasis.[2] Although the overall chances of producing stones differ around the world, it is a global public health concern.[3] Kidney calculi have risen in occurrence over the last three decades.[4]

Urinary calculi are the third most common urinary system problem. Urinary tract stone disease affects almost 10% of the population of the industrialised world, according to estimates. In developed countries, kidney stones represent for 0.5 to 1.9 percent of clinical cases.[5] Urinary calculi can lead to urinary tract blockage, hydronephrosis, infection, and bleeding.[6] To remove the calculi, surgical procedures, lithotripsy, and local calculus disruption with a high-power laser are commonly utilised. These operations, however, are costly, and recurrence is prevalent.[7]

Various therapies are being employed to try to prevent recurrence, including thiazide diuretics and alkali-citrate, but empirical evidence for their efficiency is lacking.[8] Traditional remedies, on the other hand, have supplied a substitute for many ailments as well as some additional information on disease pathogenesis.[9] As a result, the hunt for new antilithiatictherapies derived from natural sources has become more important, as herbal medicines are less expensive and have less adverse effects.[10]

Iris pseudacorus(Iridaceae) and Dolicosbiflorus (Fabaceae) is reported to be used in Urinary complaints.[11]There is no work reported on the antiurolithiatic activity of Iris pseudacorusandDolicosbiflorus, hence the present investigation has been undertaken.

1. **Objectioves Of The Study:**
    1. Collection and Authentication of Iris pseudacorus L. and Dolichos biflorus Linn Plants
    2. To Study the Taxonomical Characters of the Plants and Investigation of Morphological and Microscopical characters of the drug.
    3. Extraction, and Preliminary Phytochemical(s) Study of Iris pseudacorus L. Rhizome and Dolichos biflorus Linn Seeds.

4. Isolation, Identification and Purification Phytochemical(s) of Iris pseudacorus L. Rhizome and Dolichos biflorus Linn Seeds.
5. Acute Toxicity Studies as per OCED guidelines 425.
6. To study Pharmacological Effects of Phytochemical(s) Extracted from Iris pseudacorus L and Dolichos biflorus Linn Plants for Anti-Urolithiatic activity.

Materials And Methods:

Collection of plant material

The Iris pseudacorus L. Rhizome was procured from Iran and Dolichosbiflorus Linn Seeds were procured from Bangalore, Karnataka. Dr.Geetanjali (HOD of Botany Department SreeSiddaganga College Tumkur University, India.) has identified and authenticated the sample (Reference No. 507/20-21).

Extraction of the plant material and sample preparation

The Rhizome of Iris pseudacorus L. is sliced into small parts and dried under shades for 7 days at room temperature. The dried rhizome of Iris pseudacorus and seed of Dolichosbiflorus were powdered, then the sieved (10/40). The powder was used for preparation of methanol extraction. The 1000 ml methanol reflux condenser extracted every 100 g powder for 3 periods of 7 hours till it gets half. After completion of extraction, the extract was filtered by using Whattman No.1 paper and evaporated to get dryness at room temperature.Methanolic extracts were subjected to preliminary phytochemical studies.[12-15]

Isolation and purification of Saponin from Methanolic extraction of Iris pseudacorus L. Rhizome and Dolichosbiflorus Linn Seeds

Extraction of Saponin was done by TLC fractionation method. 5gms of methanolic extract was subjected to saponification in 50ml of 20% ethanol. Followed by filtrations and residues was once again extracted with 20%/50ml ethanol and filtered. Both the filtrates combined together and heated to residue the volume to 40ml at 900C. Fractioned with 40ml of diethyl ether in separating funnel (Repeated twice) and ether layer was recovered. Aqueous layer was fractionated with 60ml of n-Butanol in separating funnel (Repeated twice) and aqueous layer recovered. N-Butanol layer was washed with 5% NaCl solution, dried and weighed. Finally, 10 ml methanol was added and methanol layer and white powder separated. White powder assumed that highly purified. Solubility and chemical tests were conducted to confirm the presence of Saponin. And this sample (Saponin) is used for all further experimentations.

Experimental animals:

Wistar rats (Both sex, 5-6 weeks old) weighing 150-200 gm and Albino mice (Male, 5-6 weeks old) 20-25 gm have been used for the current study. They were fed with standard pellet diet and water ad libitum. All the work carried out on the animals was in accordance with the CPCSEA guidelines and the Research protocols have been approved by the IAEC, KCP, and the Sl. No. was KCP/IAEC/08/20-21/16/13-03-21.

Drugs And Chemicals:

All the chemicals used for the study was procured from Himedia, Mumbai and Merck, India. Equipment's were used was purchased from Analytical Technologies limited, India and Thermo Scientific, USA.

Acute toxicity test on the pure active Saponin *Iris pseudacorus L. Rhizome* and *Dolichosbiflorus Linn* Seedsas per OECD guidelines No. 425;

Albino mice (Female, 5-6 weeks old) with a weight of 20-25 gm were fasted overnight and limit and test is carried out with an initial dose of 175mg/kg/b.w. The following order is followed: 175, 550, 1750 and 5000 mg/kg /b.w.

All the Animals have been observed during the time being especially first 30 minutes to 24 hours. The special attention is required during the first 4 hours and then every day up to 14 days.

Ethylene Glycol (0.75% v/v) Induced Urolithiasis Rat Model[16]

All rats have been maintained using commercial pelleted feed and to induce CaOx crystals, animals supposed to be exposed to 0.75% EG in their drinking water for 28 days.

Experimental Methods

Table No. 1: 42 Wistar rats age 5 to 6 weeks weighing (150-200g) have been divided in to following groups, with 6 animals in each group (n=6), in the following manner:

Group 1	*Normal control*	*Vehicle for 28 days.*
Group 2	*Disease control*	*Ethylene glycol (0.75%v/v) in drinking water for 28 days.*
Group 3	*Standard group*	*Ethylene glycol (0.75%v/v, 28 days) + Cystone (750 mg/kg, p.o.) on 14th -28th day.*
Group 4	*Test group 1*	*Ethylene glycol (0.75%v/v, 28 days) + Saponin of* Iris pseudacorus*at low dose (X mg/kg, p.o.) on 14-28th day.*

Group 5	*Test group 2*	*Ethylene glycol (0.75% v/v, 28 days) in drinking water for 28 days + Saponin of* Iris pseudacorus*at high dose (Y mg/kg, p.o.) on 14-28th day.*
Group 6	*Test group 3*	*Ethylene glycol (0.75%v/v, 28 days) + Saponin of Dolichosbiflorus at low dose (X mg/kg, p.o.) on 14-28th day.*
Group 7	*Test group 4*	*Ethylene glycol (0.75% v/v, 28 days) in drinking water for 28 days + Saponin of Dolichosbiflorus at high dose (Y mg/kg, p.o.) on 14-28th day.*

Parameters To Be Evaluated:

Biochemical Parameters:

Collection Of Blood Samples

After the experimental period, blood samples were collected by cardiac puncture under mild pentobarbital anesthesia. Collected blood samples were allowed to clot for 10 mins at room temperature and Serum was separated by centrifugation at 10000×g for 10 minutes and analysed for Creatinine, Calcium, Blood Urea Nitrogen (BUN), Phosphorus, Uric acid, Alkaline Phosphate, Potassium, and Alanine Amino Transferases.

Histopathology Studies & Kidney Homogenate Analysis:

At the end of the experiment, on day 28th the rats were sacrificed by high dose of pentobarbital and kidneys excised, isolated kidneys have been cleaned off extraneous tissue and rinsed in ice cold physiological saline. After paraffin infiltration the Tissue pieces were sectioned at 5µm and stained with haematoxylin and eosin for Histopathological examination.[17-19]

Analysis of Tissue Antioxidant Enzyme:

The remaining half portion of the right kidney was used for the estimation of various marker enzymes like MDA or LPO, GSH and LDH. 10% homogenate of the tissues were prepared in 0.1M Tris HCL buffer (pH 7.4) in a homogenizer. The homogenate was centrifuged at 12000 × g for 30 minutes. The supernatant obtained after centrifugation were used for the estimation of various marker enzymes.[20, 21]

Statistical Analysis:

The data were presented as Mean ± S.E.M. from N = 6 rats in each group and analyzed using one way of Variance ANOVA followed by Tukey multiple comparison tests. P value <0.05 was considered statistically significant. Graph pad Prism 5.0 and Excel software were used for statistical analysis.

RESULTS:

Extraction, Isolation and Purification of Phytoconstituents

Yield of Saponin of Methanolic extract of Iris pseudacorus L. Rhizome and Dolichosbiflorus Linn Seeds.

The Yield of crude extracts of;

Iris pseudacorus L. Rhizome was 6.87%. And from 5gms of crude extract 0.5185gm of Saponin was obtained by quantitative determination. The % of Saponin was found to be 10.37.

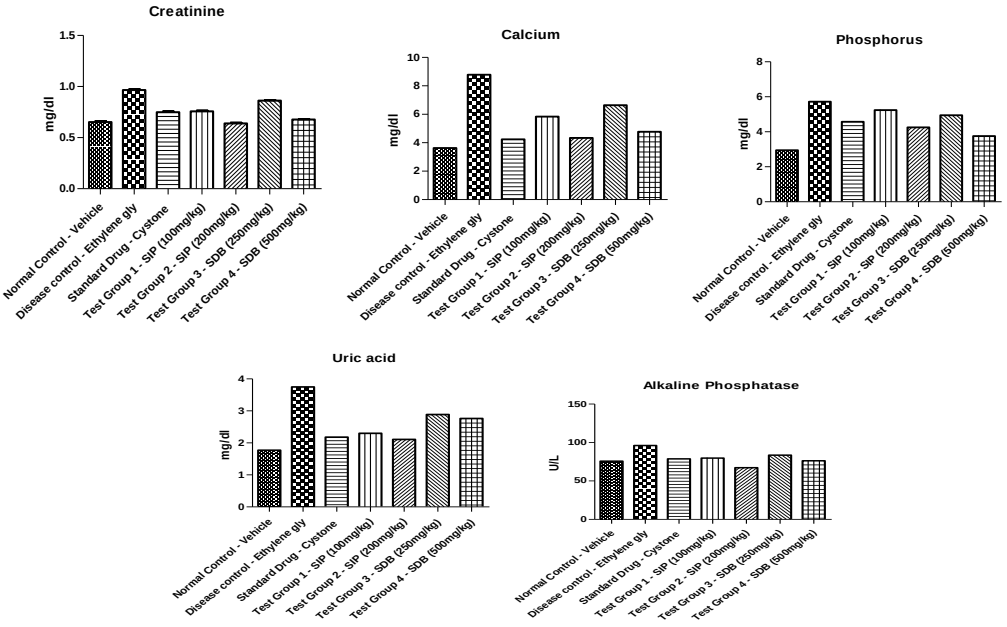
Dolichos biflorus Linn Seed was 16.14%. And from 5gms of crude extract 0.7549 of Saponin was obtained by quantitative determination. The % of Saponin was found to be 15.09.

Pharmacological Effects of Saponin isolated from *Iris pseudacorus L* and *Dolichosbiflorus Linn* Plants for Anti-Urolithiatic activity.

Saponin Iris pseudacorus (SIP) 100 and 200 mg/kg/b.w/28 days and *Saponin Dolichos biflorous* (SDB) 250 and 500 mg/kg/b.w/28 days were given orally and dissolved in distilled water. And then drugs were freshly prepared before to administration. All animals have been kept for fasting overnight before conducting the experiments.

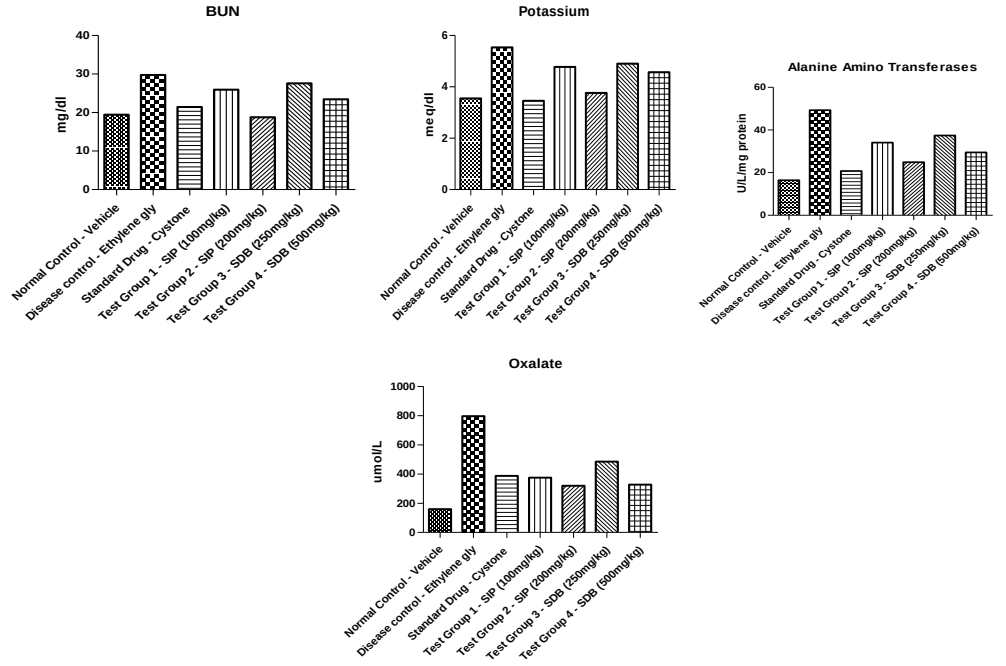
Model: Ethylene Glycol (0.75% v/v) Induced Urolithiasis Rat Model

Figure 1: Effect of oral administration of SIP and SDB on Ethylene Glycol (0.75% v/v) Induced Urolithiasis Rats on Creatinine, Calcium Phosphorus, Uric acid and Alkaline phosphatase Analysis after 28 days of treatment.



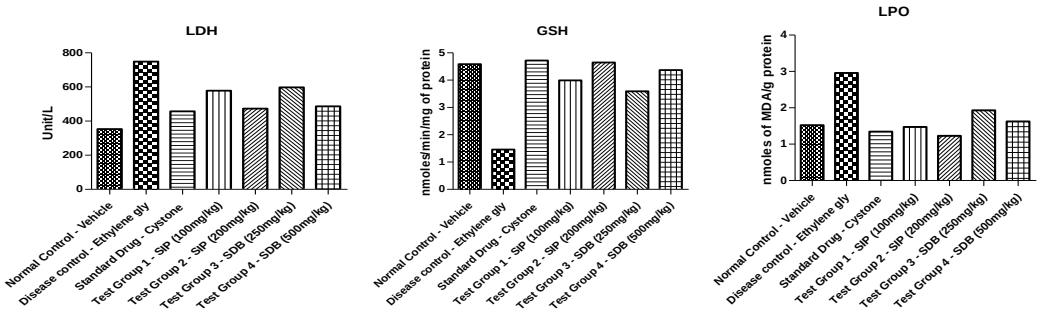
Values are expressed as Mean ± SEM, n = 6 in each group

Figure 2: Effect of oral administration of SIP and SDB on Ethylene Glycol (0.75% v/v) Induced Urolithiasis Rats on BUN, Potassium,Alanine amino transferase and Oxalate Analysis after 28 days of treatment.



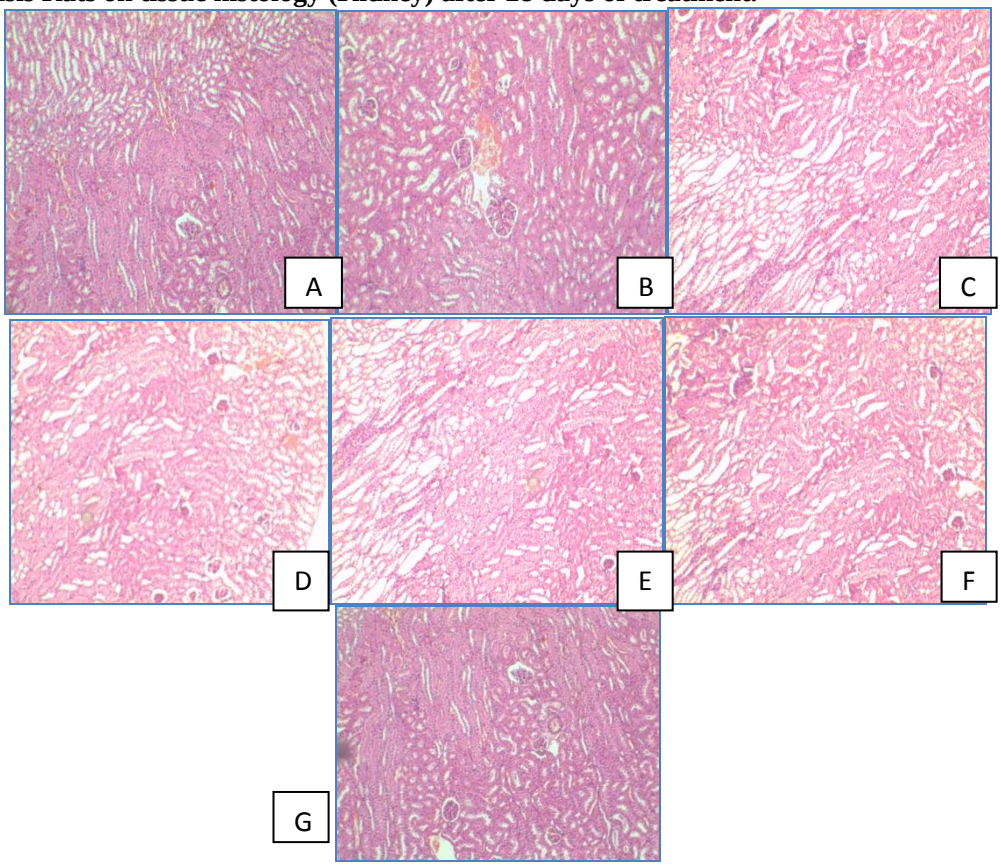
Values are expressed as Mean ± SEM, n = 6 in each group

Figure 3: Effect of oral administration of SIP and SDB on Ethylene Glycol (0.75%v/v) Induced Urolithiasis Rats on Assay of tissue (Kidney homogenate) enzyme (LDH, GSH & LPO) after 28 days of treatment.



Values are expressed as Mean ± SEM, n = 6 in each group

Figure 4: Effect of oral administration of SIP and SDB on Ethylene Glycol (0.75%v/v) Induced Urolithiasis Rats on tissue histology (Kidney) after 28 days of treatment.



A. **Normal Control –*Vehicle:***
B. ***Disease control - Ethylene Glycol:***
C. **Standard Drug – *Cystone:***
D. **Test Group 1 - SIP (100mg/kg):**.
E. **Test Group 2 - SIP (200mg/kg):**
F. **Group 3 - SDB (250mg/kg**
G. **Test Group 4 - SDB (500mg/kg):**

6. CONCLUSION:

Elevated creatinine, Serum ALP levels and presence of Uric acid crystals signifies impaired kidney function. As the kidneys become impaired for any reason, all these papameters in the blood will rise due to poor clearance of creatinine by the kidneys.

Calcium and phosphorous usually keep each other in check. With the progression of kidney disease, high phosphorus levels may lead to low serum calcium by depositing it onto the bones and other tissues.

An excess BUN, potassium and serum enzyme (Alanine amino Transferases) indicates the decline in kidney function due to a disease or kidney damage which can be advanced stages of chronic kidney

disease.Elevated lipid peroxides, LDH and decreased glutathione (GSH)indicates some form of tissue damage.

An excess amount of oxalate can combine with calcium in the urine and cause kidney stones and crystals to form. Recurrent kidney stones and crystals can damage the kidney and lead to kidney failure.

5 CONCLUSION:

In conclusion, the presented data indicate that administration of Saponin Iris pseudacorus L. Rhizome and Dolichos biflorus Linn Seeds to rats with ethylene glycol induced lithiasis reduced the growth of urinary stones by reversing all the abnormal parameters, thus supporting folk information regarding the antiurolithogenic activity of theplant. The mechanism underlying this effect is still unknown, but is apparently related to increased diuresis and lowering of urinary concentrations of stone constituents as detergent nature of saponines.

REFERENCES:

1. Pendse AK(1985). Urolithiasis in Udaipur and Jodhpur: A comparative study on prevalence and urinary profile. Bull III, Annual Conference of Urology Society of India.; 12.
2. Alelign T, Petros B (2018). Kidney stone disease: An update on current concepts. AdvUrol 2018;:3068365.
3. Ramaswamy K, Killilea DW, Kapahi P, Kahn AJ, Chi T, Stoller ML(2015). The elementome of calcium based urinary stones and its role in urolithiasis. Nat Rev Urol;12:543 57.
4. Romero V, Akpinar H, Assimos DG (2010).. Kidney stones: a global picture of prevalence, incidence, and associated risk factors. Rev Urol.12:e86-96.
5. Hadjzadeh MA, Khoei A, Hadjzadeh Z and Parizady M (2007).. Ethanolic extract of Nigella sativa L. seeds on ethylene glycol-induced kidney calculi in rats. Urology Journal, 4: 86-90.
6. Prasad K, Sujatha D, Bharathi K (2007).. Herbal drugs in urolithiasis – a review. Pharmacognosy Review, 1: 175-79
7. Bashir S, Gilani AH (2009).. Antiurolithiatic effect of Bergenialigulata rhizome: an explanation of the underlying mechanisms. Journal of Ethnopharmacology, 122: 106-116.
8. Kirtikar KR, Basu BD (1983).. Indian Medicinal Plants. Dehradun: International Book Distributors, (2nd ed) 3: 1615-17.
9. Ezeonwu VU, Dahiru D (2013).. Protective Effect of Bi-Herbal Formulation of Ocimumgratissimum and Gongronemalatifolium Aqueous Leaf Extracts On Acetaminophen-Induced Hepato Nephrotoxicity In Rats. American Journal of Biochemistry, 3: 18-23.
10. Baker JT, Borris RP, Carte B, Cordell GA, Soejarto DD. Natural product drug discovery and development: New perspective on international collaboration. Journal of Natural Products, 58: 1325-57.
11. Ahmed S., AhsanMaliick I., Hasan MM (1995).. Exploring globally used antiurolithiatic plants of A to L families: Asteraceae, Fabaceae and Lamiaceae revisited. Journal of Pharmacognosy and Phytochemistry 2017; 6(5): 1780-1787
12. Sharada LD, Somshekhar SK (2010). Isolation and characterization of phytoconstituents from Chlorophytumborivilianum. Pharm. Res; 2: 343.
13. Gini TG, Jothi GJ (2013). Preliminary Phytochemical Screening. Int. J. Pharm. Phytochem. Res; 5(3): 200-214.
14. Anjamma M and Bhavani NL: Comparative Phytochemical Constituents Evaluation from the Fruit Extracts of Momordicacharantia L. and MomordicadioicaRoxb. Int. J. Curr. Biotechnol 2015; 3(8): 17-21.
15. Burke RW, Diamondstone BI, Velapoldi RA, Menis O (1974). Mechanisms of the Liebermann-Burchard and Zak Color Reactions for Cholesterol. Clin.Chem; 20(7): 794-801.
16. Makasana A et al. (2014). Evaluation for the anti-urolithiatic activity of Launaeaprocumbens against ethylene glycol-induced renal calculi in rats. Toxicology Reports; 46–52.
17. Mukharjee TB, N. Aulakh GS, Jain HC (1984).. Herbal drugs for urinary stones – literature appraisal.Indian Drugs.
18. Bahuguna Y, Rawat MSM, Juyal V, Gupta V (2009). Antilithiatic effect of flowers of JasminumAuriculatumVahl. Int J Green Pharm.

19. KalyanBetanabhatla S, Christina AJM, SyamaSundar B, Selvakumar S (2009). Antilithiatic activity of Hibiscus sabdariffa Linn. on ethylene glycol-induced lithiasis in rats. Nat Prd Rad; 43-7.
20. Karadi R, Gadge N, Alagawadi K, Savadi R (2006). Effect of Moringaoleifera Lam. root- wood on ethylene glycol induced urolithiasis in rats. J Ethnopharmacol; 21:306-11.
21. Anonymous (2005). The wealth of India.Raw material. (Vol.7). New Delhi: CSIR; 68.

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HUMAN RESOURCE MANAGEMENT - A KEY TO SUSTAINABLE DEVELOPMENT

Prof. Mohan Kumar H.T
Assistant Professor of Economics, Government First Grade College, Yelahanka, Bangalore, Karnataka, India-560064,
email: mohankumar050270@gmail.com,

Introduction:

Human resource professionals should play a significant role in creating and implementing sustainability strategies for their organizations, according to a research report by the Society for Human Resource Management (SHRM) and two other organizations. The main objectives of this research paper is to study the historical development of managing human resources, propose claims for recognizing sustainability as the future of managing human resources, to establish the need for Green HRM, a new paradigm towards employee satisfaction and loyalty as an important priority for the efficient management of human resources evaluate how the various instruments of sustainable HRM create an impact on organizational overall performance.

Now the time has come for sustainable development. Environmental policies should be embraced to ensure that this world remains a good place to live in. Organizations may make a positive contribution in maintaining an ecosystem that would be cleaner and safer via incorporating multiple essential ecological initiatives. This simple theoretical paper deals with a step taken by organizations to encourage sustainable growth and ecological initiatives. This research suggests that human resources management departments must incorporate green and environmentally friendly practices in their organizations. Green HRM is a concept that further adds to the basic understanding of this idea.

Research Methodology:

The researcher has used reference from secondary sources like books, articles and newspaper reports to understand the issue regarding Sustainable Human Resource Management, hereinafter Sustainable HRM.

Objectives of the Study:

The main objective of this article is to analyze the Human Resource Management - A Key to Sustainable Development in India. The following are the objectives of the study:

1. To review the historical evaluation of HRM in India.
2. To analyses of impact of HRM on Sustainable Development.
3. To evaluate the recent scenario of HRM in India.
4. To provide suitable suggestions to achieve effective HRM in India.

Review of Literature:

Sustainability and strategic HRM are very rich literature. However sustainable HRM is a growing, rapidly emerging field. The term sustainability can be used in different aspects which are concerned with meeting the needs of people today without compromising the ability of future generations to meet their own needs. (World Business Council for Sustainable Development, 2005).

Sustainability and sustainable development are synonymously used for the notions (Filho, 2000). Dyllick and Hockerts (2002) noted that the term sustainability has been influenced mainly by three different stakeholder groups; ecologists, business strategy scholars, and the United Nation's World Commission on Environment and Development (WCED, 1987), called the Brundtland Commission. Some authors believe sustainability first appeared as a concept in the forestry sector, before it was adapted by the ecological movement concerned with the over-exploitation of natural and environmental resources (Leal Filho, 2000).

From a business perspective, sustainability has been defined as a company's ability to achieve its business goals and increase long-term shareholder value by integrating economic, environmental and social opportunities into its business strategies (Symposium on Sustainability, 2001, Wirtenberg et al 2007).

Evidence is accumulating rapidly that corporate social-environmental performance maybe strongly associated with financial and marketplace success (Cusack, 2005; Innovate Strategic Value Advisors, 2006; Wirtenberg et al 2007), and that the investment community and corporate people appear to

be focused increasingly on the degree to which firms are managed with the compliance of sustainability (Dixon, 2003).

The three-fold approach to sustainability focuses both on an organization's external influences and on its internal influences. It also addresses the sustainability of short-term and long-term effects on a variety of the organization's shareholders. In other words, sustainable HRM is economically rationale for companies to invest in the survival of their sources for resources if the functioning of these is endangered (Ehnert 2006).

Sustainable HRM is long-term oriented conceptual approaches and activities aimed at a socially responsible and economically appropriate recruitment and selection, development, deployment, and release of employees. (Zaugg & Thom, 2004: 217). Sustainable HRM could help sustain employee dignity in the case of staff reduction and warranting their employment on the job market (Zaugg & Thom, 2001). Thom & Zaugg (2004) stated that, a sustainable HR policy focuses on implementing proper, transparent procedures for recruitment and retention, training and development, performance management and motivation and employee engagement and it is a conceptual approach and long-term oriented activity in developing socially viable and responsible policies for recruitment and retention, employee engagement, deployment, and motivation.

Wirtenberg et al (2007) mentioned that, implementing sustainable human resource policies help in creating a more productive and motivated workforce which eventually led to organizational success. Ehnert (2009) mentioned that, sustainable HR model is that it anticipates on the short term and long-term effects of implementing a policy and measures organizational success in social and environmental dimensions and not just by the financial aspect. It also utilizes the power of human resource management to develop and empower employees by building a conducive work environment.

Several studies have shown the connection between sustainability and the management of human resources; and a new approach was established as sustainable management of human resources.

Ehnert (2006): Sustainability issues and human resource management - The Sustainability perspective of HRM raises awareness for ambiguities and dualities in HRM, unintended negative side effects of HR practices, social rationalities.

Ehnert (2009): Sustainability and Human resource management - Sustainable HRM is about to change a traditional way of managing human resources for long-term viability and sustain development. This approach covers treating HR socially responsible and to foster well-being and health in dimensions of social justice and social legitimacy.

Kramer (2014): Strategic HRM and sustainable HRM - Applications of sustainability concepts in human resource management emerged a new approach- Sustainable HRM has different features from Strategic HRM. It acknowledges social or human outcomes rather than financial outcomes.

A. Historical Evolution Of Human Resource Management:

Human Resource Management is a field of constant evolution and transition. As well, there is no standard model or an ideal type of HRM approaches, to suit all organizations, and thus, there are different models to describe HRM evolution and management (Ahmed and Kazmi, 1999; Gratton and Truss, 2003).

The concept and processes of Strategic Human Resource Management (SHRM) developed in the late The 1970s and the 1980s as a way of managing employees in an increasingly turbulent and fast-changing, uncertain environment. One of the most prominent factors in history for the management of human resources was primarily scientific research (1903) by Frederic W. Taylor, who proposed three principles that were the basis of modern HRM according to Jamrog and Overholt (2004):

- The Human Resource appointed for the job must be physically, mentally fit for the job and those who aren't fit must be removed.
- The Human resource must have trained to carry out the given specific task.
- The Human Resources must be given incentives or rewards. [xxii]

Between 1950 and 1960, was the deployment of the automobile industry, promoting concern for efficiency and performance, and parallel to it, the implementation of the sub systems of HR, known as the Technicity phase by Wood (1995). During this period, despite the knowledge and understanding of how people behave in organizations, the personnel management function was still regarded as a records unit with operational character (Jamrog and Overholt, 2004).

The transition from personnel management to Human Resource Management had begun mainly with the concepts divulged by North American authors between the 1960 and 1970 and since then, the term HRM" has been increasingly adopted worldwide (Ahmed and Kazmi, 1999).

The 1980s also saw the evolution of HRM to the Strategic Management of Human Resources. From the moment they began to identify the link with organizational effectiveness was justified for its

approval and its role within organizations (Ewing and Caruana, 1999), no longer being seen only to answer legal questions.

HRM encompasses Strategic HRM, which is a more specific approach to managing people to improve organizational performance and measures the impact of these strategies on organizational performance. The concept of Strategic HRM evolved in several ways. Strategic HRM can be expressed in terms of planned human resource activities and deployments designed to achieve an organization's objectives Strategic HRM integrated the HRM activities with organizational strategic objectives in an organizational context.

These include the development of theoretical frameworks, views about the specific contributions to organizational performance and the specific bundles of HR practices which include high-performance work systems (HPWS) which consist of selective recruitment and selections, extensive employee development and participation in decision-making. It also assumes that effective HRM activities improve organizational performance. (Schuler and Jackson 2005; Boxall and Purcell 2008).

There is a need for more discussion on what sustainable HRM is, what is the role of HRM in implementing the idea of sustainability in the organizations and what is the role of HRM in developing sustainable HRM? As consequences of actions, there is a need for empirical research on how organizations and employees perceive sustainable HRM, and, how sustainable HRM implemented.

B. Sustainable Development & Human Resource Management:

The time of Sustainable HRM has come. Governments should seriously consider working out mechanisms with the private sector to draft out plans favoring and protecting the environment. Organizations under the name of Corporate Social Responsibility (CSR) claim to pay-back to the environment, but they need to go beyond normal activities and adopt more practices in routine for the better implementation of their green initiatives, and these green initiatives can be a part of the broader CSR as well (Mandip, 2012).

Ahmad (2015) highlights the introduction of areas such as Green Accounting, Green Marketing, Green Retailing and others. Multinationals such as Toshiba, LG, and Sony are among the few brands that are on this mission. Toshiba Environment report defines Green Management as, Green Management is an initiative aiming at continuously improving the foundation of environmental management, such as the development of personnel responsible for environmental activities, environmental management systems, and environmental communication as well as conservation of biodiversity. The green management system is a dynamic and constant administration arrangement of exercises and procedures to screen, avoid and control pollutants of nature (Abbaspour, et al., 2006)

According to Denisi and Griffin (2009), HRM is the comprehensive set of managerial activities and tasks concerned with developing and maintaining a qualified workforce in ways that contribute to organizational effectiveness. HRM is a well-known and understood concept; therefore, the authors do not focus more on establishing the importance or basic understanding of this term. GHRM is relatively a new idea and is gaining limelight with the acknowledgment of the importance of environmental concerns and role organizations can play.

Green HRM is not a stand-alone concept. Sharma and Gupta (2015) are also of the view that Green HRM is a holistic and wider application of the notion of sustainability to an organization and its personnel. Green actions can be inculcated into various steps or processes in an organization. Green HRM involves the use of HRM to support sustainable use of resources in organizations (Rani and Mishra, 2014).

Some organizations, such as those mentioned in the introductory part of this paper, present themselves as Green, they are working on building their image as Green organizations to capitalize on this goodwill image. The GHRM framework is not complex and may not require a fundamental shift in the structure of HRM functions but at the same time have a positive impact in the long run. GHRM can be more fruitful if it is adopted by the organizations as part of the broader sustainable development.

Ahmad (2015) reiterates that Green HR efforts have resulted in increased efficiencies, cost reduction, employee retention, and improved productivity, besides other tangible benefits. Organizations need to become proactive and go for practices that can help them grow and at the same time enable organizations for paying back to society. It is imperative to mention that literature about GHRM and its implementation is mostly available in the context of developed economies and not in developing countries.

It is high time that developing countries should acknowledge the importance of a greener sustainable environment and counter the growing global warming issues. GHRM can be one small but effective strategy as a part of the broader mission. The Green HRM model can be assessed and evaluated using a method developed by Tang et al. (2017) to support the research.

C. Recent Scenario of Human Resource Development in India:

It's no secret that employee's attitudes about their jobs, their benefits and their employers can range from exuberant to sour. What 's less well known and harder to find out is exactly what matter to specific types of employees and how effective various types of HRD policies, practices and workplace characteristic are, in spurring employee productivity and retention. Since human resource development and management is culture sensitive, therefore we shall examine the recent scenario of HRD in India context by having a brief preview of HRD scenario in the global context as discussed below:

- More and more employers are assessing the value returned from each dollar spent on employees. They are targeting specific programs and practice to the employees that value them the most and becoming more important than ever. Determining what matter most to employees and aligning expenditures with priorities is a strategic challenge for HRD function. Employee change continuously due, in part, to change changes in personal preference but also in part to the chum that occurs as employees leave and new ones enter the Organization. However, it is neither cost effective nor practical to satisfy every employee. Therefore, understanding employees and issues they face holds the key to the function to respond quickly.
- importance of all but one. Now professionals and employees differed on the relative importance of all but one. Now the question arises whether HRD professionals are out of touch with the attitudes among their own particular employees. Perhaps, in some Organization, HRD function is very much in tune with what their employees are thinking, while in some others the gap may be larger. Finding out what really matters to employees so that the Organization can maximize its investment in human resource is not an incident undertaking. There are costs involved in doing surveys and in analyzing their results and there are there are additional costs if an Organization does not show that it values the efforts.
- Thus, it is that core HRD tools, tactics and programmes remains the same however employee needs and priorities have changed and indeed changing. Employee 's values greatly professional developments, job specific training and learning, career development and empowerment more than anything else, except compensation. Employees are increasingly emphasizing opportunities for their development in order to enhance their productive contribution to the Organization and derive satisfaction. Post 1991, India started its phased economics restructuring to provide domestic Organizations the time and competencies to face greater competition. The liberalization paved the way for integration of India economy
- with the global economy. It opened many opportunities for growth through the removal of artificial barriers on pricing and output decisions, investments, mergers and acquisition, joint ventures, technology imports, import of foreign captain etc., this enabled Indian Organizations an opportunity to expand, diversify, integrate and globalize more freely.
- Indian Organizations have to develop the workforce capable of taking up challenges thrown by the new economic environment. To tackle this challenging situation, Indian academics a nod practitioner have both advocated the adoption of the concept of human resource development. The adoption of professionalized HRD practices in India is recent phenomenon, but has gained momentum in the past ten years.

Findings, Suggestions & Limitations:

To summarize the findings, some key characteristics of a sustainability perspective in HRM derived in this study and the related theoretical literature are listed as, having a long-term approach and foresight, creating organizational dynamics, emphasizing on creating equal and non-discriminatory learning opportunities, regeneration and development of HRs, the implementation of appropriate policies to create work-life balance including flexible or floating working hours and distance working.

Targeted, a diverse, flexible, and motivational reward system that is consistent with sustainability goals, Caring for the interests of different groups of stakeholders, Caring for the health and safety of HRs, Efforts to gain and maintain social legitimacy through long-term investment appreciation and responsibility towards society and other stakeholders, make use of the restrictions and turn them into opportunities through creativity and innovation, Gaining sustainable competitive advantage, Creating corporate sustainability.

Conclusion:

Sustainable Human Resource Management is an extremely new subject for HR and empirical studies to evaluate and demonstrate best practices for more sustainable HRM-based organizations. Sustainability is a strategic issue for HRM that is necessary for a company's long-term access to resources needed for business in the future including human resources and long-term viability to maintain the social legitimacy of their commercial operations for which they need to control the risks from producing negative externalities on natural and social environments.

This ultimately leads to the long-term sustainability and capability of organizations as well as resilience and sensitivity to external environmental change within those organizations that positively influence their efficiency and effectiveness. The paper has a limitation is that no specific organizational

sustainable HRM analysis has been made. Future research could be made on some specific organizational aspects

In sum, Sustainable HRM can be viewed as facets of modern integral management model, in continual dynamic interaction that brings about a potential for improved competitive advantage and business performance and as the opportunity for HR to prove its own legitimacy and strategic position.

References:

1. Ahmed, F. & Kazmi, A. (1999), 'Historical evolution of strategic human resource management', Malaysian Management Review, Vol. 34 No. 1.
2. Dixon, F (2003), 'Total Corporate Responsibility: Achieving Sustainability and Real Prosperity, Ethical Corporation Magazine, December 2003.
3. Dyllick, T. & Hockerts, K (2002), Beyond the Business Case for Corporate Sustainability? Business Strategy and the Environment, 11(2), pp. 130-141.
4. Ehnert, I. (2009), Sustainability and Human Resource Management: Reasoning and Applications on Corporate Websites. European Journal of International Management, 3(4), pp. 419-438.
5. Jamrog, J. & Overholt, M.H. (2004), 'Building a strategic HR function: continuing the evolution', Human Resource Planning, Vol. 27, No. 1, pp. 51-63
6. Kramar, R. (2014), 'Beyond strategic human resource management: Is sustainable human resource management the next approach?', International Journal of Human Resource Management, 25, pp. 1069-1089.
7. Mandip, G (2012), Green HRM: People management commitment to environmental sustainability. Research Journal of Recent Sciences, 2012, Vol. 1, pp 244-252.
8. Ravi Kumar (2018), 'Sustainable HRM: An Evolution of a New Approach', International Journal of Management, Technology and Engineering, 8, XI, November 2018, pp. 167.
9. Schuler, R.S. & Jackson, S.E. (2005), A Quarter-Century Review of Human Resource
10. Youndt, M. A. et al. (1996), 'Human resource management, manufacturing strategy and firm performance, Academy of Management Journal, Vol. 39, No. 4, pp. 836-865.

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Sustainability of Plantation Crops in Kerala- An Analysis

Dr.Maneesh.B
Assistant Professor in Economics
MMNSS College, Kottiyam,Kollam,Kerala
manbpillai@gmail.com

Abstract

The most notable feature of Kerala's agricultural development is the emergence of cash crops as a dominant sector over the five decades. The data analysis shows that the proportion of area under food grains declined from mid-seventies and an increasing role of cash crops over food crops. The nature of changes in area indicates that paddy land has been diverted either to other crops, mainly cash crops or to non-agricultural purposes such as sites for construction of building, brick-mining and infrastructural facilities such as roads, railway, canals etc. The shift in cropping patterns from food crops to cash crops and also the shift from eco-friendly subsistence farming to profit-induced cultivation using chemical fertilizers and poisonous pesticides have accelerated the pace of biodiversity loss. The results have been an acute shortage of drinking water in summer, falling water tables, soil erosion and climatic changes. Thus, in short, the shifts in cropping pattern in favour of cash crops and the consequent reduction in area under food crops is an issue of great concern that has longterm implications for the food security and ecological and environmental balance of the State.

Key Words: Cropping pattern- land use pattern - food crops- cash crops- sustainability

Plantation Crops

In view of the potential for export, employment generation and poverty alleviation, plantation crops play a vital role in the national and state economy. Each of the four plantation crops of South India has its distinct characteristics and economic problems. Kerala has a substantial share in the four plantation crops of rubber, tea, coffee and cardamom. These four crops together occupied 7.11 lakh ha, accounting for 27.7 per cent of the total cropped area in the State**.** Kerala's share in the national production of rubber is 72.6 per cent. The per centage share in cardamom, coffee and tea were 91.3 per cent, 20.5 per cent and 5.2 per cent respectively in the year 2020-21.

Table.1
Plantation Crops- Area, Production and Productivity in Kerala (2018-19 to 2020-21)

	2018-19	2019-20	2020-21
AREA (ha)			
Tea	36474	35871	35871.16
Coffee	84976	85880	85880
Rubber *	551200	551030	550650
Cardamom	38882	39697	39143
PRODUCTION (MT)			
Tea	60760	59260	66850
Coffee	64676	65459	68545
Rubber *	492500	533500	519500
Cardamom	11535	10076	20570
PRODUCTIVITY (kg/ha)			
Tea	1666	1652	1864
Coffee	761	762	798
Rubber*	1549	1559	1534
Cardamom	297	254	526

Source: Directorate of Economics and Statistics, Economic Survey
*Note: * Provisional data from Rubber Board*

Considering the significant role of plantation in the economy, focus on initiatives to improve processing and value addition of plantation crops in addition to expanding, replanting and productivity, can enhance the revenue flow from plantations.

Rubber

The world Natural Rubber (NR) production in 2020 was 13.008 million tonnes as against 13.700 million tonnes produced in 2019, registering a decline of 5.1 per cent in production. In 2020, among the main NR producing countries, Thailand recorded the highest production of 4,372,000 tonnes followed by Indonesia and Vietnam. India was the sixth largest producer with a share of 5.5 per cent of world production.

Rubber occupies the second largest area in the State next to Coconut with 21.43 per cent of the gross cropped area. In Kerala, the area and production of rubber decreased by 0.06 and 2.62 per cent respectively in 2020-21 compared to 2019-20. The rubber production was 5.195 lakh tonnes from an area of 5.5 lakh hectares.

Coffee

The International Coffee Organization estimated the global coffee production in 2020-21 as 169.6 million bags (of 60 kilo bag) with 0.8 million bag increase over 2019-20. Brazil stands first in coffee production with a share of 37.4 per cent of the global production followed by Vietnam with 17.4 per cent. India is in seventh position with 3.4 per cent share. Domestic coffee production in 2020-21 was 334 thousand tonnes with Arabica production of 99 thousand tonnes (29.6 per cent) and Robusta at 235 thousand tonnes (70.4 per cent). This represents an overall increase in total production as well as within the break-up of Arabica and Robusta production by 34.7 thousand tonne, 8.6 thousand tonne and 26.1 thousand tone respectively compared to 2019-20.

With respect to Kerala, the production of coffee increased from 65,459 metric tonnes in 2019-20 to 68,545 metric tonnes in 2020-21. The area planted under coffee was maintained at 85,880 ha in 2020-21. The productivity of the crop in Kerala was 798 kg per ha**.** Among the coffee producing States in the country, Kerala stands second in coffee production next to Karnataka.

Focus on productivity improvement of existing coffee plantations by systematic planting and adequate irrigation facilities can facilitate increase of coffee production in the State. Encouraging coffee growers to access high value specialty markets through production of eco certified coffees would help to realize higher returns. Value addition through improved technologies, formation of FPOs and direct market access to coffee growers through e-platforms would help the coffee sector, both in terms of production as well as marketing.

Tea

The world tea production in 2020 shows an increase of 1.75 per cent despite the Covid-19 pandemic affecting the tea growing regions. As per the International Tea Committee data, China ranks first in tea production contributing to 47.6 per cent of the total world production of 6,269 million kg in 2020. The growth in production is attributed to increase in area, usage of improved planting materials, employing advanced technology and adopting integrated package of practices for tea cultivation. India is the second largest producer of tea. The performance of tea production sector in the country over the last ten years had shown a substantial increase till 2019-20. The lockdown measures due to Covid-19 pandemic resulted in decline in production in 2020-21. As per the Statistics of Tea Board the domestic tea production in 2020-21 was 1,283.03 million kg which is lesser by 77.78 million kg of 2019-20**.** As against the previous year, the South Indian tea production showed an increase, while North Indian production was lower.

Kerala accounted for 5.2 per cent of the total domestic production of tea in the country in 2020-21. Both, the production and productivity of tea in the State increased by 12.8 per cent to 66.85 million kg and 1,864kg/ha respectively compared to 2019-20**.** The import of tea in India has recorded an increase of 51 per cent since 2015-16 which is a matter of concern. With the domestic tea sector facing a setback due to increasing cost of production from high input cost and high wage rate, it is necessary to regulate the import of tea in the country.

Cardamom

India is the second largest producer of cardamom in the world and is a significant player in international trade due to the unique aroma and flavour of Indian cardamom. As per the advance estimate of Spices Board 2020-21, cardamom production in India in 2020-21 is estimated at 22.520 thousand tonnes. This is double the production compared to 2019-20. The price of cardamom which had increased to a record high of □ 2,908.50 per kg in 2019-20 witnessed a sharp decline to □ 1,513.02 per kg in 2020-21.

Kerala holds the major share in cardamom production contributing to 91.3 per cent of the total production. The production of cardamom in the State has doubled in 2020-21 compared to 2019-20 recording 20,570 metric tones**.**

Cropping Pattern

The cropping pattern in the State is quite different from that at the national scene owing to the topography and climatic conditions of Kerala. Perennial crops dominate the cultivated area in the State. Over the years, the share of perennial crops has been gradually increasing. Table.2 shows the change in the area under different crops during 1960-61 to 2019-20.

Table. 2

Share of area under major crops in total cropped area in Kerala (Per cent)

Crop	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2019-20
Rice	32.66	29.83	28.88	18.22	11.50	8.77	7.66
Coconut	21.44	24.71	23.68	28.69	30.98	29.18	29.41
Rubber	5.24	6.15	8.24	12.72	15.70	19.69	21.31
Pepper	2.43	3.42	3.75	5.58	6.59	6.43	3.24
Cardamom	1.22	1.63	1.87	2.22	1.37	1.56	1.54
Cashewnut	2.32	3.52	4.89	3.83	2.85	1.83	1.54
Tapioca	10.21	10.17	8.76	4.77	3.68	2.80	2.40
Coffee	0.72	1.08	2.00	2.48	2.80	3.18	3.32
Tea	1.60	1.29	1.25	1.15	1.22	1.38	1.38

Source: Government of Kerala (Various Years), Economic Review, State Planning Board, Thiruvananthapuram.

The Table shows the cropping pattern of major crops in Kerala from 1960-61 to 2019-20. From the Table, it is clear that the area under major cash crops, namely coconut, rubber, pepper, coffee, tea and cardamom accounted for 60 per cent of the gross cropped area in the state. The area under two major food crops, rice and tapioca, declined drastically to the tune of 7.66 per cent and 2.40 per cent respectively in 2019-20. It may infer that the relative contribution of rice to the total cropped area consistently declined in Kerala.

The most notable feature of Kerala's agricultural development is the emergence of cash crops as a dominant sector over the five decades. The most significant segment in this category is the plantation crops consisting of rubber, tea, coffee and cardamom. Among this crops, rubber emerged as the most significant crops with largest area in the state. The area was 5.24 per cent in 1960-61 to 21.31 per cent in 2019-20. Similarly the coffee was 0.72 per cent to 3.32 in 2019-20. Cardamom 1.22 per cent to 1.54per cent and tea from 1.60 per cent to 1.38 per cent in 2019-20. Another cash crops, Pepper, also increased from 2.43 per cent to 3.24 per cent in 2019-20.

The data analysis shows that the proportion of area under food grains declined from mid-seventies and an increasing role of cash crops over food crops. The nature of changes in area indicates that paddy land has been diverted either to other crops, mainly cash crops or to non-agricultural purposes such as sites for construction of building, brick-mining and infrastructural facilities such as roads, railway, canals etc. The factors influencing the shift included large increase in cost of cultivation of rice without corresponding increase in its price, relative price changes in favour of competing crops, problems of managing labour, state policies relating to land tenure etc.

The shift in cropping patterns from food crops to cash crops and also the shift from eco-friendly subsistence farming to profit-induced cultivation using chemical fertilizers and poisonous pesticides have accelerated the pace of biodiversity loss. Massive conversion of low-lying areas for non-agricultural purposes has led to a distortion of the balance of wetland ecosystems in ecologically fragile region. The conversion of paddy fields into areas to cultivate crops such as bananas and ginger has serious implications in Kerala. Large scale filling of paddy fields and leveling of hills have affected the ecosystem of the region. The results have been an acute shortage of drinking water in summer, falling water tables, soil erosion and climatic changes. Thus, in short, the shifts in cropping pattern in favour of cash crops and consequent reduction in area under food crops is an issue of great concern that has longterm implications for the food security and ecological and environmental balance of the State.

References:

1. George, P.S. and S. Chattopadhyay (2001), **Population and Land Use in Kerala, In Growing Population, Changing Landscape - Studies from India, Chhinaand**, the United States, National Academy Press, Washington D.C.
2. Government of Kerala (2006), **Kerala Human Development Report 2005**, State Planning Board, Thiruvananthapuram.
3. Government of Kerala (2020), **Economic Review**, State Planning Board, Thiruvananthapuram.
4. Joseph, Brigit and K.J. Joseph (2005), **Commercial Agriculture in Kerala After WTO**, South Asian Economic Journal, No. 1, June 6.

5. Mahesh, R. (1999), **Causes and Consequences of Changes in Cropping Pattern: A Location Specific Study,** Discussion Paper No. 11, CDS, Thiruvananthapuram.
6. Maneesh, B (2011), **Agrarian Crisis – Causes and Consequences: A Study based on Selected Cash Crops in Kerala**, Thesis submitted to the University of Kerala, Thiruvananthapuram.

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Water Management: Essential Need Of The Time

Dr. R.R. Senad
Associate Professor, Dr. Sow. I.B.P. Mahila College, Aurangabad.

Introduction :

Water is essential for our survival. The field of water resources management will have to continue to adapt to the current and future issues facing the allocation of water with the growing uncertainties of global climate change and the long term impact of past management actions, this decision making will be even more difficult it is likely that ongoing climate change will lead to situation that have not been encountered. As a result, alternative management strategies including participatory approaches and adaptive capacity are inceasingly being usual to strengthen water decision making.

Conserving water has become a prime environmental concern. Clean water is becoming increasingly source globally with deforestation, surface runoff increase and the subsoil water table drop as water has no time to seep slowly into ground once the vegetation is cleared.

Water serves not only to quench the thirst but also to meet the food requirements because it is on essential raw material in the process of photosynthesis through which green plants make food that is used by all trophic levels directly or indirectly. Ambient humidity which is indeed the invisible form of water that surrounds us is necessary to prevent desiccation of terrestrial life forms. Thus it can be said that water is biological essential and it serves as milieu internal as well as milieu external.

Water scarcity is being driven by two converging phenomena : growing fresh water use and depletion of usable freshwater resources. Water use has been growing globally at more than twice the rate of population increase in the last century, and an increasing number of regions are reaching the limit at which water services can be sustainably delivered, especially in arid regions water scarcity will be exacerbated as rapidly growing urban areas place heavy pressure on neighboring water resources.

When we waste water, we do not realize that it affects the lives of all of us, in so many different ways water has to be equitably and fairly distributed so that household use, agriculture and industry all get a share of the water. Its overuse and misuse due to various activities that waste water or course pollution has led to serious shortage of potable drinking water. Thus water conservation is linked closely with overall human well being.

At the global level, 31 countries are already shorts of water and by 2015 there will be 48 countries facing serious water shortages. The UN has estimated that by the year 2050, 4 billion people will be seriously affected by water shortages. This will lead to multiple conflicts between countries over the sharing of water. Around 20 major cities in India face chronic or interrupted water shortages. There are 100 countries that share the water of 13 large livers and lakes. International accords that will look at a fair distribution of water in such areas will become critical to world peace. India and Bangladesh already have a negotiated agreement on the water use of Ganges.

Water management, therefore, is the need of time. It is the management of water resources for the coming generations. It involves the activity of planning, developing, distributing and managing the optimum use of water resources. There are different methods through which water management preservation can be done, some of them are explained below.

Management Of Surface Water Resources :

1] Canal Water : The lion's shares of water go to irrigation as compared to industries and drinking. The canal network arid region is passing through vast sandy tract and the cultural command area is also sandy in nature. Due to such terrain conditions, significant amount of water is lost through conveying systems and irrigation methods. This loss of water could be saved by management on farm and form distribution systems.

2] Runoff Water : For education in the suspended sediment load in the runoff from catchments, adequate soil and water conservation measures are required, if adopted in the arable and no arable lands in the catchment areas. Such measures may be the establishment of vegetative barriers, contour trenches and box cumpit, contour furrows, diversion channels and stabilization of natural drainage lines. Therefore, the large capacity storage reservoirs are not desirable in the arid region because of unfavourable climatic, morphological, geological and hydrological conditions.

3] Khadins : During monsoon season, the cropped land of Khadins is usually under submergence by runoff received from rocky rugged hills and steeper plateaus. Obviously, every year submergence of cropped land increases the salinity of soils.

4] Nadis and Tanks : The inhabitants of the arid region harness the meager rainfall in the form of dugout ponds locally known as nadis and in cisterms called tanks. These are an age old practice of harnessing water untilized for drinking by human and livestock population. Nadis should be managed in the following ways to reduce problem.

1. It has high evaporation and seepage losses of water, which can be reduced by providing LDPE lining for minimizing the seepage losses.
2. Tree plantation for shading the water surface to minimize the evaporation losses.
3. By providing wind mill or hand pump for withdrawal of water.

5] Anicut : Anicut is a structure constructed across a stream. It is an earth fill section with section with a spillway and is designed to hold sufficient water to submerge a substantial upstream area during the rainy season. The retained water sinks into soils profile and then seeps down to replenish adjacent wells. There wells are used for irrigating small patches of land for the establishment of forest trees and for other uses.

Methods Through Which Water Management Preservation Can Be Done :

- **Rainwater Harvesting :**

  Rain water harvesting (RWH) is the collection and storage of rain, rather than allowing it to runoff. Rain water is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft or borehole), aquifer, or a reservoir with percolation. Dew and fog can also be collected with nets or other fools. Rainwater harvesting differs from stromwater harvesting as the runoff is collected from roods, rather than creek, drains roads or any other land surfaces. Its uses included watering gardens, livestock, irrigation, domestic use with proper treatment and domestic heating. The harvested water can also be committed to longer-term storage or ground water recharge.

- **Groundwater Recharge :**

  Groundwater recharge is the enhancement of natural groundwater supplies using manmade conveyances such as infiltration basin, trenches, dams or injection walls.

  Aquifer storage and recovery (ASR) is a specific type of groundwater recharge practiced with the purpose of both augmenting ground water resources and recovering the water in the future of various uses.

- **Artificial ground water recharge :**

  Groundwater levels are declining across the country as our withdrawals exceed the rate of aquifers to naturally replenish themselves, called recharge. One method of controlling declining water level is by using artificial groundwater recharge. Artificial recharge is the practice of increasing the amount of water that enters an aquifer through human controlled means.

- **Drip Irrigation :**

  Drip irrigation is a type of micro-irrigation system that has the potential to save water and nutrient by allowing water to drip slowly to the roots of plants, either from above the soil surface or buried below the surface. The goal is to place water directly into the root zone and minimize evaporation. Drip irrigation systems distribute water through a network of values, pipes, tubing and emitters. In the drip irrigation process, water and nutrient are delivered across the field in pipes called 'dripper lines' futuring smaller units known as drippers. Each dripper supplies a measured, precisely controlled uniform application of water, nutrients and other required growth substances directly into the routzone of the plant.

- **Grey water :**

  Grey water is gently used water from your bathroom sinks, showers, tubs and washing machines. It is not water that has come into contact with faces, either from the toilet or from washing diapers. Grey water may contain traces of direct, food, grease, hair and certain household cleaning products. While grey water may look "dirty" it is a safe and even beneficial source of irrigation water in a yard.

- **Sewage water treatment :**

  Sewage treatment is the process of removing contaminants from municipal waste water, containing mainly household sewage plus some industrial waste water. Physical, Chemical and biological processes are used to remove contaminants and produce treated waste water that is safe enough for release into environment. A byproduct of sewage treatment is a semi-solid waste of scurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land.

- **Conjunctive use:**

  Conjunctive use is a caten-phrase for coordinated use of surface water and ground water, literally going with the flow to maximize sufficient yield. Conjunctive use of ground water and surface water in an irrigation setting is the process of using water from the two different sources for consumptive purposes.

Conjunctive use can refer to the practice at the farm level of sourcing water from both a well and from an irrigation delivery canal, or can refer to strategic approach at the irrigation command level where surface water and ground water in puts are centrally managed as an input to irrigation systems.

- **Aquifer Storage And Recovery :**

Aquifer storage and recovery (ASR) is the direct injection of surface water supplies such as potable water, reclaimed water (i.e. rainwater) or river water into a qualifier for later recovery and use. The injection and extraction is often done by means of a well. In areas where the rain water cannot percolate the soil or where it is not capable of percolating it fast enough. (i.e. urban areas) and where the rainwater is thus diverted to rivers, rainwater ASR could help to keep the rainwater within an area. ASR is used for municipal, industrial and agricultural purposes.

- **Desalination :**

Desalination is a process that takes away mineral components from saline water. More generally, desalination refers to the removal of salts and minerals from a target substance, as in soil desalination, which is an issue for agriculture. Saltwater is desalinated to produce water suitable for human consumption or irrigation. The byproduct of the desalination process in brine. Desalination is used on may seagoing ships and submarines. Most of the modern interest in desalination is focused on the cost effective provision of freshwater for human use. Along with recycled waste water, it is one of the few rainfall independents water sources.

- **Water Management Plans At Environmental Protection Agency (EPA) :**

Water management plans help individuals facilities set long and short term water conservation goals. EPA has 27 signed water management plans that outline the best management practice for 30 different facilities.

Top 10 Water Management Techniques :

1. **Meter / Measure / Manage :**

Metering measuring facility water use help to analyze serving opportunities. This also assures the equipment is run currently and maintained properly to help prevent water waste from leaks or malfunctioning mechanical equipment.

2. **Optimize Cooling Towers :**

Cooling tower provide air conditioning for laboratories and are large consumers of water cooling tower operations can be optimized by carefully controlling the ratio of water discharged to water evaporated. The ratio of evaporation to blow down is called the cycle of concentration. For maximum water efficiency, cooling tower should be operated at six or more cycles of concentration.

3. **Replace Restroom Fixtures :**

The U.S. Department of Energy established federal water efficiency standards in the 1990s. Prior to that, Most EPA facilities had inefficient sanitary fixtures. For ex. toilets used 3.5 gallons per flush (gpF).

4. **Eliminate Single - Pass Cooling :**

Single pass cooling circulates a continuous flow of water just once through the system for cooling in it s laboratories, Instead, facilities have air-cooled or recirculating chilled water systems.

5. **Use Water Smart Landscaping And Irrigation :**

Planting native and drought - tolerant plant species minimizes the need for supplemental irrigation. Landscape water use can also be reduced 10 to 20 percent by having an irrigation water audit. EPA Seluts audit professionals certified through a water sense labeled program. Water sense labeled weather-based irrigation controllers or soil moisture sensors are used to water only when plants need it.

6. **Control Steam Sterilizer Water :**

Steam sterilizers use cooling water to temper steam condensate discharge from the sterilizer to the laboratory drain. Many older sterilizers discharge a continuous flow of tempering water to the drain, even when it is not needed. EPA has retrofitted sterilizers with attempting water control kit or replaced old steam sterilizers with models that only apply tempering water when needed.

7. **Reuse Laboratory Culture Water :**

Several EPA laboratories require water for aquatic culture research. In some cases, culture water is pumped into laboratory specimen tanks from local bodies of water, such as lakes or bays. It is then discharged into the sewer or treated and returned to the body of water.

8. **Control Reverse Osmois Systems Operation :**

Up to 10 percent of a laboratory's water consumption can be related to the multistep process of generating deionized (DI) purified water through reverse osmosis (RO). Water savings can be achieved by carefully regulating purified water generation rates to meet laboratory demand and making sure that system are sized accordingly.

9. Recover Rainwater :

Recovery system capture rainwater from the roof and redirect it to a storage tank. This water is used for flushing toilets, supplying cooling towards and irrigating the landscape.

10. Recover Air Handler Condensate :

Air conditioning units produce condensate water from the cooling coils. Many EPA laboratories are capturing this water for use as cooling tower make up water.

Conclusions :

Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources. Water management methods should be adopted strategically, keeping in mind the need for the work to be implemented. Needless to say that water is prime natural resource, a basic human need and a precious national asset. No doubt water management is the essential need of the time to develop happy, healthy, satisfied of life.

References :

1. Bharucha, E. (2005), Textbook of Environmental Studies, University Grant Commission, New Delhi.
2. https://em.m.wikipeida.org/wiki/water-resource-management.
3. https://pib.gov.in/newsite/print Release aspx?redicd=70832
4. https://www.business.gid.gov.au/industries/mining-energy-water/water/catchments-planning/planning.
5. https://www.constrofacilitator.com/different.type-of-water management-methods/.
6. https://www.epa.gov/greeningepa/water-management-plans-and-best-practices-epa.
7. https://www.water.wa.gov.au/planning-for-the-future/meeting-demand/water-supply-planning.
8. Prashanath, M.S.; Disy J; Kulkarni, A.R., Karlekar, S. (2006) Environmental studies, Diamond Publication, Pune.
9. Srivastava, Y. N. (1989), Environmental Pollution, Ashish Publishing House, New Delhi.

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A REVIEW ON TOXICITY OF PB(II), THEIR HARMFUL EFFECTS AND TREATMENT BY CHELATING AGENT

Tahreem Momin[1] , Seema I. Habib[2], Urusa Ansari[3], Naheed Azam[4]
Department of Chemistry, G.M.Momin Women's College, Bhiwandi.
Email ID[1]tahreem811@gmail.com, [2]seemahabib12@gmail.com, [3]ansariurusa27@gmail.com, [4]naheedazam63@gmail.com

Abstract:
Heavy metals are found naturally in the earth. They become concentrated as a result of human caused activities and can enter plant and animal (including human) tissues via inhalation, diet, and manual handling. Some elements otherwise regarded as toxic heavy metals are essential, in small quantities, for living organism..(Wikipedia) Their toxicity depends on several factors including the dose, route of exposure, and chemical species, as well as the age, gender, genetics, and nutritional status of exposed individuals. Because of their high degree of toxicity, arsenic, cadmium, chromium, lead, and mercury rank among the priority metals that are toxic These metallic elements induce multiple organ damage, even at lower levels of exposure. They are also classified as human carcinogens (known or probable) according to the U.S. Environmental Protection Agency, and the International Agency for Research on Cancer. In humans, heavy metal poisoning is generally treated by the administration of chelating agents.
Keywords: Heavy metals, Sources , Potential for human exposure ,Mechanism of lead toxicity , treatment by chelating agent.

Introduction:
Heavy metals are defined as metallic elements that have a relatively high density compared to water [1] [2].With the assumption that heaviness and toxicity are inter-related, heavy metals also include metalloids, such as lead , arsenic, that are able to induce toxicity at low level of exposure [2][3]. These heavy metals are distributed in the environment through several natural processes such as volcanic eruptions, spring waters, erosion, and bacterial activity, and through anthropogenic activities which include fossil fuel combustion, industrial processes, agricultural activities as well as feeding [4]. These heavy metals do bioaccumulate in living organisms and the human body through various processes causing adverse effects. In the human body, these heavy metals are transported and compartmentalized into body cells and tissues binding to proteins, nucleic acids destroying these macromolecules and disrupting their cellular functions. As such, heavy metal toxicity can have several consequences in the human body. It can affect the central nervous function leading to mental disorder, damage the blood constituents and may damage the lungs, liver, kidneys and other vital organs promoting several disease conditions [5]. Also, long term accumulation of heavy metals in the body may result in slowing the progression of physical, muscular and neurological degenerative processes that mimic certain diseases such as Itai itai disease ,Wilkinson's disease ,Parkinson's disease and Alzheimer's disease [5].
This chapter will highlight on the various sources of Lead and the processes that promote their exposure and bioaccumulation in the human body. More focus will be laid on the various mechanisms that leads to lead toxicity with emphasis on macromolecule and cellular damages, carcinogenesis, neurotoxicity and the molecular basis for their noxious effects. The various toxic effects along with the signs and symptoms and treatment of lead in the human body will be discussed.

Sources Of Lead In The Environment
Lead (Pb) on routine basis used for storage batteries, ammunition ,cable covering , plumbing, nuclear reactors, paints and manufacture of tetraethyl Pb, radiation shields around X-ray equipment. An oxide of lead is used in producing fine crystal glass and flint glass, solder and insecticides. Lead is highly toxic metal and its routine use has caused excess environmental contamination and health related problems in many parts of the globe[6]. The main source of lead exposure includes industrial processes, food and smoking, drinking water and domestic sources and daily house based sources of lead were gasoline and house paint, which has been extended to lead bullets, pewter pitchers, plumbing pipes, toys, storage batteries and faucets [7]. Exposure to lead occurs mainly via inhalation of lead-contaminated dust particles or aerosols, and ingestion of lead-contaminated food, water, and paints[8] [9]. Poisoning due to lead occurs mainly by ingestion of food or water contaminated with lead. However accidental ingestion of contaminated soil, dust or lead based paint may also result in poisoning[10]. Traditional medicines were

also found to contain heavy metals including lead. A number of diseases have been reported due to consumption of traditional medicine[11]. Ayurvedic medicines are considered to be heavily contaminated with heavy metals. In one recent study the blood lead levels were evaluated in consumers of ayurvedic medicines. Of the 115 participants 40% were found to have an elevated blood lead levels of 10 µg/dL or above and 9.6% had blood lead levels above 50 µg/dL [12][14]. Recently a patient taking Chinese folk remedies was reported to suffer from dysplastic changes in erythroid precursors due to lead poisoning [13][14].Lead toxicity may be caused through fruits and vegetables contaminated with high lead levels from the soils where they were grown. The soil accumulates lead levels generally from pipes, lead paint and residual emissions from leaded gasoline that was used before the Environment Protection Agency issued the regulation around 1980. In order to prevent the general population from domestic lead poisoning, it is necessary to educate people about the major sources of lead poisoning[14]. Lead from water pipes coming into homes is one of the major sources [15].

Sources of lead in environment

Potential For Human Exposure

Lead is thought to be quickly absorbed in the blood stream and is believed to have adverse effects on certain organ systems like the central nervous system, the cardiovascular system, kidneys, and the immune system [10]. The nervous system is the most vulnerable target of lead poisoning. Headache, poor attention spam, irritability, loss of memory and dullness are the early symptoms of the effects of lead exposure on the central nervous system (CNS)[2]. Morever, the absorption of lead occurs more quickly in children than in adults. Children, due to their childish behaviour, are more prone to ingest and inhale dust contaminated with lead[16] . Anemia may develop with Pb poisoning via the inhibition offerrochelatase and δ-aminolevulinic acid dehydratase (ALAD), the two of many enzymes involved in heme biosynthesis. The inhibition of ferrochelatase and ALAD by lead decreases heme synthesis which leads to anemia[17][24]. Exposure to lead is of special concern among women particularly during pregnancy. Lead absorbed by the pregnant mother is readily transferred to the developing fetus[2] [18]. Human evidence linking preferential exposure to Pb with reduced birth weight and preterm delivery [19], and with neuro-developmental abnormalities in offspring [20]. Several antioxidant molecules such as GSH and GSSG as well as antioxidant enzymes including SOD, CAT, GPx, and glutathione reductase (GR) may have fluctuations due to Pb exposure and consequent oxidative stress. Pb has high affinity to the reactive –SH group of GSH and is able to decrease the GSH levels. GPx, CAT, and SOD are metalloproteins that their antioxidant functions to detoxifying free radicals could be affected due to Pb exposure. Lead can induce oxidative damage in different organs via direct effect on membrane lipid peroxidation and reducing

antioxidant parameters [21][22][24]. The pulmonary function tests (PFT) and respiratory symptoms in 108 battery manufacturingworkers and 100 control subjects were evaluated. The lead concentrations in serum and urine of workers were significantly higher while the PFT values were significantly lower than the control group. In addition, the frequencies of respiratory symptoms including chest tightness (26%), cough (17%), and sputum (16%) were significantly higher in battery manufacturing workers compared to the control group [23][24].

Mechanism Of Lead Toxicity:

One of the major mechanisms by which lead exerts its toxic effect is through biochemicalprocesses which include lead's ability to inhibit or mimic the actions of calcium and to interactwith proteins [8] [2]. Following exposure to lead, the element is absorbed into and transported by the bloodstream to other tissues. Once absorbed, lead accumulates in three compartments: blood, soft tissues, and bone. In blood, approximately 99% of the lead is found in the erythrocytes, leaving about 1% in the plasma and serum [25][32]. The concentration of lead in plasma is more significant than that in whole blood as the means of distribution to target organs, i.e. brain, lungs, spleen, renal cortex, aorta, teeth, and bones [26][27]. The kinetics of lead transfer from blood to soft tissues is low and takes approxi-mately 4 to 6 weeks [26]. Lead in blood has an estimated half- life of 35 days [28], in soft tissue 40 days [29], and in bones 20 to 30 years [30]. The biological half-life of lead may be considerably longer in children than in adults [29]. The initial distribution of lead through- out the body is dependent on blood flow to the tissues. More than 95% of lead is deposited in skeletal bone as in- soluble phosphate [26]. Within the skeleton, lead is incorporated into the mineral in place of calcium. Lead binds to biological molecules and thereby interfering with their function by a number of mechanisms. Lead binds to sulfhydryl and amide groups of enzymes, altering their configuration and diminishing their activities. Lead may also compete with essential metallic cations for binding sites, inhibiting enzyme activity, or altering the transport of essential cations such as calcium [16] [31].The adverse effects of lead appear even with blood concentrations as low as 10 µg/dl. The best understood toxic effects of lead involve heme synthesis, as lead inhibits three impor-tant enzymes participating in the process, i.e. delta aminole-vulinic acid dehydratase, delta aminolevulinic acid synthase,and ferrochelatase [33]. It is suggested that the inhibition ofdelta aminolevulinic acid dehydrates starts at values as lowas 5 µg/dl. At higher lead concentrations this inhibition is very pronounced, reaching 50% inactivation at blood lead levels of 16 µg/dl and 90% inactivation at 55 µg/dl, resulting in the accumulation of delta aminolevulinic acid in plasma and its excretion in urine. Because this enzyme is normally present in great quantities, the inhibition of its activity may pass unnoticed [33][34]. Ferrochelatase is the enzyme that catalyzes the incorporation of iron into the porphyrin ring. If, as a result of lead toxicity, the enzyme is inhibited and its pathway is interrupted, or if adequate iron is not available, zinc is substituted for iron, and zinc protoporphyrin concentrations increase. The critical target, however, seems tobe the enzyme's heme synthesis, essential for the insertionof iron into the precursor, protoporphyrin IX [35][36]. The major consequences of this effect, which have been evaluated in both adults and children, are reduction of circulating levels of hemoglobin and the inhibition of cytochromeP 450-dependent phase I metabolism [35]. Lead clearly inhibits normal hemoprotein function in both respects, which results in basophilic stippling of erythrocytes related to clustering of ribosomes and microcytosis when blood lead levelsare 20 µg/dl. Thus microcytic hypochromic anemia is often diagnosed in victims of lead exposure. In vitro and in vivo studies indicated that lead compounds cause genetic damage through various indirect mechanisms that include inhibition of DNA synthesis and repair, oxidative damage, and interaction with DNA-binding proteins and tumor suppressor proteins[16][37].

Treatment Of Lead Poisoning:

It is recommended to frequently wash the children´s hands and also to increase their intake of calcium and iron. It is also recommended to discourage children from putting their hands, which can be contaminated, in their mouth habitually, thus increasing the chances of getting poisoned by lead[38]. The first step is to perform a confirmatory venous lead level assessment. This should be performed immediately if the screening result is >70 µg/dl, within 48 hours if the result is between 45 and 69 µg/dl, within 1 week if the result is 20 to 44 µg/dl, and within 1 month if the result is 10 to 19 µg/dl. If the confi rmatory lead levels are still between 10 and 14 µg/dl, lead level testing should be repeated within 3 months [59]. Chelation therapy may be considered, but is not routinely recommended at blood lead levels of <45 µg/dl [39].

Chelating Agents

1.Dimercaprol (BAL):

Dimercaprol, also known as British Anti-Lewisite (BAL). It increases the urinary excretion of heavy metals through the formation of stable, nontoxic, soluble chelates. BAL lacks stability in water and is administered in an oil solution as a deep intramuscular injection. It was the first chelating agent found to be useful in the treatment of childhood lead poisoning. Despite the high incidence of side effects (fever, allergy), BAL has remained in use for more serious lead poisoning because of concerns that CaNa2EDTA therapy may translocate lead into the central nervous system and increase the potential for encephalopathy. Traditionally, pre-treatment with BAL has been recommended to avoid precipitation of encephalopathy [40].

2.Calcium Disodium EDTA (CaNa2EDTA):

Lead poisoning is generally treated by using chelating salt disodium calcium edentate, which is the calcium chelate of the disodium salt of ethylene-diamine-tetracetic acid (EDTA). Such chelating agents have a great affinity to the removing agent. The chelating agent for lead has a greater affinity to lead than calcium and so the lead chelate is formed by exchange. This is then excreted in urine ,leaving behind harmless calcium. It increases the urinary excretionof lead through the formation of a non-ionizing, soluble chelate. Because the use of CaNa2EDTA may cause increased lead concentration in the central nervous system, it should be administered after BAL is given[40][41].

3.Succimer (2,3-meso-dimercaptosuccinic acid or DMSA)

This is an oral chelation agent that is approved by the United States Food and Drug Administration (FDA) for the treatment of lead poisoning in children and is also effective in adults. It is chemically similar to BAL, but has greater solubility in water, has a high therapeutic index, and is absorbed through the gastrointestinal tract. The recommended doseby the manufacturer is 10 mg/kg three times a day for five days, followed by 10 mg/kg twice a day for two weeks. This dose, which has been found to be acceptable in treating some adults, can be quite high for others, especially for heavier adults. Due to the lack of data on adult treatment with DMSA, an adult dose level of 500 mg twice a day for two weeks has also been given as a sensible maximum limit until additional clinical data become available for adults [40].A new technique called nano-encapsulation of antioxidants may provide improved biodistribution and bioavailability of poorly soluble therapeutics through solubilisation . Encapsulation of curcumin in a pluronic block copolymer demonstrated a slow and sustained release of curcumin and showed anticancer activity comparable with free curcumin (42).

Conclusion:

In this review we summarized sources , effect and treatment of lead poisoning.Failure in heavy metal exposure can cause adverse effect on living organism and surrounding environment .Potential health hazard of lead poisoning still exist and are increased due to lack if knowledge regarding dangerous for working with lead. Lead toxicity is significant and preventable health problem. Large population screening based studies are needed to find strategies to control harmfull effect of metal toxicity. Chelation theory has contributed in reduction of mortality for acute lead encephalopathy and chronic renal damage.

References:

1. Fergusson JE, editor. The Heavy Elements: Chemistry, Environmental Impact and Health Effects. Oxford: Pergamon Press; 1990. [Google Scholar]
2. Paul B Tchounwou, Clement G Yedjou, Anita K Patlolla, Dwayne J SuttonNIH-RCMI Center for Environmental Health, College of Science, Engineering and Technology,Jackson State University, 1400 Lynch Street, Box 18750, Jackson, MS 39217, USA.
3. Duffus JH. Heavy metals-a meaningless term? Pure Appl Chem. 2002; 74(5):793–807.
4. Florea A-M, Dopp E, Obe G, Rettenmeier AW. Genotoxicity of organometallic species. In: Hirner AV, Emons H, editors. Organic Metal and Metalloid Species in the Environment: Analysis, Distribution, Processes and Toxicological Evaluation. Heidelberg: Springer-Verlag; 2004. pp. 205-219
5. Monisha J, Tenzin T, Naresh A, Blessy BM, Krishnamurthy NB. Toxicity, mechanism and health effects of some heavy metals. Interdisciplinary Toxicology. 2014;7(2):60-72
6. Sharma P, Dubey RS, Lead toxicity in plants,Brazilian Journal of Plant Physiology, 2005, 17;1:35–52.
7. Jacobs DE, Clickner RP, Zhou JY, et al. The prevalence of lead-based paint hazards in U.S. housing. Environ Health Perspect. 2002, 110:A599–A606.
8. Agency for Toxic Substances and Disease Registry (ATSDR. Public Health Service. Atlanta: U.S. Department of Health and Human Services; 1999. Toxicological Profile for Lead.

9. Agency for Toxic Substances and Disease Registry (ATSDR). Case Studies in Environmental Medicine - Lead Toxicity. Atlanta: Public Health Service, U.S. Department of Health and Human Services; 1992.
10. Bergeson LL. (2008). The proposed lead NAAQS: Is consideration of cost in the clean air act's future?. Environmental Quality Management 18: 79–84
11. Karri SK, Saper RB, Kales SN. (2008). Lead Encephalopathy Due to Traditional Medicines. Curr Drug Saf 3: 54–9
12. Breeher L, Mikulski MA, Czeczok T, Leinenkugel K, Fuortes LJ. (2015). A cluster of lead poisoning among consumers of Ayurvedic medicine. Int J Occup Environ Health. Apr 6:2049396715Y0000000009. [Epub ahead of print].
13. Lv C, Xu Y, Wang J, Shao X, Ouyang J, Li J. (2015). Dysplastic changes in erythroid precursors as a manifestation of lead poisoning: report of a case and review of literature. Int J Clin Exp Pathol 8: 818–23.
14. Ab L atif WANI 1, Anjum ARA 1, Jawed Ahmad USMANI 2
    a. Section of Genetics, Department of Zoology, Faculty of Life Science, Aligarh Muslim University, Aligarh, Utter Pradesh, India
    b. Department of Forensic Medicine, Faculty of Medicine, Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh, Utter Pradesh, India
15. Moore MR. (1977). Lead in drinking water in soft water areas--health hazards. Sci Total Environ 7: 109–115.
16. Landrigan PJ, Schechter CB, Lipton JM, Fahs MC, Schwartz J. (2002).Environ-mental pollutants and disease in American children. Environ Health Perspect 110: 721–8.17. Mense, S. M., and Zhang, L. (2006). Heme: a versatile signaling molecule controlling the activities of diverse regulators ranging from transcription factors to MAP kinases. Cell Res. 16 (8), 681–692. doi:10.1038/sj.cr.7310086 .
17. Ong CN, Phoon WO, Law HY, Tye CY, Lim HH (1985) Concentrations of lead in maternal blood, cord blood, and breast milk. Arch Dis Child 60, 756-759
18. Andrews KW, Savitz DA, Hertz-Picciotto I (1994) Prenatal lead exposure in relation to gestational age and birth weight: a review of epidemiologic studies. Am J Ind Med 26:13-32
19. Huel G, Tubert P, Frery N, Moreau T, Dreyfus J (1992) Joint effect of gestational age and maternal lead exposure on psychomotor development of the child at six years. Neurotoxicol 13, 249-254
20. Gurer-Orhan, H., Sabır, H. U., and Özgünes¸ H. (2004). Correlation between clinical indicators of lead poisoning and oxidative stress parameters in controls and lead-exposed workers. Toxicol. 195 (2-3), 147–154. doi:10.1016/j.tox.2003.09.009
21. Kasperczyk, S., Birkner, E., Kasperczyk, A., and Kasperczyk, J. (2005). Lipids, lipid peroxidation and 7-ketocholesterol in workers exposed to lead. Hum. Exp. Toxicol. 24 (6), 287–295. doi:10.1191/0960327105ht528oa
22. Khazdair, M. R., Boskabady, M. H., Afshari, R., Dadpour, B., Behforouz, A., Javidi, M., et al. (2012). Respiratory symptoms and pulmonary function testes in lead exposed workers. Iran. Red Crescent Med. J. 14 (11), 737. doi:10.5812/ircmj. 4134.
23. Mahdi Balali-Mood 1, Kobra Naseri 1, Zoya Tahergorabi 1, Mohammad Reza Khazdair 2 and Mahmood Sadeghi 1
    a. Medical Toxicology and Drug Abuse Research Center, Birjand University of Medical Sciences, Birjand, Iran,
    b.Cardiovascular Disease Research Center, Birjand University of Medical Sciences, Birjand, Iran
24. Flora SJS, Saxena G, Gautam P, Kaur P, Gill KD. Lead induced oxidative stress and alterations in biogenic amines in different rat brain regions and their response to combined administration of DMSA and MiADMSA. Chem Biol Interac. 2007; 170:209–220.
25. Philip AT, Gerson B. Lead poisoning – Part I. Clin Lab Med,1994; 14: 423–44.
26. Skerfving S, Nilsson U, Schutz A, Gerhardsson L: Biological monitoring of inorganic lead. Scand J work Environ. Health, 1993; 19(Suppl.1): 59–64.
27. Roberts JR, Reigart JR, Ebeling M, Hulsey TC: Time required for blood mlead levels to decline in nonchelated children. J Toxicol Clin Toxicol, 2001; 39: 153–60
28. Guidelines for drinking water quality, 2nd ed. Vol. 2. Health criteria and other supporting information. Geneva, World Health Organization, 1996; 254–75
29. Rabinowitz MB, Wetherill CW, Kopple JD: Kinetic analysis of lead me-tabolism in healthy humans. J Clin Invest, 1976; 58: 260–70
30. Flora SJS, Saxena G, Gautam P, Kaur P, Gill KD. Lead induced oxidative stress and alterations in

biogenic amines in different rat brain regions and their response to combined administration of DMSA and MiADMSA. Chem Biol Interac. 2007; 170:209–220.

31. Nikolas C. Papanikolaou1, Eleftheria G. Hatzidaki2 , Stamatis Belivanis2,3 , George N. Tzanakakis4 , Aristidis M. Tsatsakis 3
    a.Venizelion General Hospital of Heraklion, Heraklion, Crete, Greece
    b.University General Hospital of Heraklion, Heraklion, Crete, Greece
    c. Center of Toxicology Science and Research, School of Medicine, University of Crete, Heraklion, Crete, Greece
    d.Department of Histology, School of Medicine, University of Crete, Heraklion, Crete, Greece
32. Piomelli S: Childhood lead poisoning. Pediatr Clin N Am, 2002; 49:1285–304,vii
33. Hernberg S, Nikkanen J, Mellin G et al: Delta-aminolevulinic acid dehydrase as a measure of lead exposure. Arch Environ Health, 1970; 21:140–45
34. Alvares AP, Fischbein A, Sassa S et al: Lead intoxication: effects on cytochrome P 450 mediated hepatic oxidations. Clin Pharmacol Ther,1976; 19: 183–90
35. Philip AT, Gerson B: Lead poisoning-Part II. Effects and assay. Cin Lab Med, 1994; 14: 651–70
36. Roy N, Rossman T. Mutagenesis and comutagenesis by lead compounds. Mutat Res. 1992; 298:97–103. [PubMed: 1282217]
37. Baselt RC. (2008). Disposition of Toxic Drugs and Chemicals in Man (8th ed.).Biomedical Publications. pp. 823–6.
38. Treatment guidelines for lead exposure in children: American Academy of Pediatrics, Committee on Drugs. Pediatrics, 1995; 96: 155–60
39. Treatment guidelines for lead exposure in children: American Academy of Pediatrics, Committee on Drugs. Pediatrics, 1995; 96: 155–60
40. Rogan WJ, Dietrich KN, Ware JH, Dockery DW, Salganik M, Radcliffe J, Jones RL, Ragan NB, Chisolm JJ Jr, Rhoads GG. (2001). The effect of chelation therapy with succimer on neuropsychological development in children exposed to lead. N Engl J Med 344(19): 1421–1426
41. Flora G, Gupta D, Tiwari A. (2012). Toxicity of lead: A review with recent updates. Interdiscip Toxicol 5: 47–58.

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A REVIEW ON NANOMATERIALS IN COSMECEUTICALS

Urusa Ansari[1], Seema I. Habib[2], Tahreem Momin[3], Naheed Azam[4]
Department of Chemistry, G.M.Momin Women's College, Bhiwandi.
[1]ansariurusa27@gmail.com, [2]seemahabib12@gmail.com
[3]tahreem811@gmail.com, [4]naheedazam63@gmail.com

Abstract

One of the most evergrowing and extensively broad commercial sector's inudtry is Cosmeceutical industry. The cosmetics industry is growing day by day with its high demand and applications, increasing demand lead pressure on its manufacturers to invent newer methods of production to acquire consumers needs and satisfaction with desireable and effective products. For such reasons Nanotechnology and nanomaterials are applied because of its promising properties that can be suitably applied in cosmetic products such as skin care products (moisturizer, lotions, creams, etc.), hair care products (shampoo, conditioner), and other cosmetics products that have been discussed below. Nanomaterial such as Liposome, Nanoemulsion**,** Microemulsions (micelles), Nanocrystals, Gold and Silver Nanoparticals, Inorganic Nanoparticles, Silica (SiO2) are extensively being used in cosmetics. Their occurrence,properties, uses and safety aspects has been discussed in this review article.

Keywords:Liposome, Nanoemulsion**,** Microemulsions (micelles), Nanocrystals, Gold and Silver Nanoparticals, Inorganic Nanoparticles, Silica (SiO2) and safety consideration.

Introduction

Over 4000 years ago, prehistoric Egyptians, Greeks and Roman researchers were making use of nanotechnology in hair dye preparations[1]. From 1959 onwards, the concept of nanotechnology came into existence in different fields of sciences like biology, physics, chemistry, and engineering[2,3] EU Directive 76/768/EWG defines cosmetics as follows: "*A 'cosmetic product' shall mean any substance or mixture intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odours and/ or protecting them or keeping them in good condition*"[4,5].

In an attempt to satisfy the ever growing desire of consumers to look beautiful and remain youthful, the sphere of cosmetics (through its manufacturers and researchers) has imbibed nanotechnology for its potentials and is expanding its frontiers rapidly yet steadily. Dendrimers, cubosomes, nanoemulsions are good examples of nanoform particles employed in cosmetics as an application of nanotechnology in the science of cosmetics formulation and manufacture [6,7]. The prefix "Nano" from nanotechnology is a Greek word: "Nanos" – which means "little old man or dwarf". Nanotechnology is a powerful new technology in which a material is reconstructed or engineered at an atomic and molecular level. One nanometer (nm) is one billionth, or 10−9 of a meter. According to the definition of National Nanotechnology Initiative in the US, the scale range of nanomaterial is 1 to 100 nm[8]. As nanoparticles are smaller in size, so, they exhibit different physiochemical properties[9,10] The cosmetics industry is always looking to improve the properties of its products and hence is making more and more use of the developments in nanotechnology. Nanomaterials are used in the manufacture of cosmetics in two important areas: as "encapsulation or carrier systems" to transport agents to deeper skin layers, and as optimal UV protective filters in sunscreens. According to the manufacturers other nanoscale materials can be found in cosmetic products such as nanoparticulate gold and silver, ceramic nanoparticles, pigments, minerals and fullerenes[5,11].

The Use Of Different Nanomaterial In Cosmetis.

The cosmetics industry therefore uses nanodispersion "encapsulation or carrier systems", so that agents penetrate into deeper skin layers where they activate skin metabolism with the aim of improving the skin's appearance. The functions and benefits of these "encapsulation and carrier systems" are:

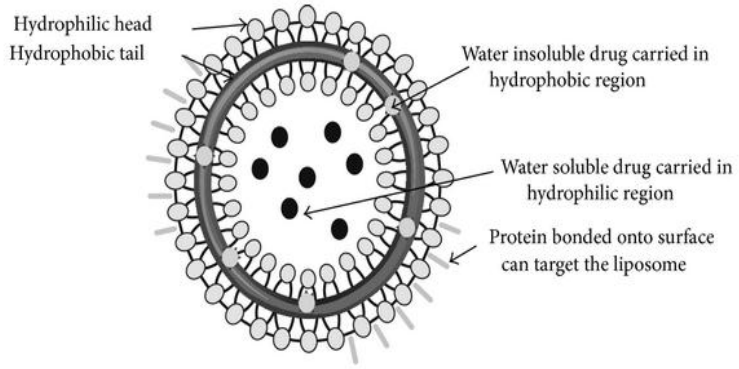
- the controlled release and optimisation of the availability of cosmetic agents in certain skin layers
- the protection of sensitive agents
- longer shelf life and hence greater product effectiveness
- a reduction in the amount of agents and additives used in products

They include liposomes, nanoemulsions, microemulsions (micelles)[5,12]

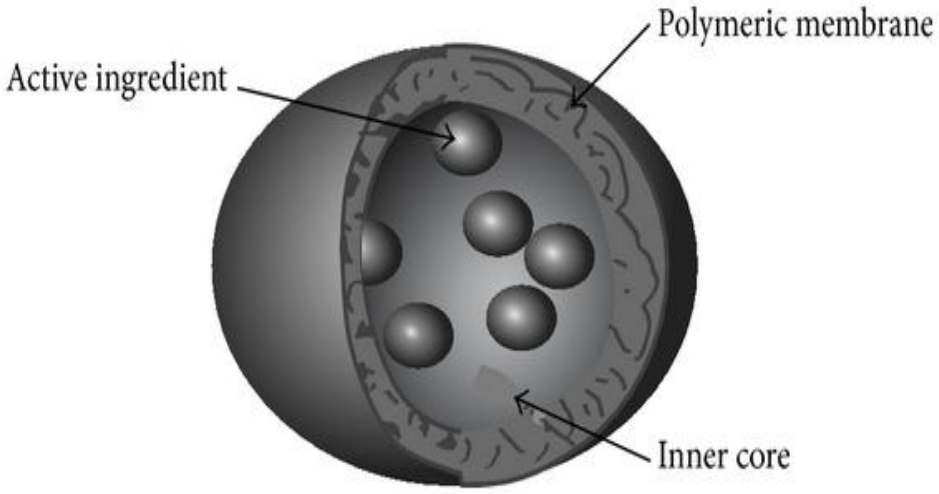
Liposomes

Liposome size ranges from 30 nm to several micrometers. Liposomes of natural or synthetic phospholipids are similar to those in cellular plasma membranes. This explains their biocompatibility, biodegradability, nontoxicity, and being flexible vesicles are readily utilized by the cells [7,13] Liposomes are used in a variety of cosmeceuticals because they are biocompatible, biodegradable, nontoxic, and flexible vesicles and can encapsulate active ingredients easily. Liposomes have an ability to protect the encapsulated drug from external environment and are suitable for delivery of hydrophobic and hydrophilic compounds.These characteristics make them ideal candidate for the delivery of vitamins and other essential molecules to regenerate the epidermis. One of the main ingredients of liposome is Phosphatidylcholine which has been used in skin care products (moisturizer, lotions, creams, etc.) and hair care products (shampoo, conditioner) due to its softening and conditioning properties. Several active ingredients (e.g., vitamins A, E, and K) and antioxidants (e.g., Carotenoids, lycopene, and CoQ10) have been incorporated into liposomes which increases their physical and chemical stability when dispersed in water. Liposomes fuse with the skin's barrier layer thus increasing the membranes' permeability locally and allowing the agents to penetrate into deeper skin layers[5,20].

Lipophilic compounds such as cholesterol and ceramides have been used in topical skin creams for many years, because they are the lipids found in normal skin tissue, and are easily incorporated into liposomes to improve skin hydration and to make the skin texture softer and smoother. "Capture" was the first liposomal antiageing cream launched by Dior in 1986[7,14,15,16,17].



(a)



(b)

Figure:1

Different types of nanoparticles. (a): liposome showing a phospholipid bilayer surrounding an aqueous interior[18], (b): nanocapsule with different drug-loading modalities [19]

Nanoemulsion

The term "Nanoemulsion" refers to a thermodynamically stable and isotropically clear dispersion of two immiscible liquids, as mentioned in the definition of emulsions in general. The difference is the size; a nanoemulsion is considered to be a thermodynamically or kinetically stable liquid dispersion of an oil phase and a water phase in combination with a surfactant. The dispersed phase typically comprises small particles or droplets, with a size range of 5 nm-200 nm, and has very low oil/water interfacial tension. [21,22]

Properties Of Nanoemulsions:

Nanoemulsions have many interesting properties that are different from those of larger scale emulsion systems. The most distinguishing properties and advantages are listed below:

1. The dispersed phase have a size range of 5 nm-200 nm, and have a very low oil/water interfacial tension. Because the droplet size is less than 25% of the wavelength of visible light, Nanoemulsions are transparent. [21,22] Ultraviolet–visible spectroscopy of nanoemulsions.
2. Nanoemulsions do not show the problems of inherent creaming (gravitationally driven Creaming), flocculation, coalescence, and sedimentation, which are commonly associated with macroemulsions [21,23].
3. Nanoemulsions have a much more higher surface area and free energy than macro emulsions that maket hem an effective transport system[21,24].
4. Nanoemulsions can be formulated in variety of formulations, it is possible to produce non-toxic and non-irritant formulations, hence they can be easily applied to skin and mucous membranes and they can be produced as foams, creams, liquids, and sprays[21].

NEs have recently become increasingly important as potential vehicles for the controlled delivery of cosmetics and for the optimized dispersion of active ingredients in particular skin layers. Due to their lipophilic interior, NEs are more suitable for the transport of lipophilic compounds than liposomes. Similar to liposomes, they support the skin penetration of active ingredients and thus increase their concentration in the skin. Another advantage is the small sized droplet with its high surface area allowing effective transport of the active to the skin.[23] Companies that manufacture these products claim that nanoemulsions can transport beneficial compounds deep into the skin in high concentrations. For example La Praire's product the Dollars 500 skin caviar in-tensive ampoule treatment uses this technology to deliver the functional ingredients into the skin at their site of action quicker to effect the claims of the product which is to minimize uneven skin pigmentation, remove lines and wrinkles[7].

Microemulsions (Micelles)

Microemulsions are a mixture of oil, water and a synthetic emulsifying agent (tenside). When a tenside is dissolved in water, dropletshaped structures are formed which are called micelles, measuring between approximately 5 and 100 nm in diameter. Micelles enable non-water-soluble agents to be transported to deeper skin layers. The tenside content is mostly a disadvantage in skincare products because it retains its emulsifying properties when applied on the skin and the skin's fatty components can be washed out. In people with very sensitive skin some tensides can cause inflammation of the skin[25]. Skin cleansing products contained microemulsions.

Nanocrystals

Nanocrystals are crystals having size less than 1µm. They are aggregates comprising several hundred to tens of thousands of atoms that combine into a "cluster". Typical sizes of these aggregates are between 10-400 nm [3,26]. Nanocrystals of poorly soluble drugs can also be incorporated in cosmetic products where they provide high penetration power through dermal application. The first cosmetic products appeared on the market recently; Juvena in 2007 (rutin) and La Prairie in 2008 (hesperidin). Rutin and hesperidin are two, poorly soluble, plant glycoside antioxidants that could not previously be used dermally. Once formulated as nanocrystals, they became dermally available as measured by antioxidant effect. The nanocrystals can be added to any cosmetic topical formulation, e. g. creams, lotions and liposomal dispersions [3,27]

Gold And Silver Nanoparticals:

Due to antibacterial properties of silver nanoparticles it can be used as preservatives in cosmetics, and in anti-acne preparation. For example, sil-ver nanoparticles, which have antibacterial activity, are also being incorporated into toothpastes and shampoos as preservatives. Kim et al. observed that silver nanoparticles inhibit the growth of dermatophytes, making them potential anti-infective agent[28,29,30]. Studies with various types of nanoparticles suggest that they may possess antibac- terial and antifungal

properties. Silver nanoparticles have been studied extensively in this regard. The literature suggests that, while the antimicrobial activity of silver nanoparticles may be due to the release of silver ions, it is also possible that they exhibit additional effect that cannot be explained solely by the release of silver ions in solution[31]. Gold and silver nanoparticals are used in cosmetics products(Figure:a) such as deodorants and anti-aging creams. In Europe, the SCCS, due to several major data gaps, has yet to draw any conclusions regarding the safety of colloidal silver in nano form when used in oral and dermal cosmetic products [32,33]. In the USA, cosmetic products cannot claim antibacterial properti es because that claim is based on a physiological function, and therefore it can only be used in drug products an d not in cosmetics [32,34].Kokura et al. [35] studied the use of silver nanoparticles as a preservative in cosmetics, and reported that silver nanoparticles remained stable, without exhibiting sedimentation, for longer than 1 year. In addition, silver nanoparticles showed acceptable preservation efficacy against bacteria and fungi, and did not penetrate human skin [35].Pulit-Prociak et al. [36] studied the application of gold and silver nanoparticles in cosmetic formulations. They reported embedding differences between silver and gold nanoparticles into the structure of a cream. Silver nanoparticles introduced to the cream mixture agglomerate, but gold nanoparticles did not agglomerate after introduction to cream mixtures. They attributed this phenomenon to the greater value of the electrokinetic potential located on the surface of gold nanoparticles. Based on a model dermal membrane study, they have reported concerns over the penetration of nanoparticles into the skin for samples with nanoparticles concentration of 110–200 mg/kg. Due to the complex composition of cosmetic creams, it is not easy to characterize the primary gold nanomaterials in situ [37].Cao et al. [37], developed a practical protocol including separation, quantification, and characterization of gold nanomaterials present in commercially available cosmetic creams.

Title	Publication Number	Publication Date	Applicant
Cosmetic pigment composition containing gold or silver nano-particles	WO2007011103A1	2007–01-25	Korea Research Institute of Bioscience and Biotechnology
Skin lotion comprising aqueous dispersion of ultra-fine noble metal particles	HU0401663A2	2005–09-28	Phild Co., Ltd.
Anti-microbial body care product	US20020122832A1	2002–09-05	Bernhard Hanke
Method for treating human keratin fibers with organomodified metallic particles	US7186274B2	2007–03-06	L'oreal
Formulations including silver nanoparticles and methods of using the same	WO2015057983A1	2015–04-23	University of South Alabama
Colored nanoparticles for cosmetic and its manufacturing method	JP2009221140A	2009–10-01	National Institute Of Advanced Industrial & Technology
Colloidal silver, honey, and helichrysum oil antiseptic composition and method of application	US5785972A	1998–07-28	Tyler; Kathleen A
Toothpaste or tooth gel containing silver nano particles coated with silver oxide	US20130017236A1	2013–01-17	Robert Johnson Holladay

Table: 01 (Gajbhiye and Sakharwade, 2016) [38]

Inorganic Nanoparticles

Inorganic nanoparticles are non-toxic, hydrophilic, biocompatible, and highly stable compared to organic nanoparticles. Their major difference—apart from the aforementioned—is that inorganic nanoparticles are synthesized from inorganic elements (Ag, Au, Ti, etc.), while the organic ones are synthesized from polymers. One of the most widely used inorganic nanoparticles for sunscreens is TiO2, and in nanoscale it has a higher sun protection factor (SPF) which makes it more efficient, and has a better cosmetic result due to its transparency, compared to TiO2 pigment. Oftentimes, in the market, companies use words such as “sheer” or “invisible” when nanoscale TiO2 or ZnO are used. It is reported that nanoscale TiO2 and ZnO show great advantages over many products at larger than nano-dimensions [32,39]. Micro-TiO2 and ZnO are used as ingredients in sunscreens due to their UVA and UVB absorption

capabilities. Nanoparticles of ZnO and TiO2 are also widely used in sunscreens as UV filters [40] starting at the size of 20 nm. They show better dispersion and leave a better cosmetic results.

Silica (Sio2)

Silica nanoparticles have attracted interest from the cosmetic industry, because they show hydrophilic surface favoring protracted circulation and thanks to their low production cost [32,41] It has been indicated that silica nanoparticles may help improve the appearance and distribution of pigments in lipsticks, and prevent pigments from migrating into the fine line of lips [43]. Nano Silica is used to enhance the effectiveness, texture, and shelf-life of cosmetic products. It adds absorbency and acts as an anti-caking agent [42] Silica nanoparticles can be found in leave-on and rinse-off cosmetic products for hair, skin, lips, face and nails, and an increase of silica nanoparticles presence in cosmetic products is anticipated [44]. Results are controversial regarding the safety of silica-based nanoparticles and factors such as size and surface modifications should be taken into account when assessing toxicity [44,45]. Therefore, opinions regarding the use and exposure of silica nanoparticles in cosmetics are still inconclusive, and further long-exposure tests are needed.

Safety Considerations Relating To Nanomaterials

It has emerged from numerous studies that some materials manufactured at the nano-scale show significant deviations in physicochemical properties, interaction with biological systems, and/or toxicological effects, compared to conventional equivalents. For example, nanoparticles (NPs) in the lower nanometre (nm) range may penetrate biological membrane barriers that normally prevent the entry of (larger) particulate materials into cells and tissues (Jani et al., 1990; Geiser and Kreyling 2010; Landsiedel et al., 2012; Treuel et al., 2013; Hougaard et al., 2015; ECHA, 2017b, c; Nakamura and Watano, 2018) [46].

Nanomaterials in cosmetics could have various functions (e.g., UVA and UVB filters in sunscreens, nano-preservatives). The unique characteristics of any given nanomaterial which may lead to the desired function/property of the cosmetic product may also pose a risk to the consumer. With this in mind, a standard safety evaluation of all nanomaterial is necessary, including tests dealing with the nano-characteristics (e.g., penetration into viable skin layers due to their small size as well as inhalation experiments in the case of sprays/powders) [32].

In addition, the potential exposure routes of NMs should be identified, and in vitro and in vivo toxicological data—including studies on dermal penetration and potential inhalation, genotoxicity studies, and possible skin and eye irritation studies—should be conducted. For NMs, in addition to the weight-based concentration of the NM, the concentration should also be given in terms of particle number concentration and surface area. Also, changes in the aggregation and/or degradation/dissolution status of the NM during exposure 16 should be accounted for. Apart from skin exposure, oral exposure—to NMs existing in toothpastes, mouthwashes, and lipsticks—is also possible[32].

As the physicochemical parameters may change in various environments, it is recommended that, as a minimum, characterisation of NMs intended for use in a cosmetic product should be determined at three stages:

- as manufactured (pristine state) to identify the basic NM,
- after addition to the final cosmetic formulation to identify how consumers are exposed, and
- as used for toxicological investigations.

In the case of application in spray products, it is also necessary to determine the concentration of NM in the spray mist released from the container (see section 4). When characterisation of an NM is not feasible at any of these stages, e.g. due to the lack of suitable methods or due to degradation of the NM, this should be justified and documented. It is important to note that environmental impacts of cosmetic ingredients are not considered during safety assessment under the Cosmetic Regulation. They, however, fall under the remit of different regulatory frameworks, such as REACH (EU, 2008)[46].

Conclusion

In recent times Nanotechnology and the use of nanomaterials has gained atmost importance over conventional methods in almost every aspect of life because of their wide application in scientific reseach and human life. Invention of nanomaterials such as Nonocrystals, nanoemulsion, Gold and silver nanoparticals, inorganic nanoparticals silica and much more has inhances the manufacturing, bulk production and application of leading cosmetic products. Also, increasing consumer attraction because of its promising applications such as longer shelf life and hence greater product effectiveness, biocompatible, biodegradable, nontoxic, and flexible vesicles and can encapsulate active ingredients easily. Nanodespersion with the aim of improving the skin's appearance. Inorganic Nanoparticles has a better cosmetic result due to its transparency and show better dispersion. Besides various beneficial applications there are some concerns specially for skin products, apart from skin exposure, oral exposure and certain

physiological behavior of these NM's should be assest so that standard safety evaluated products can reach the consumers at a reasonable cost.

References

[1] Dureja H, Kaushik D, Gupta M, Kumar K, Lather V. Indian J Pharmacol. 2005; 37(3):155-159

[2] Bangale MS, Mitkare SS, Gattani SG, Sakarkar Dm; Int J Pharm Sci, 2012; Vol 4, Issue 2, 88- 97.

[3] Kurapati Srinivas *The current role of nanomaterials in cosmetics* Journal of Chemical and Pharmaceutical Research, 2016, 8(5):906-914

[4] Council Directive dated 27 July 1976 on the approximation of the laws of the member states relating to cosmetics (76/768/EEC).

[5] Sabine Greßler, André Gazso*, Myrtill Simkó, Ulrich Fiedeler, Michael Nentwich : Austrian Academy of Sciences; legal person under public law (BGBl 569/1921; BGBl I 130/2003); Dr. Ignaz Seipel-Platz 2, A-1010 Vienna

[6] Raj, S., Jose, S., Sumod, U.S. and Sabitha, M. (2012) Nanotechnology in Cosmetics: Opportunities and Challenges. Journal of Pharmacy and Bioallied Science, 4, 186-193. https://doi.org/10.4103/0975-7406.99016

[7] Daniel Ekpa Effiong1*, Timma Otobong Uwah1, Edidiong Udofa Jumbo2, Akwaowo Elijah Akpabio3 Effiong, D.E., Uwah, T.O., Jumbo, E.U. and Akpabio, A.E. (2020) Nanotechnology in Cosmetics: Basics, Current Trends and Safety Concerns—A Review. Advances in Nanoparticles, 9, 1-22. https://doi.org/10.4236/anp.2020.91001

[8] Article 2(k) of provisional text for EU Cosmetics Regulation, 2009http:/ /www.europarl.europa.eu/sides/getdoc.do?tye=TA&language=EN&reference=P6- TA-2009-0158.

[9] U.S. Food and Drug Administration, "Cosmetics Q&A: FDA's Authority," http://www.fda.gov/Cosmetics/ResourcesForYou/ Consumers/CosmeticsQA/ucm135709.htm

[10] Kurapati Srinivas *The current role of nanomaterials in cosmetics* Journal of Chemical and Pharmaceutical Research, 2016, 8(5):906-914

[11] www.nanotechproject.org.

[12] For an overciew of encapsulation and carrier systems (liposomes, nanoemulsions, microemulsions) see: www.dermaviduals.de/ deutsch/publikationen/spezielle-wirkstoffe/ (accessed on 16.10.08) Dr. Hans Lautenschläger, Kosmetik Konzept KOKO GmbH & Co KG.

[13] Singh, A.K. (2016) Introduction to Nanoparticles and Nanotoxicology. In: Engineered Nanoparticles, Academic Press, Boston, 1-18. https://doi.org/10.1016/B978-0-12-801406-6.00001-7

[14] I. P. Kaur and R. Agrawal, "Nanotechnology: a new paradigm in cosmeceuticals," *Recent Patents on Drug Delivery & Formulation*, vol. 1, no. 2, pp. 171–182, 2007.View at: Google Scholar

[15] D. D. Lasic, "Novel applications of liposomes," *Trends in Biotechnology*, vol. 16, no. 7, pp. 307–321, 1998.View at: Publisher Site | Google Scholar

[16] Alka, L., Anurag, V., Himanshi, J., Niti, Y. and Neha, K. (2014) NanotechnologyBased Cosmeceuticals. ISRN Dermatology, 2014, Article ID: 843687. https://doi.org/10.1155/2014/843687

[17] C. C. Müller-Goymann, "Physicochemical characterization of colloidal drug delivery systems such as reverse micelles, vesicles, liquid crystals and nanoparticles for topical administration," *European Journal of Pharmaceutics and Biopharmaceutics*, vol. 58, no. 2, pp. 343–356, 2004.View at: Publisher Site | Google Scholar

[18] P. Ekambaram, A. A. H. Sathali, and K. Priyanka, "Solid lipid nanoparticles: a review," *Scientific Reviews & Chemical Communications*, vol. 2, pp. 80–102, 2012.

[19] D. Bei, J. Meng, and B.-B. C. Youan, "Engineering nanomedicines for improved melanoma therapy: progress and promises," *Nanomedicine*, vol. 5, no. 9, pp. 1385–1399, 2010.

[20] Phospholipids, such as phosphatidylcholin (lecithin) as used in cosmetics, regulate cell metabolism of the skin and have an effect on softness and suppleness. They also regulate the skin's pH value and have a greasing effect.

[21] Sinan Özgün "Nanoemulsions in Cosmetics" ; Anadolu University, MatS&E Dept. Research Gate.

[22] Devarajan V., Ravichandran V., Nanoemulsions: As Modified Drug Delivery Tool, International Journal of Comprehensive Pharmacy, 2, 4, (2011).

[23] Sharma S., Sarangdevot K., Nanoemulsions for Cosmetics, IJARPB , 1(3), 408-415, (2012).
[24] Shah P., Bhalodia D., Shelat P., Nanoemulsions: A Pharmaceutical Review, Sys. Rev. Pharm. 1, 1, 24-32, (2010).
International Journal of Comprehensive Pharmacy, 2, 4, (2011)
[25] Emulgatoren – Alternativen gesucht. Kosmetik Konzept KOKO GmbH & Co KG, Dr. Hans Lautenschläger, www.dermaviduals.com (Accessed 13.10.08).
[26] Lademann J, Weigmann HJ, Rickmeier CH, et al. Skin Pharmacol Appl Skin Physiol. 1999; 2:247–256.
[27] SCCNFP Brussels, Belgium: European Commission; 2000. Opinion of the Scientific Committee on Cosmetic Products and Non-Food Products Intended for Consumers Concerning Titanium Dioxide. URLhttp://ec.europa.eu/health/ph_risk/ committees/04_scp/04_sccp_en.htm
[28] Gajbhiye, S. and Sakharwade, S. (2016) Silver Nanoparticles in Cosmetics. Journal of Cosmetics, Dermatological Sciences and Applications, 6, 48-53. http://dx.doi.org/10.4236/jcdsa.2016.61007
[29] Kim, K.-J. (2008) Antifungal Effect of Silver Nanoparticles on Dermatophytes. Journal of Microbiology and Biotech-
nology, 18, 1482-1484.
[30] Noorbakhsh, F. (2011) Antifungal Effects of Silver Nanoparticle Alone and with Combination of Antifungal Drug on Dermatophyte Pathogen Trichophyton Rubrum. International Conference on Bioscience, Biochemistry and Bioinfor-matics IPCBEE, 5, 364-367.
[31] Mukherji, S., et al. (2012) Nano-Antimicrobials Progress and Prospects. In: Cioffi, N. and Rai, M., Eds., 226.
[32] Georgios Fytianos 1,2,* , Abbas Rahdar 3 and George Z. Kyzas 1,Review Nanomaterials in Cosmetics: Recent Updates Nanomaterials 2020, 10, 979; doi:10.3390/nano10050979 http://www.mdpi.com/journal/nanomaterials
[33]SCCS. Opinion on Colloidal Silver (Nano). Available online: https://ec.europa.eu/health/sites/health/files/ scientific_committees/consumer_safety/docs/sccs_o_219.pdf (accessed on 14 April 2020)
[34] Katz, L.M.; Dewan, K.; Bronaugh, R.L. Nanotechnology in cosmetics. Food Chem. Toxicol. 2015, 85,127–137.[CrossRef] [PubMed]
[35] Kokura, S.; Handa, O.; Takagi, T.; Ishikawa, T.; Naito, Y.; Yoshikawa, T. Silver nanoparticles as a safe preservative for use in cosmetics. Nanomed. Nanotechnol. Biol. Med. 2010, 6, 570–574. [CrossRef] Nanomaterials 2020, 10, 979 15 of 16
[36] Pulit-Prociak, J.; Grabowska, A.; Chwastowski, J.; Majka, T.M.; Banach, M. Safety of the application of nanosilver and nanogold in topical cosmetic preparations. Colloids Surf. B Biointerfaces 2019, 183, 110416. [CrossRef]
[37] Cao, M.; Li, J.; Tang, J.; Chen, C.; Zhao, Y. Gold nanomaterials in consumer cosmetics anoproducts: Analyses, characterization, and dermal safety assessment. Small 2016, 12, 5488–5496. [CrossRe
[38] Wei Ting Jess Ong, Kar Lin Nyam,Evaluation of silver nanoparticles in cosmeceutical and potential biosafety complications, Saudi Journal of Biological Sciences,Volume 29, Issue 4,2022,Pages 2085-094, ISSN 1319-562X,https://doi.org/10.1016/j.sjbs.2022.01.035. (https://www.sciencedirect.com/science/article/pii/S1319562X22000353)
[39] Cornier, J.; Keck, C.; Voorde, M. Nanocosmetics from Ideas to Products: From Ideas to Products; Springer: Berlin/Heidelberg, Germany, 2019
[40] Raj, S.; Jose, S.; Sumod, U.S.; Sabitha, M. Nanotechnology in cosmetics: Opportunities and challenges.J. Pharm. Bioall. Sci. 2012, 4, 186–193. [CrossRef]
[41] Nafisi, S.; Schafer-Korting, M.; Maibach, H.I. Measuring silica nanoparticles in the skin. In Agache's Measuring the Skin; Humbert, P., Fanian, F., Maibach, H., Agache, P., Eds.; Springer: Cham, Switzerland, 2017.
[42] Is It Safe to Use Cosmetics Containing Silica in Nanoform? Available online: https://ec.europa.eu/health/ sites/health/files/scientific_committees/docs/citizens_nanosilica_en.pdf

(accessed on 14 April 2020).
[43] Poland, C.A.; Larsen, P.B.; Read, S.A.K.; Varet, J.; Hankin, S.M.; Lam, H.R. Assessment if Nano-EnabledTechnologies in Cosmetics; The Danish Environmental Protection Agency: Copenhagen, Denmark, 2016.
[44] Mebert, A.M.; Baglole, C.J.; Desimone, M.F.; Maysinger, D. Nanoengineered silica: Properties, applications and toxicity. Food Chem. Toxicol. 2017, 109, 753–770. [CrossRef] [PubMed]
[45] Park, Y.-H.; Kim, J.N.; Jeong, S.H.; Choi, J.E.; Lee, S.-H.; Choi, B.H.; Lee, J.P.; Sohn, K.H.; Park, K.L.; Kim, M.-K. Assessment of dermal toxicity of Nanosilica using cultured keratinocytes, a human skin equivalent model and an in vivo model. Toxicology 2010, 267, 178–181. [CrossRef]
[46] GUIDANCE ON THE SAFETY ASSESSMENT OF NANOMATERIALS IN COSMETICS Scientific Committee on Consumer Safety European Union, 2020 ISSN 1831-4767 Doi: 10.2875/40446 ISBN 978-92-76-15271-2 EW-AQ-20-012-EN-N

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DETECTION OF PB(II) IN SOIL SAMPLE USING ELECTROCHEMICAL SENSORS

Laxmishree S. Chengala[1], Seema I. Habib[2], Naheed Azam[3]
*Department of Botany and Department of Chemistry
G.M. Momin Women's College, Bhiwandi
Email: - claxmishree@gmail.com, seemahabib12@gmail.com
Corresponding Author: naheedazam63@gmail.com

Abstract:
The toxicity of metal in the environment is controlled by several parameters including total metal concentration, pH, Organic and Inorganic Ligands. The Lead - Ion Selective Electrode (Pb-ISE) is a method for the analytical determination of Pb(II) in natural matrices. The ISEs are very sensitive, selective and inexpensive analytical tools that can be applied to determine Pb(II) in soil samples due to relatively high limits of detection. In the present work we examine the possibility of using solid contact ISEs in soil analysis combined with a simplified extraction method based on dilute HNO_3 that can be carried out in the field. The concentration of lead is measured by using Pb-ISE and spectrophotometer separately and the results were found to be in good agreement.
Key Words: Toxicity, Pb-ISE, Soil samples, analytical technique

Introduction

Due to rapid industrialization, heavy metals have been excessively released into the environment and have created a major global concern. Metals like Cadmium, Zinc, Copper, Nickel, Lead, Mercury and Chromium are often detected in industrial waste water which originates from metal plating, mining activities, smelting, battery manufacture, tanneries, paints, pigments and pesticides. Agriculture soil, vegetable, fruits are contaminated at high level by these toxic metals. Heavy metals are of great concern in soil pollutants because they can threaten the health of human beings and animals through hydrolysis reaction with highest affinity for soil through hydrolysis reaction. Lead accumulates within the top few centimeters of soil, the presence of mobile forms of Pb indicates toxic risk in the food chain (Brown *et al*., 1994).

There is a need of active monitoring program, consequently a low cost sensitive and selective analytical method can be applied for the analysis of these target species with potential for use in multiple location to map the extent of pollution in the area.

Lead can be detected by several conventional analytical techniques such as atomic absorption spectrophotometry, chromatographic separation, electrochemical techniques etc. Ion Selective Electrodes (ISEs) are the ideal sensors for use in the analysis of industrial and environment sample. ISEs have advantages over other techniques in the field as they are insensitive to sample colour, viscosity or suspended solids and also they give rapid response to changes in determinant concentration. At the same time ISEs are very simple, cheap in developing and relatively higher limits of detection at lower concentrations. In the present work we have taken advantage of electrode technology along with the synthesis of a Pb(II) and Cu(II) sulphides as electroactive material to characterize Pb (II)-ions selective electrode and demonstrated its potential in studying Pb(II) in soil sample (Amman *et al*.1986, Parker *et al*.1984,Sharma *et al*. 2010, Hassan *et al*. 2011).

Materials And Method

Reagents And Equipments

Analytical reagent grade lead nitrate (LOBA) was used without further purification, all the solutions were prepared in double distilled water and solutions of different concentrations were made by serial dilution of the 0.1M stock solution. Equipments used were Potentiometer (EquipTronic-model no.EQ.603), pH meter (EquipTronic-Model no.EQ.614), Spectrometer (Elico-Ltd, Model No.SL159), saturated calomel electrode as reference electrode. All measurement were made at temperature of 30± 1°C.

Preparation Of Electrodes

Membrane incorporating active ingredient, electro active material and plasticizer in varying amount in PVC matrix was synthesized. The solution obtained after complete dissolution of various components was poured on glass ring placed on glass plate. The mixture was allowed to evaporates for 48 hours, a translucent membrane of thickness 0.5mm was obtained, which was then cut into the size of 0.8 cm diameter and fixed to the narrow end of the glass barrel with the help of araldite, then soaked the

electrode in $PbNO_3$ 0.1 mole dm^{-3} solution for 24 hours before taking measurement (Tomar *et al.* 2011, Chandra *et al*. 2014, Mousavi *et al*. 2001, Barzegar *et al*. 2005).

Potential Measurement

All the potential measurements was carried out at 30±1°C. The electro chemical system is presented as follows.

$Hg/HgCl_2$/KCl (Std), Internal solution (1.0×10^{-1}M $Pb(NO_3)_2$ //membrane//test solution /Hg/Hg Cl_2/ KCl (Std). Figure1

Treatment And Analysis Of Soil Sample

Total six soil samples were treated artificially with $Pb(NO_3)_2$ solution, dried, grinded and digested with 100ml 4N HNO_3 for 24 hours to reduce organic matter interference and allow metal ion to enter the solution. Filter the solution using Whatman filter paper No.1., Pb(II) ions were determined using Pb(II) electrochemical sensor (Brown *et al*.1994, Akinola *et al*. 2008).

Results And Discussion

Electrode Response:

The response of electrode was evaluated by taking different concentrations of Pb (II) solutions and by recording the potential using potentiometer in millivolt (mV) value for each solution using the Pb - ISE electrode as indicator electrode and saturated calomel electrode used as a reference electrode. A linear response was obtained in the concentration range 1×10^{-1} to 1×10^{-6} M and the slope of response curve is 27±0.5mV per decade. To check the potency of Pb-ISE lower concentration range in the order of 10^{-5} M was selected for the experimental purpose.

Effect Of pH:

The pH dependence of the potential response of the sensor was studied in the pH range from 2.0-11.0 in the solution of 1.0×10^{-3} M of $Pb(NO_3)_2$. The pH was adjusted using concentrated NaOH and HNO_3. The linear curve obtained in the pH range of 5 -8 clearly indicates that the working pH range of the sensor is between 5and 8 a(Figure2).

Dynamic Response Time:

Dynamic response time is one of the most important factor for ISEs. By changing the solution Pb(II) sensor reaches at equilibrium in less than10 seconds.

Sensitivity of Sensors:

The influence of interfering ions on the response behavior of sensors is usually described in terms of selectively coefficient (kij). The potentiometric selectivity coefficient of Pb(II) sensor was evaluated by mixed solution method.

The sensor response was measured for a series of solutions of varying primary ion activity (ai) and fixed interfering ion activity (aj). The selectivity coefficient (kij) is calculated by using following expression:

$$kij = ai/(aj)^{z/y}$$

The sensor exhibits high performance for Pb(II) over a number of other cations Co^{2+}, Ni^{2+}, Cd^{2+}, Ca^{2+}, Ba^{2+}, Sr^{2+}, Zn^{2+}, Na^{+}, K^{+}, NH_4^{+} do not interfere. (Radu et al. 2007, Ganjali et al. 1998).

Table 1. Characteristic of optimized Pb(II) ion selective electrodes

Properties of the Electrodes	Values
Types of electrode	Heterogenous
Composition	PbS+CuS (2:1)
Conditioning time and concentration	2-3 days, 1.0×10^{-2}M of $Pb(NO_3)_2$ solution
Linear working range	1.0×10^{-1} to 1×10^{-6}M
Slope	27± 0.5mV per Decade
pH	5.0 to 8
detection limit	6.5×10^{-6}M
Life time	6 months

Storage	In 0.01M $Pb(NO_3)_2$ with buffer solution of pH 4.0

Analytical Application

Determination Of Pb(II) Ions In Soil Sample

The Pb(II) ISE was found to work well under the laboratory conditions. It was successfully applied to the determination of Pb (II) in soil samples (Figure 3). It is clear from the values(Table-2) that these were in a good agreement with results obtained by spectrophotometer.

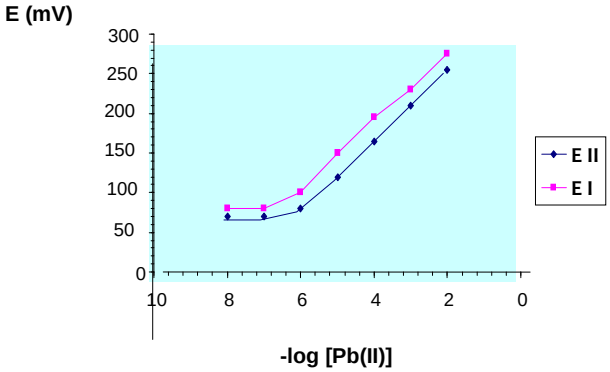


Fig. 1. Calibration Graph of Pb – ISE

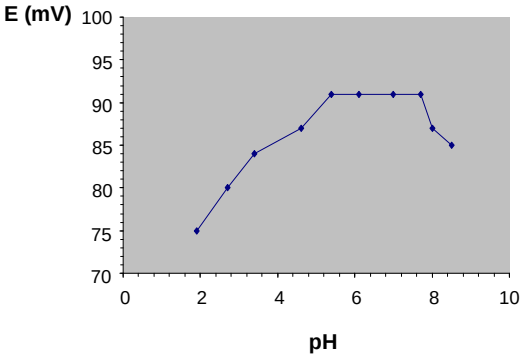
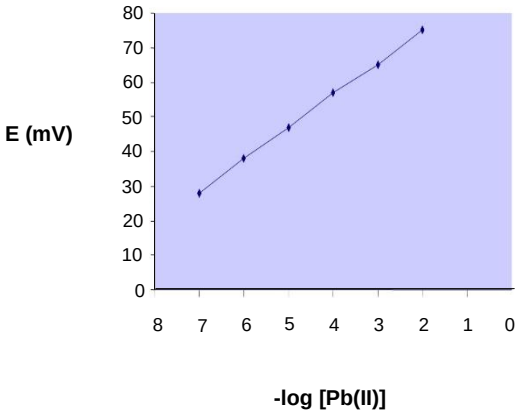


Fig. 2. Effect of pH



Soil Sample	pH found	Pb (II) conc. as determined by the electrodes (mol/dm^{-3})	Pb (II) conc. as determined by spectrophotometer (mol/dm^{-3})
A	6.25	$7.2 \pm 0.1\times10^{-5}$	$7.5\pm0.1\times10^{-5}$
B	6.51	$7.6\pm0.1\times10^{-5}$	$7.7\pm0.1\times10^{-5}$
C	6.43	$7.8\pm0.1\times10^{-5}$	$7.9\pm0.1\times10^{-5}$
D	6.52	$9.6\pm0.1\times10^{-5}$	$9.2\pm0.1\times10^{-5}$
E	6.59	$9.3\pm0.1\times10^{-5}$	$9.1\pm0.1\times10^{-5}$
F	6.45	$9.5\pm0.1\times10^{-5}$	$9.3\pm0.1\times10^{-5}$

Conclusion:

The results obtained from the above mentioned study revealed that a potentiometric heterogeneous based membrane electrochemical sensors can be used to directly determine Pb (II) in the soil analysis for agriculture purpose. The response time of the electrode is quite low and it would be successfully used for 6 months without showing any drift in response. The proposed electrodes can be successfully employed to determine Pb (II) quantitatively in the soil sample.

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References

1. Akinola, M.O, Joku, K.L.N. and Ekeifo, B.E. (2008). .Determination of lead, cadmium and chromium in the tissue of an economically important plant grown around a textile industry at Ibeshe, Ikorodu area of Lagos State, Nigeria. *Advances in Environmental Biology* , 2 (1): 25-30
2. Amman,D.(1986). Ion selective Microelectrodes: Principles, Design and Application, Springer-Verlag, Berlin, 15.
3. Barzegar,M and Sharghi, H.(2005). Application of some recently synthesized 9, 10-anthraquinone derivatives as new class of ionophores responsive to lead (II) ion. *IEEE sensors journals* , 5(3):392-397
4. Brown, S.L, Chaney, R.L, Angle, J.S and Baker, A.J.M. (1994). Phytoremediation potential of *Thlaspi caerulescens* and bladder campion for zinc- and cadmium-contaminated soil. J. Environ. Qual,23: 1151-1157
5. Ganjali, M. R, Rauhollahi, A., Mardan, A.R, Hamzeloo, M, Mogimi, A,and Shamsipur,(1998). Lead ion-selective electrode based on 4' - vinybenzo-15-crown-5 homopolymer. *Microchemical Journal*, 60(2):122-133
6. Gupta, V.K., Mangala, R and Agarwal,S.(2002). Pb(II) selective potentiometric sensor based on 4-tert-butylcalix[4]arene in PVC matrix. *Electroanalysis*, 14(15): 1127–1132
7. Gupta, V.K., Jain, A.K and Kumar, P. (2006). PVC-based membranes of *N*, *N*′-dibenzyl-1, 4, 10, 13-tetraoxa-7, 16-diazacyclooctadecane as Pb(II)-selective sensor. *sensors and Actuators (B)* , 120(1): 259-265
8. Hak- Jin Kin., John, W. Hummel, Kenneth A. Sussuth and Peter, P. Motavalli. (2007). Simultaneous Analysis of soil macronutrients using ion-selective electrodes .*Soil Sci. Soc. Am J*, 71 : 1867-1877
9. Hassan. A. Arida., Ameera. S. Al-haddad and Michael J. Schöning. (2011). New Solid-State Organic Membrane Based Lead-Selective Micro-Electrode. *Int. J. Electrochem. Sci.*, 6 : 3858 - 3867
10. Mousavi, M.F., Barzegar, M.B. and Sahari, S. (2001). A PVC-based capric acid membrane potentiometric sensor for lead (II) ions. *sensors and Actuators (B)*, 73: 199-204
11. .Praveen. Kumar .Tomar., Chandra ,Sand Singh, A. (2011). Development of a new copper (II) ion-selective PVC membrane electrode based on tris (2-benzimidazoly methyl) amine ..*J.Indian Chem.Soc*.88 (11): 1739-1744.
12. Parker, S.P.(1984). Concise Encyclopedia of Science and Technology, MC Graw-Hill, New York.
13. Radu,T. Radu, A., Mcgraw ,C and D. Diamond.(2013). Ion - selective electrodes as simple and inexpensive Detectors for Soil analysis. *J.Serb.Chem.Soc*.78 (11) 1729-1761
14. Sharma, S and. Prasad, F.M.(2010). Accumulation of Lead and cadmium in soil and vegetable crops along Major Highways in Agra (India). *J. chemistry*, 7(4), 1174-1183.
15. Sulekh,C., Parveen Kumar Tomar and Inderjeet Singh.(2014). A new Pb II selective PVC membrane electrode based on tris (2-benzothiazolul-methyl) amine as ionophore .*J. Indian Chem. Soc*, 9: 35-41

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"Introspection, Prognosis and Strategy for global Water Resources, Environment, Agriculture, Science and Technology." With special reference to Sub-Theme "Water Resources and Sustainable Development."

Adv.Rajlaxmi Mandar Sardesai ,Bsc .L.L.M, (M-9421574721)
Assistant Professor,Tukaram Krishnaji Kolekar Arts and Commerce College,
Nesari.Tal- Gadhinglaj,Dist-Kolhapur.
Email- 1) shamikasardesai@gmail.com, 2) rajlaxmisardesai@rediffmail.com

Abstract:

Scientific and industrial development which has taken place rapidly in the last few decades has been so spectacular that it has affected the presence of those factors of the environment which are regarded essential for the well-being of human life.

The Encyclopaedia Britannica define Environment as, "the entire range of external influences acting on an organism, both the physical and biological (in other organisms) forces of nature surrounding an individual."

Change in physical, chemical and biological conditions in the environment is called pollution of the environment.

Global environmental challenges of 21ST century are global warming, toxic waste, water and air pollution, noise pollution, acid rain etc.

'Sustainable development' as defined in the World Commission on Environment and Development Report, means development that meets the needs of the present without compromising ability of future generations to meet their own needs.

The present study is carried out regarding sustainable development by protection of environment and valuable fresh water resources by doctrinal research method. The present paper will use secondary data from various books, law journals and websites.

Introduction:

Water pollution means pollution of bodies of water such as lakes, rivers, seas, oceans as well as ground water. Almost all human activities depend on water. Water is nothing but life of all living things. So, it is the most important thing to protect, preserve and restore the fresh water resources. Environment should not be destroyed for Urban development.

Meaning Of Doctrinal Research: - Doctrinal research involves analysis of case law, arranging, ordering and systematizing legal propositions, and study of legal institutions, but it does more- it creates law and its major tool to do so is through legal reasoning or rational deduction.

Actual Doctrinal Research Is As Follows: -

A) Name Of The Court: - Supreme Court.

B) Name Of The Case With Citation: -

Intellectuals Forum Tirupati Vs State of A.P. & others.
(AIR 2006 SC 1350)

C) Name Of The Panel Of Judges: -

Mrs. Ruma Pal and Dr. AR. Lakshamanan.

D) Brief Facts: -

The appeal is filed by the registered society called, **the Intellectuals Forum**, against the respondents herein. The contesting parties are the **State of Andra Pradesh** represented by its Chief secretary, Tirupathi Urban Development Authority represented by its Vice- Chairman and the A.P. Housing Board represented by its Vice- Chairman and Housing Commissioner.The present case relates to the preservation of and restoration of two tanks, historical in nature being in existence since the time of Srikrishnadevaraya, 1500 A.D. The tanks are called 'Avilala Tank'and 'Peruru Tank'which are situated in suburbs of Tirupathi Town which is a world renowned popular pilgrim centre having every day in-flow of tourists between one lakh to two lakhs.

There was a systematic destruction of percolation, irrigation and drinking water tanks in Tirupati Town, namely, Avilala and Peruru Tank and alienation of the Avilala Tank bed land to Tirupathi Urban Development Authority (TUDA) and A.P. Housing Board under G.O.Ms.No. 84 Rev. dated 28-1-94 and Peruru Tank bed land toTirumala Tirupathi Devasthanam (TTD) for housing purposes under

G.O.Ms.No.181 Rev. dated 15-3-91, which are impugned in writ petition Nos. 8650 of 1994 and 7955 of 1994 respectively.

According to appellant, the cry of socially spirited citizens calling for judicial remedy was not considered in the right perspective by Division Bench of the High Court of Andhra Pradesh despite there being over-whelming evidence of the tanks being in existence and were being put to use not only for irrigation purpose but also as lakes which were furthering percolation to improve the ground water table, thus serving the needs of the people in and

around these tanks. It was submitted that the High Court has given precedence to the economic growth by completely ignoring the importance and primacy attached to the protection of environment and protection of valuable and most cherished fresh water resources.

The members of the appellant's forum and also the various other socially spirited citizens have written letters to various authorities of the government requesting the said authorities including the Chief Minister not to alienate the tank bed areas of both the tanks for housing or for any other activity except for the purpose for which it is meant.

Since there was no response to the representations made, the appellant filed two writ petitions in the High Court challenging the Government Orders passed by the Government of Andhra Pradesh by which the District Collector Chittoor was directed to hand over the tank bed areas of Avilala tank and Peruru tank to TTD and A.P. Housing Board.

By the impugned and common judgement dated 28-9-2000, the Division Bench of the High Court finding no illegality or irregularity in the action of the respondents dismissed both the writ petitions. Aggrieved by the dismissal of the writ petitions, the appellant has filed these appeals by way of special leave petitions.

E) Issues Involved: -

There are following issues-

1. Whether the Urban Development could be given primacy over and above the need to protect the environment and valuable fresh water resources?
2. Whether the action of A.P. state in issuing the impugned G.Os. could be permitted in derogation of Articles 14 and 21 of the Constitution of India as also the directive Principles of State policy and fundamental duties enshrined in the Constitution of India?
3. Whether the need for sustainable development can be ignored, do away with and cause harm to the environment in the name of urban development?
4. Whether there are any competing public interests and if so, how the conflict is to be adjudicated /Reconciled?

***F) <u>Final Judgment</u>: -**

The appeals are disposed of with following directions-

With Regard To Peruru Tank -

1. No further constructions to be made.
2. The supply channel of Bodeddula Vanka needs to be cleared and revitalized. A small check dam at Malapali to be removed to ensure the free flow and supply to the tank.
3. Percolation tank to be constructed and artificial recharge to be done to ensure the revival of the tank, keeping in mind its advantage at being situated at the foot hills.
4. The area allotted by Mandal Revenue Office for construction of the tank to be increased to a minimum of 50 acres. Percolation tank with sufficient number of recharge shafts to be developed to recharge the unsaturated horizons up to 20m. The design of the shafts etc. to be prepared in consultation with the CGWB. The proposed percolation tank to be suitably located along the bund keeping in view the inlets, irrigation sluices and surplus water.
5. Feasibility and cost estimation for the revival of the old feeder channel for Swarnamukhi River should be carried and a report to be submitted to the Court.
6. Each house already constructed by the TTD must provide for roof top rain water harvesting. Abstraction from ground water to be completely banned. No borewell/ tubewell for any purpose be allowed in the area.
7. Piezometers to be set up at selected locations, in consultation with the CGWB to observe the impact of rain water harvesting in the area on ground water regime.

With regard to Avilala tank: -

1. No further construction to be allowed in the area.
2. Each house already constructed by the APHB/ TUDA must provide structure for roof top rain water harvesting. All the storm water in the already built colonies to be recharged to ground water. Structures for such purposes to be designed in consultation with the CGWB. (Central Ground Water Board.)

3. No borewell/ tubewell for any purpose be allowed in the area.
4. An area of 40 acres presently reserved for the Government should not be developed in any way that may lead to concretization of the ground surface. Recharge structures to be constructed for rain water harvesting.
5. Piezometers to be set up at selected locations, in consultation with the CGWB to observe the impact of rain water harvesting in the area on ground water regime.

Case Comments: -

i) Principles Of Law Involved: -

a) State responsibility.
b) Sustainable Development.
c) Public Trust Doctrine.
d) Inter-generational Equity.
e) Articles 48-A, 51-A, 14, 19, 21of the Indian Constitution.

ii) Effect Of The Case On Society At Large: -

a) As the destruction, deterioration of the environment is going on, there is a drastic change in the atmospheric temperature, which has resulted in 'Global warming'.

b) According to water expert, Mr. Rajendrasingh from Rajasthan, 'offering the packages to the farmers to overcome the suicide problem or debt problem etc. is a wrong alternative, but to provide them basic needs is important. Besides this the farmers should realize the importance of 'environment protection' and 'forest conservation'.

c) Due to pollution, encroachment of builders, decrease in the level of ground water, there are 144 small & big rivers in our country which are facing drastic conditions.

iii) Conclusions: -

a) No one is greater than nature and natural resources.

b) Water is nothing but a life of every individual, so ultimately protection of environment and natural resources such as lakes, rivers, wells is very essential.

c) If there is pollution of environment i.e. changes in the physical, chemical and biological condition of environment, it directly affects the human-being.

References: -

1. Dr.S.C.Tripathi (3rd edition,2008, Central Law Publications) - Environmental law.
2. Dr. J.N.Panday (44th edition,2007, Central Law Agency) – Constitutional Law of India.
3. Dr. H.O.Agarwal (9th edition,2006, Central Law Publications) – Human Rights.
4. Wikipedia.
5. AIR 2006 SC1350

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SUSTAINABLE PRACTICES IN EDUCATIONAL INSTITUTIONS IN CONTEXT OF NEP 2020

Archna Vats[1] , Kalpana Bora[2]
[1]*Kamal Institute of Higher Education and Advanced Technology,Mohan Garden, Delhi (affiliated to GGIPU)*
[2]*Physics Department, Gauhati University, Guwahati - 781014, Assam*
Email - archnavats41@gmail.com
Email - kalpana.bora@gmail.com

Abstract

As India aims towards achieving the ambitious UN SDGs (Sustainable Development Goals) by 2030, the plan of action for the people, planet and prosperity cannot be formulated without acknowledging the vital synergy between the educational Institutions and a sustainable learning environment. Sustainable development is the need of the hour as the world has been facing severe environment related challenges such as global warming and climate change, deforestation, pollution, quality of life, shortage of energy and food supplies and other unsustainable practices. This paper focuses on the how we can achieve the ambitious goal of implementing Sustainable Practices (SPs) in educational institutions in context of new education policy 2020, on a day-to-day basis.

keywords : Sustainable Development, NEP 2020, sustainable practices in educational Institutions

Introduction

World today is transcending through crucial pathways, where human civilisation seems to find itself on crossroads - on one hand, we have been fighting the COVID19 pandemic ever since December of 2019, while on the other hand we are also a witness to visible climate change issues, and of course not to mention about shortage of food and energy supplies, depleting resources, unrest and unhappiness among people in general, unemployment, growing drugs and alcohol addiction among the youth, environmental pollution, etc. True, we have made tremendous advancement in the science and technology sector. However, these problems make us introspect - has our education system been successful in achieving its goals truly?

Solution to the above discussed problems could lie in practicing sustainable practices in our daily lives, and also implementing it in educational Institutions. There must be a healthy relationship/ connections between the educational Institution and sustainable learning environment. A sustainable education system adopts an integrated School approach as NEP 2020 (para 4.23) recommends that curricular integration of essential subject, skills and capacities. An integrated approach is one that extends beyond the curriculum and addresses the entire management like planning, operations and organisations of the educational institution. Educational sustainable policies and practices can strengthen what, why and how the sustainability practices can be adopted in classrooms in the Institutions. It will improve the institutions on carbon footprint and enhance the good relationship with surrounding community.

If we can inculcate healthy practices among our students, then our future would be secured. Keeping these burning issues in mind may be, the National Education Policy 2020 was launched in the year 2020, under the supervision of none other Dr. K. Kasturirangan, a former chairman of ISRO. NEP2020 aims to address several critical issues related to education system in our country, and it emphasises on holistic attitude of education with ancient Indian traditions, values and knowledge base system forming the backbone of the education system in India. Unfortunately, this traditional knowledge and practices have been ignored by the modern India that had to face colonisation, industrialisation and globalisation during last several centuries. These traditional practices in society and education institution have been replaced by the short visioned policies that focused mainly on the capitalism and economic production - the contemporary education system seems to be based primarily on consumer-centred society. This has lead the world to an era which ignored traditional knowledge, values and skills of Sustainable living practices that once prevailed in ancient times (one of the essences of NEP2020 in Indian context).

Above discussion explains the motivation of this paper. We will focus on synergies between these two aspects of modern societies - education and sustainable development. In what follows - we discuss

about SD, NEP2020, and how to implement the former in our educational Institutions in context of NEP2020.

Sustainable Development (SD) and SD Goals (SDGs)

In the 1987 reports of the United Nations World Commission on Environment and Development, sustainability is defined as:

"Meeting the needs of the present without compromising the ability of future generations to meet their own needs"

A strategy for sustainable living prepared by International Union for Conservation of Nature (IUCN), United Nations Environment Programme (UNEP) ad Word Wildlife Fund (WWF) defines SD as:

"Improving the quality of human life while living within the carrying Capacity of supporting ecosystems"

This implies the conservation and improvement of natural ecosystems through research, training, technology, collaboration and cooperation among community and Govt. At the SD summit on 25 November 2015, UN member states adopted the 2030 agenda for Sustainable Development, which includes a set of 17 Sustainable Development Goals (SDGs), to

- End poverty
- Fight inequality and injustice
- Tackle climate change by 2030.

These Global goals are based on earlier Millennium Development Goals (MDGs, adopted in 2000), that included fighting poverty, hunger, gender inequality, access to water and sanitisation - SDGs are broader than MDGs.

NEP2020

NEP 2020 aims to address the rising needs of the development of our country, based on the principles that education should not only improve cognitive skills, but also enhance social, moral and emotional strength of the students. Holistic and multi-disciplinary aspects integrated with knowledge base of ancient India, its traditions, values - these are the essence of NEP2020. NEP also states that aim of education should not only be scoring marks - rather how much students have actually learned, acquired skill and have been empowered, so that they can apply it successfully to fulfil the needs of society and a progressive Nation. The policy delineated that the curriculum and teaching of our education institution should inculcate among the students a deep sense of respect for the basic works and values, harmony with environment and a clear understanding of human roles and responsibilities in ever-changing world. It envisions a revamping education system and aspires that quality education should be inclusive and equitable and should promote learning opportunities for all, with ample flexibilities. The policy also emphasises promotion of indigenous knowledge which can undoubtedly prove to be beneficial for facing the environmental challenges. Needless to state that education can prove to be an excellent tool for achieving the critical targets and goals of SDG 2030 agenda for sustainable development.

Thus, from above discussion, we can say that implementing promoting sustainable practices at educational institution can serve dual purpose - achieving SDGs as well as follow the NEP2020. One more facet of NEP2020 is community engagement among our students, so that they are aware of the problems faced by the society. A curriculum that can enhance learning as an ongoing and self-directed education will inculcate in learner, sustainable practices that would support a lifelong learning.

Implementation of Sustainable Practices (SPs) in Educational Institutions

Next, we present the main highlights of this work - i.e., how can we implement SPs in Educational Institutions in context of NEP2020. This comes with responsibilities - what we can do at homes and college, in our daily lives.

- At the outset - we have to change our mindsets and attitude.
- We should do our bit with passion, accountability and dedication to serve the Nation.
- We have to start acting today - to save and protect the environment, to save resources for tomorrow for our younger generation.

Teaching should follow a multi-disciplinary approach - for example projects can be given not only for the development of creative problem solving skills but also to impart sustainable habits by developing substantial conceptual understanding and learning of science, history, geography, political science in an integrated way. It is a call of the day that the thread of sustainable schools should be woven into various activities of education in such a way that sustainable practices become their habits in life. Vision of

quality and sustainable education Institutions is an optimal approach to make balance between society and economy and environment. The approach of sustainable education should be guided by the principles of "sarvey bhavantu sukhinah" which means wellbeing of ourselves, wellbeing of others and wellbeing for the mother earth.

As Gandhiji said "the world has enough for everyone's need, but not enough for the everyone's greed", in the same essence SDGs also state" ensuring inclusion and equitable quality education and promoting lifelong learning opportunities for all." It is a prerequisite for an integrated sustainable education institution to have a inclusive, equitable, quality education, environmental awareness and promotion of lifelong learning. With the development of Science and Technology, it is also important to ensure the inculcation of ethics and values among the students so that they can adopt the sustainable practices in their life.

It should be emphasised that earning livelihood should not be based on merely making money, but it should also lay stress on meaning for life and refining skills. The real power of a country is in the hands of students and the solution lies in making learning more experiential based which will lead to making of good sustainable education institution. It is required to focus on global change to make education more relevant which changes student attitude and move them to adopt sustainable practices in life.

We must begin with small things, like, we can follow and show to our students -

1. Conservation of natural resources in long term plannings and daily life activities too.
1. Inclusion and participations of learner.
2. Evolve our own quality resources.
3. Should use water and electricity judiciously and should not waste them, avoid plastics.
4. Not to cut trees. Regular plantation programmes should be undertaken in school/college premises and we can reach out to our communities too.
5. We should keep our vehicles in check, so that they are not emitting black smoke, we can increase use of bicycles, whenever possible. If feasible, we the teachers can come to our school/college riding our bicycle.
6. Reduce, reuse, recycle, rebuild, repair should be followed in our daily life.
7. We can follow waste management - can think of generating electricity from organic kitchen wastes, should dispose different types of wastes separately, Units of recycling should be promoted, in fact, students can take up project with industries for this. Such innovative, small scale units should be opened in each educational Institute and community.
8. Should not waste food, and can engage our students in distributing extra food to the needy people in communities.
9. Small scale farming can be promoted in school/college premises and homes - this will increase dignity of farming among our students, and also we can consume our home grown organic vegetables etc.
10. Should always keep our surroundings clean in and around our homes and college, and students can be engages in such programmes at least once a week.
11. Students can engage in research related to green technologies.
12. While constructing building, we should take care that maximum sunlight comes inside the building, and that building walls are non-conducting, which will keep school building cool in summer and the hot in winter - this would save electricity.
13. Car pool/sharing of vehicles/use of public transport system should be encouraged - this will save fuel.
14. We should minimise paper wastage in school/colleges - in fact, paper recycling units can be of great help.
15. Waste water can be treated and used for gardening etc.
16. Rain water harvesting should be promoted in premises of educational Institutions.
17. Community engagement programmes (NEP2020) in schools/colleges, such that students visit communities and understand and try to take up projects to solve them, can be a step ahead in achieving SDGs.
18. Sharing and caring should be enhanced through community service.
19. We all must maintain a healthy life style, strive to improve spiritual intelligence and happiness index (NEP2020).

Summary

To summarise, in this paper, we discussed two of the important aspects of modern life in India - sustainable development and education, in context of NEP2020. We briefly outlined the importance of sustainable development, and also discussed highlights of NEP2020. Finally we presented our ideas on how we can implement SPs in schools/colleges, by following them we can show to our students that they can be followed through daily life habits. Community engagement of students can prove to be a boon in achieving these goals. We hope that ideas presented here would inspire our younger generation, teachers and students alike, to lead us to a path for a strong and prosperous India.

References

1. World Commision on Environment and Development, 1987, Our Common Future, OUP, Oxford.
2. Kopnia H., Education for Sustainable Development, Environmental Education Research, Vol 18, No. 5, p 699-717, 2007, book academia.edu
3. Archna Vats, International Research Journal of Engineering and Technology (IJRET), eISSN - 2395-0056/pISSN - 2395-0072, Volume **08**, Issue 03, March 2021.
4. Archna Vats, in "Akshar Wangmay", UGC CARE Journal, ISSN-2229-4929, Jan. 2021(Special Issue - Interdisciplinary view on Education and Sustainable Development).
5. NEP and SD related documents on open resources on Internet.
6. Kalpana Bora, Lecture as Resource person at FIP-4 (Faculty Induction Programme) at HRDC, Gauhati University, Sept. 2021, ***Topic - Relevance of Ancient Indian Knowledge System in current times-*** https://drive.google.com/file/d/1uH1ZmuWiFM4sHvNhQQ90WN0T4Eyx8Qvu/view?usp=sharing

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SOLAR POWER ENERGIES THE EARTH SYSTEM

K. MALATHI
Assistant Professor, Department of Management Studies,
Christ college of Engineering & Technology, Moolakulam, Pondicherry.

Abstract :

This Paper deals with the Solar power energy consumption through the Sun Energy. In olden days people given importance of Sun without knowing the maximum utilization of sun power into electricity but nowadays all the country knowing the usage and consumption of solar energy on daily routine and government also taken lots of initiatives to promote the solar energy system to people. However the people will get the benefits of unlimited electricity usage in the Technology world.

History Of The Study:

Since the Ancient times people value the power of sun in their ecosystem. Some believed the power of sun is everything for the Earth .But other believed it's the sources of energy and the stimulating the overall system happening for the living mankind. From there people started realizing the uses of solar power to the Earth.

From 7th century B.C. magnifying glasses helps to use for making fire. In those days fire is considered as God. So this solar power has been plays the most important idea from the older times. Then Day by day the usage of sun energy has been upgraded to solar power.

As we all knows generally the Energy has been classified into Conventional & Non-Conventional Sources. Conventional sources are Coal, petroleum, Electricity, Fire wood, straw, Cow Dung. On the other hand Non- Conventional sources are Bio, Solar, wind, Tidal Energy.

Introduction:

In this paper we clearly studies about how the Solar power energies the earth in the ways of consumption of solar power to household, solar power to companies, solar power to social use. Energy produced through the sun is called solar power.

Solar Technologies converted sunlight into electrical energy through Photo voltaic (PV). This power helps to the entire house by installing the solar system in every house. That makes the environment user friendly with the help of natural resources. The absorption of sunlight during the day time can helps to survive the people during the night time also. Here the usage of electricity is less and it can be able to save the electricity for future use. Nowadays Scarcity of resources is happening everywhere but this leads to the upgradation of world to next level.

Meaning Of Solar Power :

Solar power means Converting Renewable energy from sunlight into Electricity either Directly or indirectly. **Photovoltaics** using the solar power directly through photovoltaics cells that converts light into electric current . **Concentrated solar power** system indirectly using solar power by Direct sunlight through mirrors & Lens in hot shinny sun.

Current Status Of India :

The solar energy installation capacity in India is 18 times more than 2.63 Giga watt in March 2014 to 46.77 Giga watt in October 2021. Most of the countries started realizing the power of solar energy and

makes it possible to implemented for their regular usage. Even in India we consider the solar energy capacity as on 31st January 2022 were 50.777 Giga Watt . As report says China is leading the usage of Solar power even in the rural places for converting the energy to utilities especially for farming purpose. India placed fifth Rank in installation of solar power to people. In India, Rajasthan is in First position of saving electricity through solar power.

The Process Of Solar Power :

Solar Energy can be only possible to collect during the day time as the Sun shines increases the energy saving is more but the Sun shine reduces the conversion of electricity from Sun can be very less. This is the basic ideology of Solar power mechanism. So that Storage of Power is effective method to utilize the Sun power during the night time. That conversion process is called as Photovolatic (PV) energy. In which the process starts when the sun shine is attracted towards the solar power plant and the power of Sun energy can be converted to the electricity through the help of Solar plates fitted on the Solar plant. That Grid plate can able to store the energy for future use. This Energy can be used for the purpose of all the home appliances like Air Conditioner, Washing machines, Iron Box, TV, Charging gadgets, Electric Scooter, washing machine etc.,

How does Solar Energy works for Household purpose :

Step 1: Sun Light activates Panels and produce Electrical current:

Sunlight hits the layer of your solar panel and photons and electrons interact to create an electrical current.

Step 2 : Electrical energy is converted :

The Electrical current flows from the panels down to your solar Inverter, Which converts the energy generated from your panels(DC- Direct Current) into usable energy for your Home (AC- Alternative Current)

Step 3: The converted Electricity powers your Home:

The AC Energy flows from the inverted into your breaker box, which will then Circulate it.

Step 4: Unused energy are stored potentially returned for an energy bill credit :

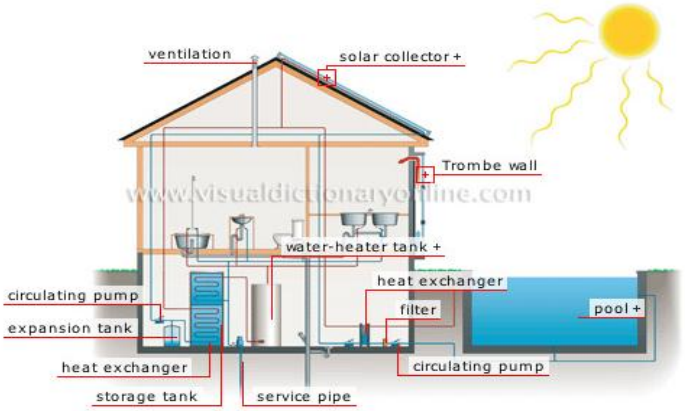
Any unused AC will flow back to your utility meter and remain available to consumption. The owners have the ability to return that unused AC back to the electric grid in the form of energy credits on their next power bill. This process is known as Net Metering in Electricity generation.

Net Metering Concept in Solar power:

Net Metering works to send any extra energy that solar panel system produces back to the power grid, in return we are getting the energy in 1:1 Ratio. However this has to be decided by the owner of the solar plant can either sold the energy to someone or they are save it though the batteries for their own usage in future days.

The excess energy storage Uses:

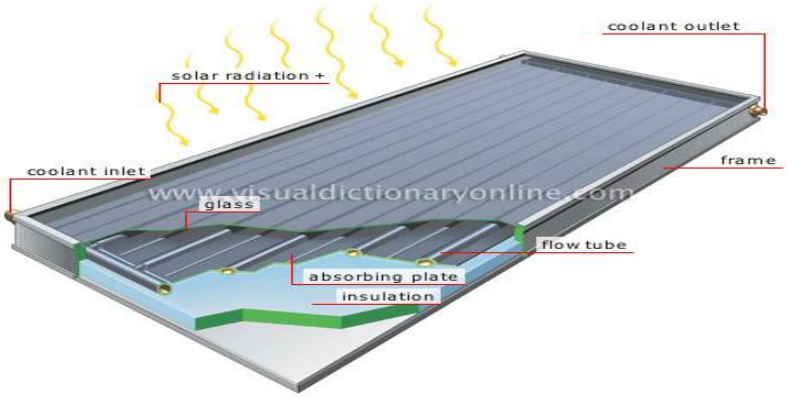
To manage the excess of power supply or energy, we can either store the energy in solar battery or Lithium- ion battery or to use net metering to sell the energy back to the utility company. During the peak sunlight hours or we can say daylight the solar system can preserve more energy. So storing the excess of energy in any form of solar power batteries can be able to access during the outages time.



The unused Storage of power is essential for Solar power system and makes it works as an Inverter to the Electricity later. The best Method of storage is Lithium-ion Batteries.

Some Important Components For Solar Battery : (Backup Resource)
Anode: It stores Lithium and releases Lithium ions when the battery is discharging.
Cathode : It stores Lithium and releases Lithium ions when the Battery is charging.
Electrolyte: A Liquid that acts as a transporter of lithium ions.
Negative Current Collector: It receives Electron from the External Circuit during charging of the battery from the positive current collector.
Positive current Collector: It receives electrons from the external circuit during discharging of the batteries from the negative current Collector.

A battery is made up of Anode, Cathode, Electrolyte, Seperators and two other current collectors like Positive and Negative. The electrolyte charges lithium ions from the anode and cathode or vice versa through the separator. The Movement of the Lithium ions creates free electrons in the anode that creates the charge to the positive current collector. The Electrical current then flows the current collector through the device to the negative current collector. The separator will do blocks the flow of electrons inside the



battery.

Pros Of Electricity Storage:

- Balancing Electricity Loads.
- Consistent of Electric Supply
- Acting as Backup source.
- Reduce your carbon footprint
- Customize the battery settings to meet your specific consumption needs.

Points To Be Consider While Installation Of Solar Power At Our Earth (Self Residing Area):

- The Location and Direction of the Building terrace is visible to the Direct Sunlight .
- The outside Electricity Consumption may possible to Reduce.
- Aesthetic look for the terrace area .

- Acting as an Inverter to store the Excess Energy in nearby place for future use.
- Less Maintenance of solar power plant in return will get more power supply for the premises.

Environmental Impact Of Solar Power Plant:

1. It Reduces Air Pollution
2. It Reduces water Pollution
3. It Reduces the need of Nonrenewable resources
4. It Reduces Hazardous waste
5. It Reduces the Impact of Climate Change.

Advantages:

- The Solar energy is User friendly & unlimited resources.
- It is completely free of cost from Sun.
- Solar power is non- pollution to the Environment.
- It will not emit any harmful wastage or any side effects to Mankind.
- Able to save for the energy for future usage.
- Solar power plant can also acts as an Inverter to the Building.
- Potentially save money on paying of Electricity bill.
- The simple maintenance of solar plant is required can use it for many more years later.
- The Ultimate return on Investment.
- To reduce potential Roof damage.

Disadvantages:

- The Energy can available only during the day time so needs to save it for the every night.
- Technology may possible of corrupt at any time so need proper backup of storage of energy capacity.
- Producing of electricity during rainy season is another challenge of solar power.
- Many people may not afford to buy the solar power plant for installation as the investment is little bit costlier.
- Solar power will not able to work effectively in places of snow covered areas like Jammu and Kashmir and also not effective during rainy season.

Conclusion:

So this research paper concludes that more the eco-friendly power supply we use the more we get benefits from the environment. But some photovoltaic (PV) may converted to silicon waste to the ecosystem that can comparatively less impact to the environment. All the other Resource like water, Air, Minerals are moving towards scarcity let us use this solar power energy to the earth that has been provided by the Sun for unlimited Resources.

References:

1. https://www.economicsdiscussion.net/notes/conventional-and-non-conventional-sources-of-energy/2177
2. https://www.investopedia.com/articles/mortgages-real-estate/10/solar-power-home.asp
3. https://www.google.com/search?q=recent+developments+in+solar+energy+in+india&sxsrf=APq
4. https://www.energy.gov/eere/solar/solar-integration-solar-energy-and-storage-basics
5. https://www.solarreviews.com/blog/are-lithium-ion-the-best-solar-batteries-for-energy-storage
6. https://www.energysage.com/energy-storage/storage-101/how-do-batteries-work/

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EGO STRENGTH AND SELF-ACTUALIZATION AS A KEY COMPONENTS OF SUSTAINABLE HUMAN RESOURCE DEVELOPMENT

Khaja Moinoddin[1] Dr. Charulata Pradhan[2]
[1]*Research Scholar,Department of Psychology,*
[2]*Asst. Professor, Kohinoor College of Arts, Science and Commerce, Aurangabad*

Abstract

Human resource is an asset of any country. Sustainable development of human resource enhances quality of work life, increases productivity among the concerned human resources and develops influential leadership among them. This study aims at reviewing ego strength and self-actualization as a key components of sustainable human resource development. Ego strength is an ability of an individual to deal with the id and superego while self-actualization is achieving full potential. Self-actualized individual is he who achieved his full potential in what he is meant to do. If we develop the ability to deal with id and superego among our human resources their performances and ability to look at profession enhances. The human resources will be able to explore and decide their choices and preferences. This study explores and discusses the qualities of self-actualized and high ego strength person and ways to develop self-actualization and ego strength among human resources.

Keywords: Ego Strength, Self-actualization, Human resources, sustainable development

Introduction

Sustainable development of human resources leads any nation towards productive leadership. It is essential for any organization to keep its employees updated according to goals of the organization. Human Resource Development (HRD) include knowledge upgradation, skills upgradation and attitudinal changes among the employees of the organization through different trainings, workshops, seminars, symposiums, conferences and research opportunities. Essential aspect of the HRD is it should be sustainable and long lasting. Along with professional development it also includes the psychological wellbeing. An individual can only perform well when he or she is psychological fit. Human resources have unlimited potential capabilities. Ego strength and self-actualization can be seen as the key components of sustainable development of human resources. These components lead to create balanced and professionally strong individuals. These balanced and professionally strong individuals contribute in the growth of the self, organization they work in, society they live in and ultimately the nation they belong to. Hence it is important to consider enhancing ego strength and self-actualization in all programmes of sustainable HRD.

Concept

In 2015 all the member states of United Nations adopted the 2030 agenda for sustainable development. This agenda is plan of action for peace, people and prosperity. The goals and targets are to stimulate action in areas of critical importance for the humanity and planet. These sustainable goals ensure every individual dignity and equality in healthy environment. These goals ensure eradication of poverty and hunger in all their forms and dimension. To achieve these goals, it is important to focus on the sustainable HRD. Ego strength and self-actualization are key components of the sustainable HRD. The agenda itself ensure all human beings can fulfil their potential. The agenda contains at its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests. To achieve these goals, we need the detailed programme for the sustainable development of human resources. Hence focusing on achieving high ego strength and self-actualization of human resources we have help us achieve these sustainable development goals.

Meaning of words

- **Ego strength** - in psychoanalytic theory, the ability of the ego to maintain an effective balance between the inner impulses of the id, the superego, and outer reality. (APA Dictionary of Psychology)
- **Self-actualization** - a person's desire to use all their abilities to achieve and be everything that they possibly can. (Cambridge Dictionary)

- **Sustainable development** - economic development that is conducted without depletion of natural resources. (Oxford Dictionary)
- **Human resources** - people, when considered as an asset that is or can be employed and that is useful to a company, organization, etc.

Human Resource Development (HRD)

Human resource development is continuous process of identifying the potential of workforce of any organization, bring it to surface, nurture it and use the capabilities of people to achieve shared common goals of organization. As it is described earlier that human capabilities are unlimited. These capabilities can only be used by following systematic development programme to identify the skills of workforce, their strengths and areas of the development. Different experts defined HRD in different ways.

HRD concept was first introduced by **Leonard Nadler** in 1969 in a conference in US. "He defined HRD as

"Human resource development is a series of organised activities, conducted within a specialised time and designed to produce behavioural changes." HRD includes, training, workshops, conferences, symposiums, seminars and every thing that enhance the performance of the workforce, and helpful in attaining their shared goals. The objectives of HRD are to develop knowledge, skills and behaviour of workforce.

Ego Strength

Sigmund Freud presented the theory of psychoanalysis. He developed more structural model of mind comprising the entities id, ego and super ego. These are not physical areas within the brain, but rather hypothetical conceptualizations of important mental functions. The id, ego, and superego have most commonly been conceptualized as three essential parts of the human personality. Freud assumed the id operated at an unconscious level according to the pleasure principle (gratification from satisfying basic instincts). The id comprises two kinds of biological instincts (or drives) which Freud called Eros and Thanatos. The ego develops from the id during infancy. The ego's goal is to satisfy the demands of the id in a safe a socially acceptable way. In contrast to the id, the ego follows the reality principle as it operates in both the conscious and unconscious mind. The superego develops during early childhood (when the child identifies with the same sex parent) and is responsible for ensuring moral standards are followed. The superego operates on the morality principle and motivates us to behave in a socially responsible and acceptable manner. Ego strength is an ability of an individual to successfully deal with id and superego.

High And Low Ego Strength

People with high level of ego strength comes up with solutions to problems, tackle the situation well, confident in their ability to deal with challenges, have high level of emotional intelligence. They face the challenges as an opportunity to them. They are very resilient and even in difficult situation they find themselves very strong. In contrast to the people with low ego strength, avoid challenges, simply give up or break down.

Self-Actualization

Psychologist Abraham Maslow outlines what is known as a hierarchy of needs, representing all the various needs that motivate human behaviour. The hierarchy is often displayed as a pyramid, with the lowest levels representing basic needs and more complex needs located at the top of the pyramid. At the peak of this hierarchy is self-actualization. The hierarchy suggests that when the other needs at the base of the pyramid have been met, you can then focus your attention on this pinnacle need of self-actualization. Self-actualized persons display qualities like peak experience, (which opens the horizons of the vision). They are democratic in nature having world view, (listen to others, involves all and even the divers' thoughts), they are realistic, (View problems logically and rationally), they tend to be problem centred, (apply their skills to solve the problem). They are autonomous, they create their own way of satisfaction and contentment. They enjoy solitude and privacy and they have philosophical sense of humour. They are open and enjoy full journey of life not stick to their destination.

Development Of Ego Strength And Self-Actualization Among HR As Sustainable Development

As mentioned above objectives of HRD is to attain the structured working goals of an organization. It includes the professional skills as well as behavioural changes. Developing ego strength and self-actualization among HR may helpful in achieving the goals set by an organization. The workforce will be able to manage the id, the natural instincts and superego the moral obligations. It will help to motivate the workforce to withdraw their unnecessary gratification instincts and move them towards the rational decision making. So, following strategies may be used to develop ego strength and self-actualization among the workforce.

1. **Mastery Over The Skills:** HR should be trained well in their respective field. If they master the competence the level of ego strength moves up. They feel confident and can perform well. The workshops seminars, trainings regarding the skills regarding their work can be organized, micro level thinking is needed. Before conducting such training or workshop need analysis can be done to know better what areas of HR needs development or what actually they want to learn? What they are lacking behind? So, mastery over the work-related competencies makes them confident, resilient and autonomous.
2. **Addressing Basic Needs**: an individual can only be self-actualized when her basic needs are satisfied. It is an important aspect of HRD. Basic physical needs and needs regarding dignity and to be loved should be addressed. To attain this purpose workforce should have relevant wages, working atmosphere, work culture should be developed. Work force treated with dignity and ample opportunities to register their grievances, dealing with conflicts and conflict management.
3. **Counselling And Mentoring:** as self-actualization meant to achieve the highest potential of an individual. For this purpose, the services of professional counsellor can be hired. Knowing their needs, strengths and weakness, professional qualities etc and define the lines where to scaffolds and from where to lead them forward.

Conclusion

To fulfil the agenda of 2030 to achieve 17 sustainable developmental goals defined by United nations organization, we need equipped and skilled workforce. The workforce we need is not only professionally strong but also, they must be psychological strong. Psychological strong workforce may help us in achieving sustainable developmental goals. Looking at sustainable development of human resources it is essential to look at the concepts like ego strength and self-actualization. These concepts are related with human behaviour which may reflect in human endeavours. High level of Ego strength makes an individual confident, resilient and smart in decision making. He/she may take wise decision helpful in growth of organization. The 21st century skills like creativity, critical thinking, communication, collaboration, leadership, problem solving, productivity and initiative can also be enhanced. Every organization depends on its able workforce, so while managing workforce we can consider developing ego strength and self-actualization among HR as a key components of sustainable human resource development.

References

1. Armstrong M. (2006); A Handbook of Human Resource Management, Practices 10th Edition; Kogan Page, London.
2. Bulla. D.N & Scott. P.M. (1987); Manpower Requirements forecasting. A Case Example in Strategic Human Resource Planning applications, Edition Richard, J. Nichaus, New York; Plenum Press.
3. Hall, C.S., Lindzey, G. and Campbell, J.B. (2004). *Theories of Personality* (Fourth Edition). New York: Wiley
4. Jackson, Susan E and Sehuler, Randall,S., Human Resource Planning, Challenges for Industries and Organisation Psychologists. American Psychologists, Feb. 1990 PP. 223-239.
5. Mullins,L.J.,(1989) Management and Organisational Behaviour. 2nd edi, Allahabad, Wheeler Publishing Com.
6. Pervin, L. (1996). *The Science of Personality*. New York: Wiley
7. Pierce J.L & Gardner. D.G. (2002) Management and Organisation Behaviour, U.K., Thompson.

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AGRICULTURE AND SUSTAINABLE DEVELOPMENT

Mrs. Dipali Krishnat Patil[1], Dr.Krishnat Raghinath Patil[2]
[1]Assistant Professor, Chh. Shivaji College of Education, Rukadi
[2]Assistant Teacher, Sanjay Ghodawat International School, Atigre

Introduction

Agriculture has changed dramatically since the end of the World War II. Food & Fibre productivity has soared due to new technologies, mechanization, increased chemical use and government policies that favoured maximizing production & reducing Food prizes. These changes have allowed fewer farmers to produce more Food & Fibre at lower prices. Sustainable agriculture gives equal weight to environmental, social and economic corners agriculture.

What Is The Sustainable Agricultural Development?

The FAO definition of sustainable agricultural development is "The management and conservation of the natural resources base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such development … conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable."

Farmer involvement is the key to sustainable agriculture. Given the right incentives and government support, farm families can and are making significant progress towards managing their land and water sustainably.

Some traditional farming systems using low inputs have improved yields while safeguarding the resource base. Indonesian rice farmers who adopted integrated pest management (IPM), which reduces the need for pesticides, soon achieved higher yields than those who relied solely on pesticides.

The ultimate objective should be the optimum mix of agricultural practices, both old and new, in order to maximize sustainable output within the limits of available resources.

Development Of Agricultural And Problems -

The current trajectory of growth in agricultural production is unsustainable because of its negative impacts on natural resources and the environment. One-third of farm land degraded, up to 75 percent of crop genetic diversity has been lost and 22 percent of animal breeds are at risk. More than half fish stocks are fully exploited and over the past decade, some 13 million hectares of forests a year were converted into other land uses.

The overarching challenges being faced are the growing scarcity and fast degradation of natural resources, at a time when the demand for food, feed, fibre and goods and services from agriculture (including crops, livestock, forestry, fisheries and aquaculture) is increasing rapidly. Some of the highest population growth is predicted in areas which are dependent on agriculture and already have high rates of food insecurity. Additional factors - many interrelated - complicate the situation:

Competition over natural resources will continue to intensify. This may come from urban expansion, competition among various agricultural sectors, expansion of agriculture at the expense of forests, industrial use of water, or recreational use of land. In many places this is leading to exclusion of traditional users from access to resources and markets;

While agriculture is a major contributor to climate change, it is also a victim of its effects. Climate change reduces the resilience of production systems and contributes to natural resource degradation. Temperature increases, modified precipitation regimes and extreme weather events are expected to become significantly more severe in the future;

Increasing movement of people and goods, environmental changes, and changes in production practices give rise to new threats from diseases (such as highly pathogenic avian influenza) or invasive species (such as nephritis fruit flies), which can affect food safety, human health and the effectiveness and sustainability of production systems. Threats are compounded by inadequate policies and technical capacities, which can put whole food chains at risk;

The policy agenda and mechanisms for production and resource conservation are mostly disjointed. There is no clear integrated management of ecosystems and/or landscapes.

Our Responsibility To Protect Agriculture-

The challenges outlined above give rise to five key principles for guiding the strategic development of new approaches and the transition to sustainability:

Principle 1: Improving efficiency in the use of resources is crucial to sustainable agriculture;

Principle 2: Sustainability requires direct action to conserve, protect and enhance natural resources;

Principle 3: Agriculture that fails to protect and improve rural livelihoods and social well-being is unsustainable;

Principle 4: Sustainable agriculture must enhance the resilience of people, communities and ecosystems, especially to climate change and market volatility;

Principle 5: Good governance is essential for the sustainability of both the natural and human systems.

In order to cope with the rapid pace of change and increased uncertainty, sustainability must be seen as a process, rather than a singularly defined end point to be achieved. This, in turn, requires the development of technical, policy, governance and financing frameworks that support agricultural producers and resource managers engaged in a dynamic process of innovation. In particular:

Policies and institutions are needed that provide incentives for the adoption of sustainable practices, to impose regulations and costs for actions that deplete or degrade natural resources, and to facilitate access to the knowledge and resources required;

Sustainable agricultural practices must make full use of technology, research and development, though with much greater integration of local knowledge than in the past. This will require new and more robust partnerships between technical and investment oriented organizations;

Evidence-based planning and management of the agricultural sectors requires suitable statistics, geospatial information and maps, qualitative information and knowledge. Analysis should focus on both production systems and the underlying natural and socio-economic resources;

The challenges relating to stocks and utilization rates of natural resources often transcend national boundaries. International governance mechanisms and processes must support sustainable growth (and the equitable sharing of benefits) in all agriculture sectors, protecting natural resources and discouraging collateral damage.

Essential Ingredients For Sustainable Development -

Biological:

Continued conservation of genetic resources is essential if food supplies are to be increased. Authorities in regions rich in genetic resources should be encouraged to conserve wild species of animals and plants.

Physical:

Soil and water must be conserved to sustain plant productivity. This requires the introduction of land management to reduce or halt topsoil erosion and to maintain or increase the water-holding capacity of soil. Irrigated agriculture needs to be overhauled where water is wasted or crop yields are declining as a result of soil salinity and waterlogging. Atmospheric pollution, including acid rain, harms crops and forest stands. Excessive use of chemical fertilizers and pesticides poisons soils and reduces productivity.

Social:

Clear property rights and land tenure systems provide powerful incentives for owners and tenants to use their land in a sustainable way. Land tenure systems need reform in countries where land distribution is grossly unfair or where laws are inadequate to control land use, protect forests and safeguard rangelands. Participation must also be encouraged by local controls over planning and the allocation of resources.

Economic:

Farmers in developing countries need fair prices for their produce and better agricultural infrastructure, including adequate extension services and efficient transport for getting their food to markets. They need incentives to conserve soil and water resources.

References –

1. Mahapatra, B.S., Ramasubramanian, T. and Chowdhury, H. (2009) Organic farming for sustainable agriculture: Global and Indian perspective. Indian Journal of Agronomy 54(2): 178-185.
2. Meena, R.K., Singh, Y.V., Nath, C.P., Bana, R.S. and Lal, B. (2013). Importance, Prospects and Constraints of organic farming in India. Popular Kheti 1(4): 26-31.
3. Nagar, S., Umesh, D. K., Kachhap, S. and Dhakar, R. (2013) Organic Farming: A way towards sustainable agriculture. Popular Kheti 1(4): 55-57.

4. Nejadkoorki, F. (2012).Environmental benefits of organic farming. International conference on applied life sciences (ICALS2012) Turkey, September 10-12.
5. Prasad, K. And Gill, M.S. (2009) Developments and strategies perspective for organic farming in India. Indian Journal of Agronomy 54(2): 186-192.
6. Ramesh, P., Singh, M. And Rao, S. A. (2005) Organic farming: Its relevance to the Indian context. Current Sciences 88(4):561-568.
7. Reeves, W.D. 1997. The role of soil organic matter in maintaining soil quality in continuous cropping systems. Soil and Tillage Research 43:131-167.

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A STUDY OF PRESENT AND FUTURE PROSPECTS OF AGRICULTURE PRODUCTION IN INDIA

Barge Shital Kalidas
Assistant Professor, Abasaheb Marathe Arts And New Commerce Science College, Rajapur. Ratnagiri
E-mail ID – shitaljadhav08@gmail.com

Abstract:

Although India is a developing country, it is reaching a significant growth rate. Our country has made significant progress on many levels and in many areas. But our country is still lagging behind in agriculture in some respects. The present research paper is based on the essentials for sustainable development of agriculture. This paper discusses technical and structural improvements in agriculture. Attempts have been made to predict agricultural production in India, its present status and what may happen in the future. The true nature of agriculture and the various initiatives taken by the government for agriculture as well as some secondary data have been collected. From all this information, some useful measures have been suggested for the growth of the agricultural sector.

Key Words : Agriculture, Success, Growth, Productivity, Government of India

Introduction:

The agricultural sector in India is progressing very fast. Although India has made many efforts for agricultural reform since independence, it still lacks in agricultural development. With good employment in urban areas, farmers can leave farming and move to cities. Dependence on nature and low income from agriculture are responsible for this. These are the findings of the Institute for the Study of Developing Societies. The first Five Year Plan (1951-56) sought to address the food crisis in the agricultural sector. However, due to non-fulfillment of these objectives in the Five Year Plan, different measures were taken in the Eleventh Five Year Plan (2007-8 to 2011-12). The plan seeks to reverse the slowdown in agricultural productivity growth and productivity. After this, in the Twelfth Five Year Plan, emphasis was laid on the development of the entire agricultural sector. Although India is less developed in agriculture than other developed countries, some development initiatives have resulted in many improvements. These include new irrigation facilities, improved seeds, improved fertilizers, pesticides, new farming methods and new management methods.

Literature Review:

A study of our current economic situation shows that fifty per cent farmers are satisfied with farming and 40 per cent farmers are dissatisfied. Considering the regional pattern, it is clear that farmers in Central India are more satisfied with farming than farmers in East India. Due to the climate required for agriculture, climatic trends, farming methods, policy changes made in agriculture, the agricultural sector came to be well known. It cannot be said that agriculture in our country has completely eradicated poverty and malnutrition but special efforts are being made for it. The future of the agricultural sector depends on the budgetary policy of the government. Emphasis has been placed on reducing the use of natural resources in agriculture. Using this method of eco innovation we can limit the use of natural resources. Production can be increased by farming using many innovations. Environment and climate change play a big role in agriculture.

Major Barriers to Agribusiness Irrigation

1. Indian agriculture is dependent on rainfall. Many places do not have irrigation facilities for agriculture and farmers do not have enough money for irrigation.
2. Currently, artificial scarcity in agricultural production is causing many problems. Which is why inflation is rising and this is an inconsistent situation.
3. According to the survey, agricultural GDP grew by 15.2% in the Eleventh Five Year Plan and then by 13.9%.
4. Today's farmer is seen using more chemical fertilizers. So the fertility of the soil is being destroyed.
5. India's main crop wheat and rice production has declined sharply since the Green Revolution (1980).

6. Direct communication with the farmers revealed that due to insufficient income from agriculture, their tendency to engage in farming has been declining.

Technical Development for Agriculture:

As India's population grows, it needs to focus on improving agriculture due to increasing global food demand. Farmers in India as well as the Government of India need to rely on advanced agriculture to increase their own agricultural production. Agricultural technology is essential for agriculture. It enables wide-ranging farming as well as key monitoring of agriculture and adopts various improved technological advances as well as technologies for global farming. The Government of India launched the Digital Agriculture Mission in 2021 to 2025. Robots were used in this digital agricultural mission. Progress was made in the field of agriculture and various projects were created and implemented. According to this, guidance was given on what type of land to cultivate, what seeds to use and what fertilizers to use. The Government of India has provided subsidy for agriculture in villages according to the Department of Science and Technology. This has given impetus to sustainable agriculture in rural areas.

Private Sector:

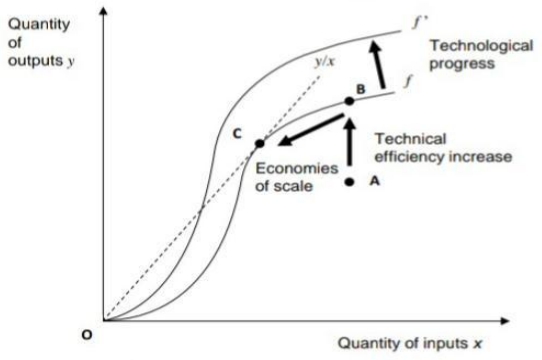
There is often ambiguity between the agricultural sector and the private sector. But if there is to be proper growth in the agricultural sector, the private sector needs to be given priority. Just as the public sector is playing a crucial role in India's agricultural transformation, so is the private sector. Necessary competent changes have been made in the private sector and in the agricultural sector which has posed a kind of challenge to the government. Successful models required for agricultural development have been brought to the market. This makes it convenient to grow crops depending on the favorable climate. Most importantly, the private sector has a big hand in creating chains that deliver consumer goods to farmers. Also, agricultural development is impossible without the support of the public sector. In short, both the public sector and the private sector play an important role in the agricultural sector. The private sector is more dynamic in our country, they play a vital role in the agricultural sector. The role of the private sector in the agricultural sector increased during the early 1990's. After 2000, modernization affected the value chain of agriculture, agriculture and food. This had a different effect. Food prices rose and continued to rise. Everything from the initial product to the final use became transparent. Due to the changes brought about by the agricultural sector, this change is in full swing across the country. The agricultural sector is becoming more diverse. Farmers are shifting to dairy business, horticulture, fruits, poultry farming, medicinal plants and other crops. These mainly benefit the minority farmers. As much as the government has a key role to play in the success of agriculture, so has the private sector. Private companies are at the forefront of bringing innovation in the agricultural sector as well as developing the agricultural sector. Private organizations are also at the forefront in the fields of agrochemicals, organic plant growth regulation, health, biofuels and machinery materials as well as soil analysis by treating heredity and seeds.

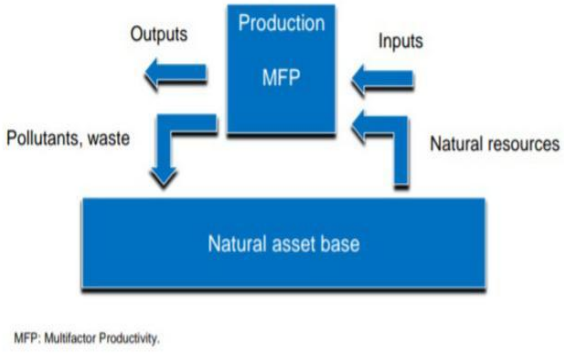
Effective Financial Support:

It is very important to ensure that the work is done well and that you will benefit from it. But even if our farmer works hard in the field, there is no guarantee that he will get any reward for his hard work. It is important to guarantee the goods produced by the farmers for the development of agricultural production and productivity. Farmers should be assured that agricultural produce will be sold at a fixed price. The prices of agricultural commodities in the market fluctuate often, which can lead to severe and severe losses to the farmers. High investment and high productivity should be encouraged here. Barriers between farmers and consumers should be reduced. If the goods produced by the farmers reach the consumers without any chain, then their goods can get a fair price. We see the government always moving forward to protect the interests of the farmers.

Improved Trade Policy:

The key to long-term investment in any economy is trust. Private investment is a way to create competition and enable it. Make sure you use the tools you need. Facilitates access to goods, capital and knowledge required for business. Introduces new ideas by changing the food and agriculture system in different ways. In addition to setting agricultural policy, the agro-environment protects the environment by suggesting recurring measures. The private sector is economically important to all sectors. If we want





to create a framework for every sector and sector policy in India, it is necessary to adopt strategic measures. They need to be promoted in various ways to promote sustainable productivity growth. In order for their products to get commercial status in the agricultural sector, their products need to be of good quality.

Figure 1. Pathway of productivity grow

Source: OECD (2011a).

Figure 2: Natural Capital and multifactor Productivity growth

Source: adapted from OECD (2014 and b)

Conclusion:

Unfortunately, volatility in the prices of agricultural commodities has pushed up food prices, leading to starvation for farmers themselves. Various efforts have been made in various ways for the safety of farmers and agriculture. After years of neglect in agriculture, the private sector is helping to increase spending on agriculture. This paper reviews the issues related to agricultural policy. Discussions have been held on how agriculture can be used to boost India's economy. The huge potential for poverty in our country lies in the agricultural sector, which needs to be given a fair go. The agricultural sector has the potential to drive attractive growth in the economies of developing countries. The role of the government is important for the measures suggested for the development of the agricultural sector in this paper. The private sector is not only a source of net investment but also plays an important role. We have to find different ways to increase agricultural productivity in our countries. To increase agricultural production, agriculture has to be expanded. Because the only way to increase productivity in the future is through agriculture and green revolution. Small farmers need to be brought into the stream by adding in modern ones

Reference:

1. Anderson, Jock R. and Feder, Gershon. 2007. ―Agricultural Extension.‖ In Handbook of Agricultural Economics, Vol. 3, ed. Robert Evenson and Prabhu Pingali. Amsterdam: North Holland.
2. Anderson, Kym, editor. 2009. Distortions to Agricultural Incentives. A Global Perspective, 1955 – 2007. New York and Washington D.C.: Palgrave Macmillan and World Bank.
3. Anderson, Kym, John Cockburn and Will Martin. 2010. ―Would Freeing Up World Trade Reduce Poverty and Inequality? The Vexed Role of Agricultural Distortions.‖ Forthcoming.
4. Barrett, Christopher B. 2002. ―Food Security and Food Assistance Programs.‖ In Handbook of Agricultural Economics, Vol. 1B, ed. Bruce L. Gardner and Gordon C. Rausser. Amsterdam: North Holland
5. Beintema, Nienke M. and Gert-Jan Stads. 2006. ―Agricultural R&D in Sub-Saharan Africa: An Era of Stagnation.‖ Background Report, International Food Policy Research Institute, Washington D.C.
6. de Janvry, Alain, Elisabeth Sadoulet and Rinku Murgai. 2002. ―Rural Development and Rural Policy.‖ In Handbook of Agricultural Economics, Vol. 2A, ed. Bruce L. Gardner and Gordon C. Rausser. Amsterdam: North Holland
7. Ghatak, Maitreesh and Sanchari Roy. 2007. ―Land Reform and Agricultural Productivity in India: A Review of the Evidence.‖ Oxford Review of Economic Policy 23 (2): 251 – 269.
8. Himanshu, Peter Lanjouw, Abhiroop Mukhopadhyay and Rinku Murgai. 2010. ―Non-Farm Diversification and Rural Poverty Decline: A Perspective from Indian Sample Survey and Village Study Data.‖ Paper presented at the Conference Agriculture for Development-Revisited, University of California at Berkeley. October 1-2.
9. Johnston, Bruce F. and John W. Mellor. 1961. ―The Role of Agriculture in Economic Development.‖ The American Economic Review 51 (4): 566 – 593.
10. Matsuyama, Kiminori. 1002. ―Agricultural Productivity, Comparative Advantage, and Economic Growth.‖ Journal of Economic Theory 58 (2): 317 – 334.
11. Reardon, Thomas, Christopher Barrett, Valerie Kelly and Kimseyinga Savadogo. 1999. ―Policy Reforms and Sustainable Agriculture Intensification in Africa.‖ Development Policy Review 17 (4): 375 – 395.

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WATER QUALITY AND HEALTH

Shaziya Mohammed Irfan Momin
Assistant Professor, Department of Chemistry, G.M.Momin Women's College, Bhiwandi, Dist Thane, Maharashtra, India
Email-farhanmomin9890@gmail.com

Abstract:
The water is clean and pure source of energy which should be free from any contaminants and should contain only the hydrogen ion and hydroxyl ions.This pure form of water is very essential for healthy life and for good health of human being. Therefore the quality of water should be maintained properly so that good health is maintained. Deterioration of quality of water due to different anthropogenic activities, one of the such property is festival period (Idol immersion activities) which result in decrease and obliteration in the quality of water and ultimately affects the human health.
Keywords: Water quality, Human health, Contaminants

Introduction:

Pollution of any water reserviour is caused by disposal of waste material into lake water. Initially the waste from the community was relatively small and the easiest method of disposal was to dump it into the nearest receptacle [1]. Pollution of water due to discharge of industrial and domestic effluents are creating a serious threates to the human populations.

Because of immersion of Idol, the concentration of heavy metals get increased as these metals along with some other metals are applied on the Idol as a decorative paints.In this manner level of heavy metals get increased in the ponds,lakes,river and ocean.These all heavy metals have a tendency to get concentrated from one tropic level to another tropic level in the food chain.As the food chain get disturbed,the entire aquatic ecosystem get destroyed by the metal toxicity.These heavy metal toxicity are very significant scientifically not only among the scientist may be biologist,environmentalist and chemist but also among the human population having a somewhat knowledge about the harmfull effects of heavy metals[2].

Water is known as human life because it is needed in every form of life and for every purpose of life surviving. Besides, we create energy from water and navigate in it. Water is such an essential resource for our life that most of the ancient civilizations have developed in the river valleys of the country. With the growth and development of the modern civilization, our life is threatened due to pollution and contamination of water both from surface and underground routes. The doctors predict that several disorder widen due to contaminated water. In our country, the insufficiency of pure drinking water is felt too much that 50.0 % of urban people and 81.0 % of rural people are affected by water contamination [3].

Pollution of water is defined as a deterioration of water quality due to introduction of some external materials may be from natural or anthropognic phenomena.

If the level of contaminants get increased than the standard limits prescribed by the standards bodies are harmfull for drinking [4,5]. Water pollution is the undesirable and unwanted mixing or entry of the foreign substances, elements, entities and matter may be solid ,liquid and gaseous which results in the formation or accumulation of harmful or hazardous substances in the water , which are completely not required and should not be present in the water otherwise the quality of water get deteriorated and when this deterioration or contamination in the water reservoir or water bodies occur then automatically it leads to an decrease in the quality of water .Quality of water means , the required element which is necessary for the good health of human being and it should be obtained from the clean and green that is pure water which contain only the significant element in appropriate proportion along with elemental hydrogen ion and hydroxyl ion. Therefore the contamination of water with undesired substance will leads to change in the quality of water and it is very clearly seen by the appearance of water that this water is not suitable for human consumption. There are the various physical and chemical characteristics of water which are necessary to define the good quality of water as different standard bodies like World Health Organisation, Bureau of Indian Standard provides the standard prescribed level or concentration of different physical and chemical parameters present in water and up to what concentration they are allowed to be present in water and most of the chemical parameters are represented by the concentration unit of parts per million or milligram per liter .And if the level of physical and chemical parameters goes high than the prescribed

concentration or level then it causes destruction in water quality which will have great influence on human health.

Water is a fundamental product, both to sustain life and for the worldwide financial system. However, the quality of water throughout the globe has rapidly declined for decades due to the impact of both natural and anthropogenic factors. Assessing water quality for different water use purposes, such as domestic use, irrigation, conservation and industrial usage, are an important approach for food safety and human health. Water quality assessment aims to identify the sources of water pollution and develop a strategy for sustainable water source management, maintaining and promoting human health and other social and economic growth. Surface water quality indexes have been developed and introduced worldwide by researchers with various applications of the Nation Sanitation Foundation Water Quality Index (NSFWQI), the Water Quality Index (WQI), the Comprehensive Pollution Index (CPI), the Organic Pollution Index (OPI), the Trace Metal Pollution Index (TPI), the Eutrophication Index (EI) based on the database of water monitoring parameters. In Vietnam, research on water quality assessment mostly focuses on comparing the concentration of pollutant to the national surface water quality standard [6].

In this research study which is a part of an literature review, author focused on the determination of physico-chemical parameters, such as temperature, pH, Electrical conductance, hardness, chlorides, alkalinity, dissolved oxygen, biological oxygen demand, chemical oxygen demand, phosphate and sulphate of water samples from different sampling points. Increase of pollution concentration indicate an increase in the pollution load due to domestic sewage and industrial effluents and anthropogenic activities and discharge of wastes to the discharge into river at Erode district [7].

In this research study which is a part of an literature review, author write regarding the quality of drinking water, microbiological contamination is a primary concern of developing countries. In addition, inorganic contaminants,organic chemicals, dyes ,drugs and other different kind of chemical as a byproduct which are discharged in to near by water bodies concerning both health and aesthetic aspects, are found in the water bodies. Fluoride and arsenic are a great health problem worldwide as indicated by this research paper as there are many other heavy metals released in to water which are detrimental to the human health. The public health burden of these two chemicals far exceeds that of other chemical contaminants in drinking-water, but globally it is masked by the public health impact of microbial contamination[8]

Methodology:

The quality of the water is assessed during festival period .The water body which is selected for study purpose is Varal Devi lake water. Different physico-chemical parameters were determined by using a standard method and it was found that the level of most of the parameters are greater than the standard limit prescribed by the standard body.Causual relationship of heavy metals and other contaminants which are present or entered in the water which deteriorates the quality of water are then determined by using different studies which is been done on quality of water and how does it affects the human health.

Result And Discussion:

Water is clean and green source of energy and provides all necessary elements in a accurate proportion which is required for healthy growth of human beings. Deviation in the quality of water due to increase in pollution created by human population leads to an drastic change in the quality of water.This disturbance in quality of water due to various anthropogenic activities like different kinds of festival(Idol immersion activities) which releases various types of soluble and insoluble contaminants and chemicals.Deviation in physical and chemical properties of water due to man made sources make the water unfit for human use. Even though such kind of water is been utilized by human being as a source of drinking water and also for serving to the domestic animals.As most of the water bodies are the source of drinking water and provides edible fishes.There are different hazards and harmful effect of using low quality or already deteriorated quality water on human health and it causes various diseases.There are different metals, colouring agents are released in the water when idols are immersed in water, some of the elements are even non biodegradable and they do not undergo disintegration or breakdown in water and remain persistent in water bodies and causes diverse effect on human health.

The increased amount of metals in lake water are toxic to the living communities in the aquatic ecosystem and also cause health problems in humans. The aquatic ecosystems are degraded by the increased nutrients and metals. Water quality is impaired and water availability is decreased [9,10].The water in which fish breeds and consume this polluted water with heavy metals and other chemical compounds and substances which destroy the proper functioning of internal organs of fish and creates various diseases in the fish. This then through biomagnifications enters the human body and results in various diseases in humans.

Reference:

1. Sindhu,P.S., Environmental Chemistry , New Age International Publisher , Chapter Water Pollution ,54-59.
2. Kaur R. D. O,[2013], Comparison of immersion effects of idols made of different materials on the water quality parameters, Indian journal of Fundamental and applied life sciences,l3(1),16-23.
3. Singanan. M., Wondimu.L., and Tesso.M.,[2008], Water quality of Wenchi Crater Lake in Ethiopia, Maejo International Journal of Science and Technology,2(2), 361-373.
4. De A. K., Environmental Chemistry, International (P) Ltd, Publishers: Fifth edition New Age.
5. Prasad. D & Gaur.H. S,[1992],Environmental pollution : Water, Venus Publishing House , New Delhi, 294 -330
6. Cao Truong Son, Nguyen Thi Huong Giang; Trieu Phuong Thao; Nguyen Hai Nui; Nguyen Thanh Lam; Vo Huu Cong, Assessment of Cau River water quality assessment using a combination of water quality and pollution indices , Journal of Water Supply: Research and Technology-Aqua (2020) 69 (2): 160–172.
7. Available online at: https://doi.org/10.2166/aqua.2020.122
8. Study Of Water Quality Parameters Of Cauvery River Water In Erode Region, Arivoli Appavu, Sathiamoorthi Thangavelu, Satheeshkumar Muthukannan, Joseph Sahayarayan Jesudoss and Boomi Pandi, Journal of Global Biosciences ISSN 2320-1355 Volume 5, Number 9, 2016, pp. 4556-4567
9. Website: www.mutagens.co.in
10. Sabrina Sorlini , Daniela Palazzini , Joseph M. Sieliechi , Martin B. Ngassoum, Assessment of Physical-Chemical Drinking Water Quality in the Logone Valley (Chad-Cameroon), Sustainability, 2013, 5, 3060-3076;
11. doi:10.3390/su5073060, ISSN 2071-1050
12. Available online at : www.mdpi.com/journal/sustainability
13. Das K. K, Panigrahi T, Panda R.B, [2012], Idol Immersion Activities Cause Heavy Metal Contamination in River Budhabalanga, Balasore, Odisha, India, International Journal of Modern Engineering Research (IJMER), 2(6), 4540-4542
14. Singh T. A, Meitei L. B. ,Meetei N. S.[2012], Distribution Pattern of Enteropathogens in Greater Imphal Area of Imphal River, Manipur ,Current World Environment, 7(2), 259-265.

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IMPORTANCE OF ENVIRONMENTAL ETHICS IN INDIAN PHILOSOPHY

Prof. Dr.Vijay Shedage
Head, Philosophy Department,Agasti Arts, Commerce andDadasaheb Rupawate Science College, Akole, Tal. Akole, Dist.Ahmednagar

Introduction:

The environment has been given a very important place in Indian philosophy. The human body is made up of the five great physical elements; Earth, water, fire, air and space. This truth was first introduced to the world by Indian philosophy. In the past, land use was systematically planned. Some areas were forested, some were kept for cattle grazing, some were kept for agriculture and settlement. But as the world's population grew, so did the need for land to build houses. The trees were cut down without any thought. Next came the age of machines, where humans resorted to machines to alleviate their suffering. As a result, industry grew, and villages began to crumble for factories. Naturally, the balance of nature began to shift.

Due to the growing population and factories, the need for water was increased tremendously. Dams were built to make the water available and to generate energy. The trees were cut down. Fertile lands were buried under the dam. The deforestation affected the animals and birds.

The environment is an all-encompassing subject. Human beings are responsible for the rising average temperature of the earth as well as nature. Geographical and scientific problems arise, such as water cycle failure, ozone depletion, and missile tests. As human beings are a very intelligent component of the environment, human beings have a responsibility to protect, nurture and balance the environment, for which human beings need to be aware of environmental ethics.

Nature Of Environmental Ethics :

There is an inextricable link between life and nature. The environment is the idea of the interrelationship between man, nature and all the elements of nature. The introduction of environmental ethics is very important for maintaining this relationship.

Definition Of Environmental Ethics:

Environmental ethics is the practice of human beings taking care and not spoiling the benevolent relationship of the human race with nature.

Environmental ethics is the study of the principles of conduct designed to prevent the degradation of human and non-human creatures on Earth.

Man is an integral part of the environment. The existence of living and non-living things also depends on the state of the environment. Due to increasing population, increasing industrialization, increasing pollution, the need for environmental ethics' awareness is being felt by all the nations of the world, because if the balance of the environment is disturbed, the existence of living creatures on all beautiful planets like Earth will be threatened.

The relationship between nature and man has to be considered in environmental ethics. Human beings have started using nature's resources for their own selfish ends. Nature's trees are cut down for their own development and attractive furniture is made and sold in the market. Deforestation inevitably threatens the survival of animals and birds. Some people make ornaments from the body parts of many wild animals, not for their own subsistence, but as a beauty item in the house. For example, wall-pieces and showpieces are made from ivory. These beauty products fill today's markets. Nature was worshiped in ancient times. Example- In the month of Shravana, Vatvarksha(Banyan tree) was being worshiped. The peasantry worshiped the bull on the occasion of the Bailpola. Snakes on Nagpanchami were worshiped as a snake deity and Govardhan mountain was worshiped as a nature worship in pilgrimage places like Vrindavan.

The real reason behind nature worship is environmental protection. Due to this nature worship, for example, in the Varanasi pilgrimage site, the river Ganga continued to flow with clean and pure water. The problem of water pollution has been created due to the construction of dams by human beings in many places. In fact, in modern times, human beings have started the degradation of the environment and the ecological balance has been disturbed.

Is it right or wrong to kill animals for your own benefit? Don't animals and plants have duties and rights because they do not have intellect? Such questions are discussed in Environmental Ethics.

Nature has an important place in the environment. Awareness of environmental policies is essential for the protection of natural resources. The development of Indian culture started from the Vedic period. In the valleys of rivers like Ganga, Indus, Godavari, Kaveri, Pravara, Indrayani, Chandrabhaga, Yamuna, etc., Indian culture developed rapidly.

For the protection of trees and animals in the Vedic period, their relationship with the deities was connected. Example- Tulsi Vrindavan in front of your house. The Tulsi tree in Vrindavan balances the environment. The aroma of Tulsi enhances happiness in the home. Tulsi constantly produces oxygen gas. In Ayurveda, many medicines are made from Tulsi. Tulsi creates a conducive environment for human health. It is the moral duty of every member, and not only family, to nurture this multi-faceted Tulsi, this is called environmental ethics.

Forest resources are a gift to human beings. Forests are an important source of livelihood for human beings in mountainous areas. Ayurvedic trees are found in this hilly area. It is the moral duty of the people in the area to save this tree. Small and big business is done by collecting different types of fruits, herbs, honey. Nature's original clean goods are delivered to the customer, so the application of business policy in applied policy science is possible only due to nature.

India's social norms, traditions, practices and culture are related to the environment. Indian culture has been identified with the ancient Vedas, Ramayana, Mahabharata, Bhagavad Gita and its relationship between culture, nature and environment has been clarified. Bathing in the river, bathing in the evening, sunbathing in the fields, working in the fields, performing Surya Namaskar, performing fasting and festivals, etc., all seem to be in harmony with nature. From human birth to death, festivals and rituals are performed according to the environment.

Tree Conservation:

As the humans can brighten their future, this fact also apply to the trees as they bend down till the sunset. This means that they have the urge to live. That is why trees are important. If innumerable deforestation occurs, the balance of nature will be disturbed and human beings will have to bear the consequences. Therefore, it is the moral responsibility of every individual to ensure that the natural balance is not disturbed.

Our culture considers nature as 'God'. The holiness and beauty of this God is destroyed by man. Our saints have considered nature as a source of trees, vines, animals and birds.

वृक्षवल्ली आम्हा सोयरी वनचरे|

पक्षीही सुस्वरे आळविती||

Such is the feeling of Saint Tukaram.

Saint Gyandev, while giving guidance on how to build cities while preserving the beauty of nature, says-

नगरेचि रचावी| जलाशये निर्मावी

महावने लावावी| नानाविध|| (Dnyaneshwari)

जो खांडावया धाव घाली| का लावणी

जयाने केली| दोघा एकची साऊली|

वृक्ष दे जैसा||

Environmental ethics is about realizing that human beings cannot survive without loving and protecting nature.

Animal Conservation:

Animals should have the same right to life as humans. Animal ethics is a consideration of how human beings should behave in the case of animals.

If some people think that animals have rights then we should conserve animals. Don't kill animals for your food. The right of animals is to free them from the clutches of man. Although animals cannot speak, they have some emotions and sensations. If human beings give rights to them as intelligent creatures considering their emotions, then there will be no creation of violent environment around them and compliance with environmental ethics will happen automatically.

All animals should have the following rights:

Animals should have the right to live as human beings have. They must have the following rights:

1. The right to find one's own food.
2. Animals should also be given medical treatment in case of illness.
3. Animals should have the freedom to behave like humans.
4. Animals should not be used as tools.
5. Animals should not be used as food.
6. Use of animals for human entertainment i.e. bullock cart race; Animals like tigers, lions, elephants, monkeys and bears should not be played in the circus.
7. Heavy objects should not be placed on the body of animal i.e. donkey.
8. Animals should have the right to roam freely in nature. Cages Parrot should be banned.
9. Do not hit the horseshoe in horse's feet. Don't race against its will.

We should treat animals with respect and without any kind of exploitation. The idea that the fundamental and moral rights of animals should be protected is gaining ground in modern times.

Land Ethics Theory:

Earth is a big family. Land Ethics is a system of life that balances the earth and its surroundings as it is the house we enjoy living in.

Land Ethics includes organic and inorganic components. Biological components include non-human animals, insects, livestock, fauna, plants, etc. Inorganic elements include earth, sun, moon, stars, rivers, mountains, rocks, pebbles, roads, industries, air, water, fire, light, etc. That is, land ethics includes all biological and inorganic elements such as land, air, water, light, plants, animals and humans. The individual has certain duties and responsibilities towards all the elements of this extended family. In it, all our family members, neighbors, pets useful for agriculture, manpower useful for work and all other biological and inorganic factors are given a place in Land Ethics.

What values should man adopt to maintain the balance of the environment? What lifestyle should humans adopt to conserve the environment? This is what environmental policy thinks. Environmental policy thinking is profound.

Environmental problems-

Environmental problems are not caused by the scarcity of natural resources but by the destruction of the environment by man for his own economic progress and enjoyment. Beginning to cutting down trees. Construction of factories increased air pollution. Many of these things have caused pollution problems for humans. Mankind neglected harmony with nature, oneness, love. The arbitrary and unrestrained behavior of human beings has created discrepancies between the available resources, the growing human population and the consumption of resources, leading to many kinds of problems. Problems such as pollution, ecological imbalances, natural disasters, man-made disasters, eruption of human population, unplanned extravagance and misuse of resources, premature depletion of resources and scarcity. There is a need for environmental management and planning to address these issues.

Essentials For Environmental Protection:

1. At least 33% of the total land area must be for forest.
2. Rainwater harvesting must be practiced.
3. Automatic vehicles should be used for the right purpose and pollution should be controlled.
4. Noise limit should be observed while conducting any cultural program.

5. Nature conservation and environment education should be imparted to every citizen of the country. It is easily possible to protect the environment by adopting these and other things.

The importance of environmental ethics has been mentioned in many religions and scriptures in India:

1. Hinduism – Cultural, social, natural, historical and geographical importance of the environment is given to plants, animals, land, air, mountains and hence are worshipped.
2. Jainism- Vegetarianism is given importance in Jainism. "Ahimsa Paramodharma" is the supreme religion of not harming others. Jainism teaches that plants purify the air. The message is to love the tree. Also worm infestation is considered taboo.
3. Buddhism- Gautama Buddha attained enlightenment under the Bodhisattva tree. The first discourse on the acquisition of knowledge by the Buddha addressed to the five ascetics is called 'Dharmachakra Pravartan'. In this discourse he preached four Aryasatyas. Also the importance of Ahimsa, Satya, Asteya, Brahmacharya, Aparigraha and Aryashtanga path has been mentioned.
4. Islam – The importance of environmental conservation is stated in the Quran.

Conclusion:

Everyone has the right to life, liberty and security of person. Our unity is related with non-human beings, plants, unconscious creatures. What should we do about the environment to keep this relationship going? Environmental ethics is about following the principles, values or rules that tell us how to treat the environment. In this dissertation, the importance of environmental ethics in Indian philosophy has been explained in terms of tree conservation, animal conservation, animal rights, family policy, as well as environmental issues and issues related to environmental protection.

Also, by explaining the nature of environmental ethics according to the Vedic period, Indian sages have explained the guidelines of environmental protection with the help of plant sukta, animal sukta and Samhita from many religious texts. In today's age of mechanics, I strongly believe that these principles will be useful for human protection. All the philosophies of Indian philosophy have made clear the importance of environmental ethics. Accordingly, every human being is expected to behave according to environmental ethics.

References:

1. Bhartiya Tatvadnyan- Mr.Nivas Dixit
2. Nitishastra- Dr.Sunil Salunke
3. Nitimimansa- P.D.Chaudhari
4. Sant Tukaram Gatha- P.M.Lad
5. Sartha Dyaneshwari- Mamasaheb Dandekar
6. Paryavaran Shastra- Dr.Surekha Pandit
7. Paryavaran Shastra- Bhandarkar.K.C
8. Manav aani Paryavaran- Dr.Niranjan Ghate
9. Paryavaran Prakalpa Karya- Dr.Taruja Bhosle
10. Paryavaran Shastra Parichaya- Dr.Jaykumar Magar

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ANALYTICAL STUDY OF THE POLICIES AND LAWS OF THE CENTRAL GOVERNMENT REGARDING PRESERVATION OF THE GROUNDWATER AND PREVENTION OF ITS POLLUTION IN INDIA.

Dr. Umesh S. Aswar
Former Judge, Assistant Professor, Government Law College, 'A' Road Churchgate Mumbai 400020, Mail ID umeshaswar@gmail.com

Abstract:
The clean and pollution free water is an essential ingredient of the healthy environment. The issue of the preservation of the groundwater and prevention of its pollution is an integral part of the prevention and control of the water pollution. The central Government is expected to play leading role regarding it. Therefore it is necessary to examine Indian policies and laws regarding preservation of the groundwater and prevention of its pollution.
Keywords: International and municipal environmental jurisprudence – the Water (Prevention and Control of Pollution) Act 1974 – provisions under other laws for preservation of the groundwater and prevention of its pollution – policy of the central Government.

Introduction:

The problem of the environmental pollution was identified after Second World War. It was the United Nations Organization's conference at Stockholm, Sweden organized in 1972 which is popularly called as first earth summit where for the first time this problem was discussed. Subsequently in the year of 1982 UNO organized second earth summit at Nairobi, Kenya in the year of 1992; third earth summit by UNO was organized at Rio de Janeiro, Brazil. Since then after every 10 years by and large UNO has been organizing international conferences with the objective of the protection of environment and for prevention of its pollution. The conventions passed in these conferences do also specify the environmental jurisprudence in form of the principles namely sustainable development, doctrine of public trust; polluter pays principle, precautionary principle etc. It also includes mandate for the preservation of the groundwater resources and prevention of its pollution.

Being state party to these conferences India has introduced suitable amendments in its Constitution by virtue of the 42nd Constitutional Amendment Act 1976 for the implementation of the objective of protection of environment and for prevention of the environmental pollution. Accordingly Article 48A and Part IVA were inserted in the Constitution. Under Article 21, 14, 19 read with Article 47, 48A, 51A the right to pollution free environment has been declared by the higher judiciary as one of the fundamental rights under Indian Constitution. The preservation of the groundwater and prevention of its pollution is ancillary to it.

Moreover the Supreme Court in the cases namely *M.C. Mehta v. Union of India* AIR 1988 SC 1037, Ganga (Tanneries) Pollution Case, *Vellore Citizens Welfare Forum v. Union of India*, AIR 1996 SC 2721, *Subhash Kumar v. State of Bihar*, AIR 1991 SC 420 and in many other cases has specifically stated that right to pollution free water is an integral part of the fundamental right to pollution free environment. But no full proof scheme as such has been specified by higher judiciary for the preservation of the ground groundwater resources and for protection of its pollution; which in fact is the domain of the legislative organ of the state.

Legislative Competence In Environmental Matters:

Under Indian federal system Constitutional law distributes legislative power between Union and the State Governments. Accordingly the division of the lawmaking power pertaining subject namely forest and environment between central Government and the State Governments is apparent. Moreover central Government has exclusive prerogative of enacting suitable legislations for the sake of implementation of international obligations accepted in form of any treaty agreement and any decision taken in international conference, organization etc to which India is party. In order to discharge above referred international obligations Parliament has passed some of the important legislations such as the Air (Prevention and Control of Pollution) Act 1981 and the Environment (Protection) Act 1986.

Parliament even may enact laws on any of the state subjects wherein state legislative assemblies have passed the resolutions consenting for it. For example the Wild Life (Protection) Act 1972 was enacted

by Parliament to honour resolutions passed by the 11 states. The Water (Prevention and Control of Pollution) Act 1974 was enacted by Parliament because relevant resolutions were passed by 12 state legislatures.

The subjects namely forests and protection of wild animals and birds has been put into concurrent list by passing Forty-Second Constitutional Amendment Act 1976. Now union and state Governments may enact suitable legislations on it.

The Water Prevention and Control of Pollution Act 1974, Coastal Zone Regulation Notifications, Provisions of IPC and Other Statutes regarding Preservation of Groundwater & Prevention of its Pollution:

Apart from the provisions under the Water Act 1974 there are some provisions under Indian Penal Code, Coastal Zone Regulation Notifications and under other statutes for the prevention of the water pollution.

I) Indian Penal Code 1860: Under section 268 of IPC the term public nuisance has been defined. Water pollution in any form constitutes public nuisance and same is punishable with imprisonment of either description for a term which may extend to three months, or with fine which may extend to five hundred rupees, or with both. It is cognizable, non bailable and no-compoundable offence, triable by court of judicial magistrate first class.

II) The Coastal Zone, Regulation Notifications (As Amended By Notification Dated 16/08/1994 And Supreme Court Judgment Dated 18/4/1996): Under it ministry of environment & forests of the central Government in exercise of the power conferred by clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules 1986 and all other powers vesting in its behalf, declared that the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action (in the landward side) up to 500 metres from the high tide line (HTL) and the land between the low tide line (LTL) and the HTL as Coastal Regulation Zone. Central Government has imposed the restrictions on the setting up and expansion of industries, operations or processes, etc., in the said Coastal Regulation Zone (CRZ).

III) Legislative Framework Under The Water (Prevention And Control Of Pollution) Act 1974: The main objectives of the Act are,

i) To provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water.

ii) To establish with a view to carrying out the purposes aforesaid, boards for the prevention and control of water pollution, for conferring on and assigning to such boards powers and functions relating thereto and for matters connected therewith.

The central Government under section3; the state Government under section 4 and two or more state Governments or union territories under section 13 may constitute central pollution control board, state pollution control board and joint pollution control board respectively. These boards under water Act 1974 are the statutory authorities entrusted with the policy making powers to deal with the problem of water pollution.

The water pollution control boards under section 21 enjoy the power to take samples of effluents in conformity to the prescribed procedure whereby water pollution in the industrial establishments can be traced out. The Act under section 23 also confers power on the boards to send their officers for the inspection of the industrial establishments etc.

Section 24 prohibit the persons to cause or permit any poisonous, noxious or polluting matter determined in accordance with the standards laid down by the state board to enter directly or indirectly into any stream or well or sewer or on land. It further forbids to abstract flow of any stream in order to cause logging resulting into water pollution. Whoever contravenes the provisions of section 24 shall be punished with imprisonment for a term which shall not be less than one year and six months but which may extend to six years and with fine.

Under section 25 of the Act without the previous consent of the state board no one can establish or take any steps to establish any industry, operation or process, or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land. Similarly no new or altered outlet for the discharge of sewage can be built up without the prior permission of the board. Whoever contravenes the provisions of section 25 shall be punished with imprisonment for a term which shall not be less than one year and six months but which may extend to six years and with fine.

Section 33 confers power on the board in case of the apprehension of the pollution of water in streams or wells to make application to metropolitan magistrate or judicial magistrate first class, for restraining the person who is likely to cause such pollution from so causing.

Section 45A speaks that whoever contravenes any of the provisions of this Act or fails to comply with any order or direction given under this Act, for which no penalty has been elsewhere provided in this Act, shall be punished with imprisonment which may extend to three months or with fine which may extend to ten thousand rupees or with both, and in the case of a continuing contravention or failure, with an additional fine which may extend to five thousand rupees for every day during which such contravention or failure continues.

Under section 47 (offences by companies) and section 48 (offences by Government departments) the private and Government companies similarly Government departments have also been brought within the ambit of the provisions of water Act.

iv) Provisions under other Acts: **a)** Under **Indian Fisheries Act 1897** use of dynamite or other explosive substance in any manner (whether in the coastal or inland area) for the sake of catching or killing of fishes is an offence wherein penalty has been prescribed.

b) The River Boards Act 1956 empowers the central Government for setting up an advisory river board in order to resolve issues regarding interstate water disputes.

c) The Merchant Shipping Act 1970 contains the provisions for the prohibition of the waste emitting from ships in the coastal areas within a specified radius.

d) The Water (Prevention and Control of Pollution) Cess Act 1977 prescribes provisions for the levy and collection of cess or fees on water consumed by the industries and local authorities. It also contains the standard definitions and indicate the kind of and location of meters that every consumer of water is required to affix.

IV.The Policies Of The Central Government On Preservation Of Groundwater And Prevention Of Its Pollution: Under Environmental Protection Act 1986 central Government has been empowered for taking necessary steps for the protection of environment. Accordingly in order to regulate and control preservation and management of the groundwater resources central Government has constituted Central Ground Water Authority under Section 3 (3) of the Environment (Protection) Act, 1986. It works under control of Government of India's Ministry of water resources. It is the agency at apex level entrusted with the obligation of providing scientific inputs for the better regulation of the groundwater resources which includes its management, exploration, monitoring and act of assessment of the same.

The groundwater resources of the country are mainly facing two threats one is arbitrary increase in the arsenic level of the water because of the natural phenomena. The second threat is excessive use of the groundwater resources by the individuals and its degradation /pollution by them.

The degradation, pollution of the groundwater includes depletion of water tables, increase in the saltwater tables in the ground, drying of aquifers, water logging and salinity, etc. In many parts of the country the groundwater table has been lowering down 1-2 meters per year. Similarly in some of the parts of the country in canal command areas there is rise in the groundwater table by 1 meter per year because of excessive availability of the water. Intensive irrigation through canals hampers the natural cycle of the environment leading towards multiple issues such as soil pollution etc. Thus because of the degradation, pollution of the groundwater sources the availability of the freshwater has been reduced.

The reason for the increase in the arsenic level of the water is environmental imbalance which has been happening because of the excessive use of the natural resources and pollution. The persons who are owner of the land could make arbitrary use of the land water resources because of the provisions of the Easement Act, 1882. Under it every landowner has legal right to collect and dispose of all water under the land and on the surface.

Therefore Union Government has undertaken certain administrative measures to overcome above-mentioned problems of the groundwater sources. The Government of India along with the state Governments has initiated the schemes namely Jal Jeevan Mission and Har Ghar Jal with the objective of making the potable water available in an adequate quantity in the regular manner to each rural household inclusive of the tribal areas of the country through tap water connection by 2024. However because of the lack of awareness and certain issues at the political and administrative end many challenges have been observed in the path of absolute implementation of these schemes.

V.Conclusion And Recommendation: On the basis of above-mentioned analysis following conclusions are drawn.

i) There are adequate provisions under Indian laws in form of coastal regulation zones, specific sections of the Indian Penal Code 1860 for the prevention and control of the water pollution but there is no central

legislation passed exclusively for the preservation of the groundwater resources and for prevention of its pollution.

ii) Despite of the administrative directions issued by Government of India under Environmental Protection Act 1986 for the preservation of the groundwater resources and for prevention of its pollution the above-mentioned threats to the groundwater sources have remained intact.

iii) The judgments passed by the high courts and supreme court laying down the environmental jurisprudence do not provide detailed scheme for the preservation of groundwater resources and for prevention of its pollution.

Hence it is necessary that central Government should enact special legislation providing detailed scheme for streamlining easementary rights of an individual regarding use of the groundwater resources for its preservation and for prevention of its pollution on the basis of the concept of sustainable development.

References:

1. P. Leelakrishnan, Environmental Law in India, 2019, Lexis Nexis.
2. Divan Shyam and Rosencranz Armin, Environmental Law and Policy in India: Cases, Material & Statutes.
3. H. N. Tiwari, Environmental Law, 2016, Allahbad Law Agency.
4. S. Shanthakumar, Introduction to Environmental Law, 2017, Lexis Nexis.
5. Dr. S. C. Tripathi, Environmental Law, 2018, Central Law Publication.
6. M. P. Jain, Indian Constitutional Law, 2018, Lexis Nexis.

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RESIDUAL EFFECT OF NON LEGUMINOUS ORGANIC WEED MANURES ON GROWTH OF FODDER CROP LABLAB PURPUREUS

Dr. Gholap Prakash N.
Head Dept. of Botany, Kalikadevi Arts, Comm. & Sci., College, Shirur (Ka.),
Tal. Shirur (Ka.), Dist. Beed- 413 249, Dr. B.A.M. Uni. Aurangabad. (MS) India.
Email ID: prakashn.gholap@gmail.c

Abstract :

The experiment was conducted on the farm located at V-P High-tech Research farm, Dist. Beed. The experiment design was a randomized block design [RBD] with ten treatments and three replicates. Previous work in this laboratory and field shows that input, data for the organic manure treatments in form of Non-leguminous weed manures as green manure of Achyranthes aspera (AGM), green manure of Parthenium hysterophorus (PGM), mixed green manure of both (A&PGM), Dry manure of Achyranthes aspera (ADM), Dry manure of Parthenium hysterophorus (PDM), compost of Achyranthes aspera (ACo) and compost of Parthenium hysterophorus (PCo), were applied to field for maize crop cultivation compared with treatment of chemical fertilizers PK, NPK and Control. First maize crop was harvested and after 41 days of interval Lablab purpureus L. was sown in the same treatment plots of bed, having a previous residual effect of organic manures. The growth analysis of the plant was recorded after 27 and 53 days and Chlorophyll analysis of the plant was recorded after 28 and 54 days. Result shows that all organic manures showed good residual effect on growth of Lablab purpureus crops plants. Green manure and compost manure of Non-leguminous weeds gives long term residual effect on crop Lablab purpureus and improves the soil quality.

Keywords: Compost, Green, Dry manures, Treatment, Analysis, Chlorophyll.

Introduction:

Lablab purpureus is a species of bean in the family Fabaceae. it is cultivated throughout the tropics for food. It is a very important fodder crop for tropical people, especially in the dry season and with its enhanced nutritional value. It is not only drought resistant but also able to grow in diverse environmental conditions around the world. During the dry season Lablab purpuras dense green cover protects the soil from the action of sun rays and it can be advantageously used as a cover crop to reduce soil erosion due to wind or rain.

Parthenium hysterophorus is a species of flowering plant in the aster family, Asteraceae. In India, it is locally known as carrot grass, congress grass or Gajar Ghas. It is an annual herb that aggressively colonizes disturbed sites. It grows on any type of soil and in a wide range of habitats. It affects the production of crops, animals, human and animal health, and biodiversity. Achyranthes aspera is a species of plant in the family Amaranthaceae. It is distributed throughout the tropical world. It can be found in many places growing as an introduced species and a common weed.

An application of manure usually shows a favourable influence on crop yields for several years. These beneficial effects are distributed over a longer time than those of chemical fertilizers. Present investigation state that the residual effect of Non-leguminous (Parthenium hysterophorus and Achyranthes aspera) weeds organic manures as compost, green and dry leaf manure effect was studied on growth of Lablab purpureus.

Green manure and compost manure of Non- leguminous weeds gives long term residual effect on crop Lablab purpureus plant and its improves the soil quality **Gholap P. N.** (2021). The residual effects of organic matter in soil following manure or compost application on crop yield and soil properties can last for several years. Four years after application, residual effects of one-time application of beef feed lot manure at rates varying from 123 to 590 Mg dry weight ha^{-1} (1280–6140 kg N ha^{-1}) resulted in a quadratic increase in corn grain yield but also in increased leaching of NO_3–N and Na to a depth of at least 1m **Wallingford, G. W. et al** (1975).

Ayoola O. T. and Makinde E. A. (2007): Studied that complementary Organic and Inorganic Fertilizer Application: Influence on Growth and Yield of Cassava/maize/melon Intercrop with a Relayed Cowpea and concluded that complementary application reduces the dependence of the farmer on inorganic fertilizer use. It also reduces the exposure of the soil to the consequences of inorganic fertilizer application.

The residual effects of organic materials on soil properties can contribute to improvement in soil quality for several years after application ceases **Ginting, D. et al** (2003). Excessive and imbalanced use of chemical fertilizers has adversely affected the soil, causing decreasing the structure and water holding capacity, reduction in organic carbon and microbial flora of soil results as increasing acidity and alkalinity and harding of soil, to solve this organic manure plays an important role, they are complementary to the chemical fertilizers and many times they have the capacity to replace them **Gholap P. N.** (2021). Organic amendments play a residual role in their ongoing maintenance. Residual amendment effects on total nitrogen (N) and phosphorus (P) were apparent 11.5 yr after application **Larney F. J. et al** (2011).

Materials And Methods:

Field Site And Experimental Design - The experiment was conducted on the farm located at V-P High-tech Research farm, Dist. Beed. The experiment design was a randomized block design [RBD] with ten treatments and three replicates.

Treatments, Seeds Variety And Plot Size - The present work related to treatments of plots depends on the basis of the previous work of the field. First maize crop was harvested then on bed of previous residual effect of organic manure plots like comparative residual effect of compost, green manure and dry leaf manure. Previous work in this field shows that input, data for the organic manure in form of chemical fertilizers PK and NPK at the rate of 120N, 80P and 40K and Control (CON) compared with Non leguminous weeds organic manures as green manure of Achyranthes aspera (AGM), green manure of Parthenium hysterophorus (PGM), mixed green manure of both **A.**aspera & **P.**hysterophorus (A&PGM), Dry manure of Achyranthes aspera (ADM), Dry manure of Parthenium hysterophorus (PDM), compost of Achyranthes aspera (ACo) and compost of Parthenium hysterophorus (PCo). After 41 days of interval the Variety Lablab purpureus was sown. It was produced by a Patel Seeds Corporation, old Mandi P.O. Padra (Baroda, Gujrat). 36gm/plots of size 3m x 3m i.e. at the rate of 40 kg/ha each.

Plant Sampling - After 56 days of age finally the total crop Lablab purpureus was harvested, before it during the early hours of the day, growth and Chlorophyll analysis of green foliage of Lablab purpureus per plot was recorded on the field itself [100 gm plot $^{-1}$] samples of each treatment along with control they were oven dried at 90 ^{o} C for 2 Days till it gives constant weight for the determination of dry matter (DM), this dried sample was grinded to fine powder and stored in sealed polythene bags for further analysis.

Analysis :

Chemical Analysis - Chlorophyll analysis of green foliage of Lablab purpureus per plot was recorded on the field itself [100 gm plot $^{-1}$] samples of each treatment along with control they were oven dried for further chemical analysis. **Jackson, M. L** (1973),

Statistical Analysis - All the results were statistically analyzed by using analysis of variance [ANOVA] test and treatments means were compared using the least significant difference [CD,P_0.05] which allowed determination of significance between different applications. **Mungikar A. M**. (1997)

Results And Discussion:

Fig.1. Show that graph of Residual Effect of Non-leguminous organic weed manures on Lablab purpureus plant growth analysis. The plant Lablab purpureus maximum height recorded in the plant of Achyranthes green manure as 101.7cm, followed by Parthenium green manure 92.0cm, 87.7cm on NPK, and lowest in control 34.0cm, followed by Parthenium dry manure 47.7cm.

Total fresh plant weight in gms per plant at Lablab purpureus was highest in the treatments of the Achyranthes green manure as 24.3gm followed by Parthenium green manure as 24gm and the lowest Total fresh plant weight in gms per plant Lablab purpureus was in Control as 11gm followed of dry manure Achyranthes and Parthenium as 14.7gm.

4th leaf weight in mgs was highest in the treatment of Achyranthes green manure as 322.9mg, followed by Parthenium green manure as 292.2mg, then in Achyranthes compost manure as 285.8mg and the lowest 4th leaf weight in mgs in the treatment Control as 108mg.

Fig.2. Show that Graph of Residual Effect of Non-leguminous organic weeds manure on Lablab purpureus 4th leaf growth analysis, the plant was highest 4th Leaf Area on Achyranthes green manure 33.63cm² followed by Parthenium Green manure as 30.43cm², followed by Achyranthes compost manure 29.77cm² then while lowest Leaf Area found on treatment Control 11.25cm² then followed up Parthenium dry manure as 15.77cm².

The plant was highest 4th Leaf length on Achyranthes green manure 14cm followed by Parthenium Green manure as 13.7cm and lowest 4th Leaf length found on Control 9.7cm. Like wise the plant was highest 4th Leaf width on Parthenium green manure 11cm followed by Achyranthes Green manure as 10.7cm and lowest 4th Leaf width found on Control 6.7cm.

Fig.3. Show that Graph of Residual Effect of Non-leguminous organic weeds manure on Lablab purpureus analysis of estimation of Total Chlorophyll Chl.a & Chl.b (Mg/gm), Total Chlorophyll highest in Achyranthes Green manure & NPK as 2.32mg/gm followed by Parthenium green manure as 2.18mg/gm as well as lowest in control 1.45mg/gm followed by Achyranthes & Parthenium dry manure as 1.82mg/gm. Chl.a highest in NPK as 1.50mg/gm followed by Achyranthes Green manure as 1.47mg/gm as well as lowest in control 0.88mg/gm. Likewise Chl.b (Mg/gm) highest in Achyranthes Green manure as 0.85mg/gm followed by NPK as 0.82mg/gm as well as lowest in control 0.57mg/gm then Parthenium dry manure as 0.64mg/gm.

Conclusion:

On the basis of the result obtained, it can be concluded that an application of organic manure usually shows a favourable influence on crop yields for several years. These beneficial effects are distributed over a longer time than those of chemical fertilizers. Present investigation showed that the residual effect of Non-leguminous (Parthenium hysterophorus and Achyranthes aspera) weeds organic manures as compost, green and dry leaf manure, on crop Lablab purpureus plant plays an important role.

References:

1. **Ayoola O.T. and Makinde E.A.** (2007), "Complementary Organic and Inorganic Fertilizer Application: Influence on Growth and Yield of Cassava/maize/melon Intercrop with a Relayed Cowpea". Australian Journal of Basic and Applied Sciences, **1(3)**: [187-192];
2. **Gholap P.N.,** (2021), "Comparative study of various Organic Manures on Growth of Spinach". International Journal of creative Research Thoughts. http://www.ijcrt.org/papers/IJCRT2105837.pdf;
3. **Gholap P.N.,** (2021): "Residual Effect of Non Leguminous Weed Manures on Lablab Purpureus" International Journal of Researches in Biosciences, Agriculture and Technology. Issue (Special-17), [542–550].
4. **Ginting, D., A. Kessavalou, B. Eghball, and J.W. Doran.** (2003), Greenhouse gas emissions and soil indicators four years after manure and compost applications. J. Environ. Qual.**32**: [23–32];
5. **Jackson, M.L.** (1973), "Soil Chemical Analysis." Prentice Hall of India Pvt. Ltd., New Delhi;
6. **Larney FJ, Janzen HH, Olson AF,** (2011), "Residual effects of one-time manure, crop residue and fertilizer amendments on a resurfaced soil" Canadian Journal of Soil Science, 91(6):[1029–1043];
7. **Mungikar, A.M**. (1997) "An Introduction to Biometry." Saraswati Printing Press, Aurangabad;
8. **Wallingford, G.W., L.S. Murphy, W.L. Powers, and H.L. Manges.** (1975) "Disposal of beef-feedlot manure: Effects of residual and yearly applications on corn and soil chemical properties" J. Environ. Qual. **4** :[526–531];

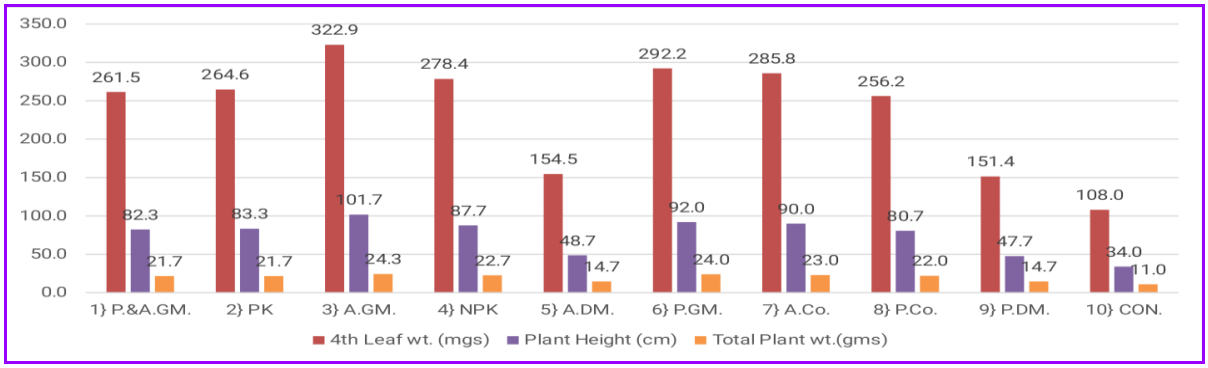

Fig. 1 : Graph of Residual Effect of Non-leguminous organic weed manures on Lablab purpureus plant growth analysis.

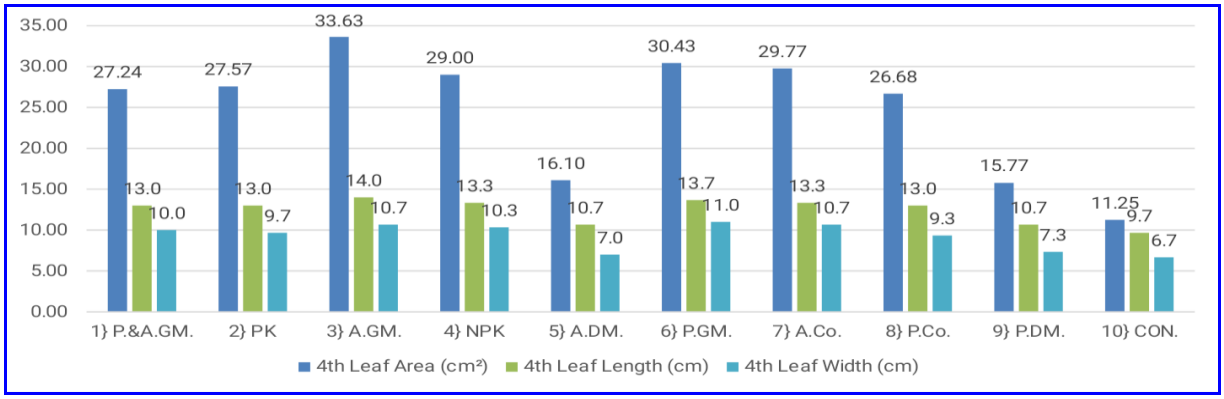

Fig. 2 : Graph of Residual Effect of Non-leguminous organic weeds manure on Lablab purpureus 4th leaf growth analysis.

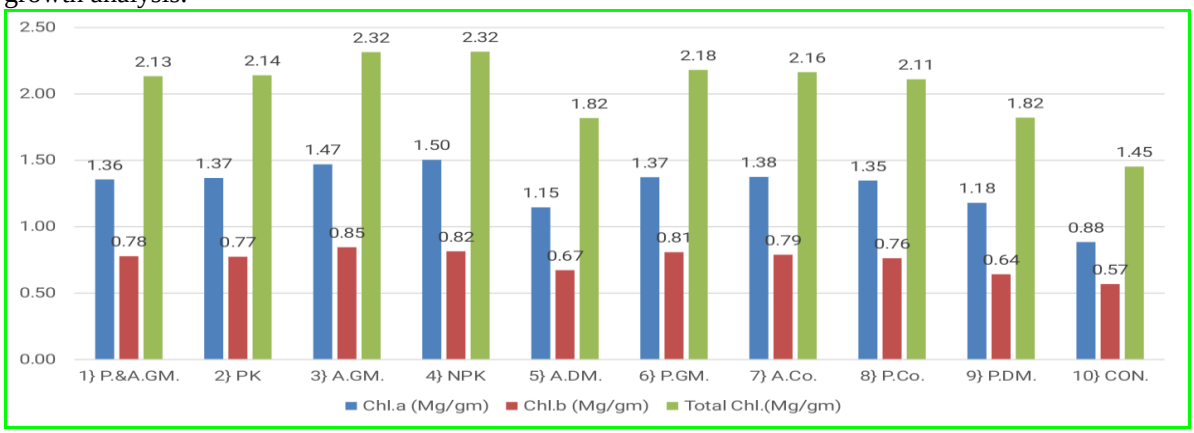

Fig. 3 : Graph of Residual Effect of Non-leguminous organic weeds manure on Lablab purpureus Chlorophyll analysis. Chl.a (Mg/gm) S.C.= 0.12, C.D.= 0.24, Chl.b (Mg/gm) S.E.= 0.06, C.D.= 0.12 and Total Chl. (Mg/gm) S.E.= 0.17, C.D.= 0.36

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ATMOSPHERIC CONCENTRATION OF NIGROSPORA SPORES OVER SUNFLOWER FIELDS

Pathare G. M.
Dept of Botany AnandraoDhonde Alias Babaji College Kada
Tq. Ashti Dist. Beed(M.S.)
E.mail. gorakshapathare14@gmail.com

Abstract:

Present paper deals with airborne concentration of *Nigrospra* spores over the Sunflower fields by using Volumetric continuous Tilak Air Sampler was employed for exploring fungal airspora over a Sunflower field at Kada, Tal.Ashti, Dist.Beed. From 5th July to 30th September 2016 for first Kharif season and from 1st July to30thSeptember 2017 for second Kharif season. The present paper deals with airborne concentration of *Nigrospra*spores over sunflower fields. The concentration of airborne *Nigrospra*spores was assessed and the roles of the metrological parameters over the spore concentration were discussed. The spore concentration was maximum (7542^{m3}and 8432/^{m3}of air) in the month of September 2016 and December 2017 during first Kharif season and first Rabi season respectively. Metrological parameters such as Rainfall, Relative humidity, Wind velocity and temperature showed significant effect on liberation of spores of *Nigrospra*in the airspora composition qualitatively and quantitatively.

Key Words: Aerobiology, Sunflower field, Air Sampler, Airspora

Introduction:

Aerobiology is branch of science which deals with the study of biological component like pollen grains, fragments of fungal spores, hyphal fragments, bacteria, viruses, algae, lichens, minute insects & insect parts, protonzoancyst, etc. In the atmosphere a biotic particulates & gases affecting living organisms have been recently included in the concept of aerobiology. The aerobiological studies are mainly concern with interrelationship between the biological component in the atmosphere, source of biological component, their release in the atmosphere, their deposition & impact on health of plants & animals including human beings. Airborne infections & the resulting diseases threaten the lives & productivity of plants. Airborne diseases still pose a challenge to mankind. The role of fungi in causing diseases to crop plants, man, domestic animal, in bringing deterioration of food grains in storage, valuable monuments has been subject of great interest for long time. Standing vegetation has a great influence of aerospora of any place and it changes with changes in weather. Sunflower (*Helianthus annus* L.) is one of the most important oil seed crops being grown all over the world. Sunflower seed cake or meal is a protein reach feed and is used as a concentrate for cattle, animals like pig, sheep, goat and poultry feed. Sunflower is native of North America. In Germany and Russia it is grown on large scale. Sunflower is not season bounded; as such it can be grown throughout the year with little irrigation when necessary. Another good feature is it's short of life cycle. Now a day's sunflower crop cultivation has become more popular among the farmers of Marathwada region. As considering survey of this crop that since last few years sunflower is subjected to various type of fungal diseases which may be soil borne, seed borne, airborne etc. The aim of present study was to find out the atmospheric concentration of *Nigrospora* and its correlation with meteorological parameters. It was with the aim to find out the important airborne pathogens, their distribution and seasonal variation in the concentration these investigations were undertaken, the prediction of airborne fungal disease could be attempted. If well in advance information of airspora of this crop is made timely available. In view of the above fact using by continuous Volumetric Tilak Air Sampler carried out an aero mycological survey over sunflower field for two kharif season. From 5th July to 30th September 2016 for first Kharif season and from 1st July to30thSeptember 2017 for second Kharif season.

Materail And Methods:

In the present investigation an exploration of airborne spores of *Nigrospora* (Tilak and Kulkarni 1970) was undertaken over the fields of sunflower field for one Kharif and one Rabi season. The sampling was carried out by operating Tilak Air Sampler in the center of crop field at a constant height of 1.5 meters from the ground level at Kada Tal Ashti DistBeed (M.S.) for two kharif season from 5th July to 30th September 2016 for first Kharif season and from 1st July to30th September 2017 for second Kharif season.

While installing the air sampler lid is opened. The rotating drum is removed from the clock motor of the sampler. Cello tape is covered with a thin layer of petroleum jelly. Now the drum is fixed with start point S of the drum facing nozzle of orifice with a central screw. Sampler is started by putting the electric button on. The air was sampled at the rate of 5 liters/minutes which left traces of deposition over cellophane tape, affixed on the outer surface of drum. The slides were prepared every offer eight days. Before the scanning, the slides were marked with a ball pen point pen in the six equal parts, each part, indicating the spore catch of two hours of sampling period. Area of 9600 sq.micron of the total area of the trace obtained was scanned under 10Xx45X eye piece objective combination of binocular research microscope. The transformation of spore was done which was based on visual characteristics of spore such as size, shapes. The metrological data was recorded during period of investigation.

Result And Discussion:

Spores one celled, globose to sub-globose or depressed globose, black and opaque, smooth, 14-23µm diameter.During the period of present investigation, spores of *Nigrospra* Contributed as 4.78% and 6.24% which total concentration of 12315/^{m3}and 14319/^{m3}for first kharif and second kharif season respectively of air. Spores of *Nigrospra* occurred continuously throughout the period of investigation. The maximum monthly mean concentration (7542^{m3}and 8432/^{m3}of air) was recorded in the month of September 2016 and August 2017 during first kharif season and second kharif season respectively. The maximum daily mean concentration (421/^{m3} and 578/^{m3}of air) was recorded on 22nd September 2016 and 14th August 2017 during Kharif season first and kharif season second respectively. Mason (1927) reported this spore type. Panzer et al. (1937) reported and included this spore type to 'DrySpora" with maxima between 08.00 hrs and 17.00 hrs. Pady (1957) collected occasionally these spores on exposed slides at Kansas. Meredith (1961) at Jamaica observed variation in the number of spores and showed their relevance with rainfall and humidity. Rees (1964) at Brisbane reported that the sunny and humid condition favor for high concentration of this spore type. Mishraand Shrivastav (1970) from Gorakhpur, Kulkarni (1971) from Aurangabad. Mishra and Kamal (1971) from Gorakhpur trapped the spore type from the air over different fields. Gaikwad (1974) reported these spores from air at Ahmedpur. Pande (1976) recorded 5.16% spores to the total airspora at Nanded. Mane (1978) reported 1.28% of the total airspora at Vaijapur. Varma (1979), Bhalke (1981) also reported these spores in the airspora. Bhagwan (1983) and Patil (1983) recorded 3.67% and 3.29% spores to the total airspora over sugarcane and banana fields at Nanded and Aurangabad respectively. Patil (1985) Venugopalchari (1986) Ramkrishna Reddy (1987),Minhaj (1988), Jagan Mohan Reddy (1988),Meghraj (1989) also reported these spores from the air in different localities of this region. Vaidya (1992) reported 3.22% contribution from the airspora over jower fields at Aurangabad. Ahuja (1991),Bhadane (1991),Thube(1992) ,Goud (1993),Narsimha (1996),Shinde (1996), Thite(1998) and Pawar (1998) also reported these spores over different fields. Dhimdhime (1999) and Tuljapurkar (2000) reported these spore from airspora at Aurangabad. Garje (2000) recorded 3.52% spores to the total airspora over bajara fields at Aurangabad. Mali (2002) and Banswadkar (2002) also reported this spore types at Kada and Udgir respectively. DasiMeena (2008) reported 2.29% contribution to the total airspora over garbage area in the Ambernath and Ulhasnagar. Dere (2011) recorded Nigrospora spore in the ambient air of vegetable market at Aurangabad. During the period of present investigation the spores of *Nigrospra* were almost continuously found in the atmosphere over the sunflower field. Metrological parameters such as rain fall, relative humidity, wind velocity and temperature showed significant effect on liberation of spores of *Nigrospra*in the air spores composition qualitatively &quantitatively The pathogenic fungi *Nigrospra* generally bring about leaf spot disease incidence, however very much significant in the atmosphere, nevertheless, they did not bring about leaf spot disease incidence to the sunflower crop. Therefore the entire sunflower crop in both Kharif seasons was found healthy.

References:

1. AherS.K., Thite S.V.& Pande B.N. (2002). Fungal airspora of a groundnut field. Eco,Env.&Cons, **8**: 283 - 288
2. Ahuja,S.R.(1992) Airspora of Aurangabad, Ph.D. Thesis, Marathwada University, Aurangabad.
3. Bhalke,S.P (1981) Airspora over some fields. Ph.D. Thesis Marathwada University Aurangabad.
4. Bhadane,M.T.(1991) Aerobiological studies at Dhulia Ph.D. Thesis, Marathwada University,Aurangabad.
5. Banswadkar,V.R.(2002) Airspora over oilseed crop Ph.D. Thesis, Dr.Babasaheb Ambedkar Marathwada University,Aurangabad.
6. Mishra,R.R. and Kamal,(1971) Aeromycology of Gorakhpur-III. Seasonal variation in air fungalspora.Mycopath.Mycol.**45**:301-310.
7. Mishra,R.R. and Shrivastava,(1971) Aeromycology of Gorakhpur-II. Spore content over a paddy field.Mycopath.Mycol.Appl. **44:**283-288

8. Pady,S.M.(1957) Quantitative studies of fungus spores in the air Mycologia,**49:**339-353
9. Rees,R.G.,(1964) The airspora of Brisbane.Aust.J.Bot.**12**:185-204
Tilak, S.T. &Kulkarni R.L. (1970) A new air sampler Experienta. **26**: 443-444

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CONSERVATION OF NATURAL RESOURCES

Prin. Dr. Smita Rane
Mahiala Shaikshan Shastra Mahavidalaya, Market yard Kolhapur
E-mail : smitarane708@gmail.com, mbed338.cl@unishivaji.ac.in

Abstract

Earth's natural resources include air, minerals, plants, soil, water, and wildlife. Conservation is the care and protection of these resources so that they can persist for future generations. It includes maintaining diversity of species, genes, and ecosystems, as well as functions of the environment, such as nutrient cycling.

Conservation is similar to preservation, but while both relate to the protection of nature, they strive to accomplish this task in different ways. Conservation seeks the sustainable use of nature by humans, for activities such as hunting, logging, or mining, while preservation means protecting nature from human use.

Introduction

The need for conservation of natural resources was felt by our predecessors and in India, there was a tradition of respecting and preserving the nature and natural resources. Natural resources were conserved in the form of sacred groves/forests, sacred pools and lakes, sacred species etc. In our country the conservation of natural forests is known from the time of Lord Ashoka. Sacred forests are forest patches of different dimensions dedicated by the tribal to their deities and ancestral spirits. Cutting down trees, hunting and other human interferences were strictly prohibited in these forests. This practice is wide spread particularly in peninsular, central and eastern India and has resulted in the protection of a large number of plants and animals and. Similarly, several water bodies, e.g., Khecheopalri lake in Sikkim was declared sacred by people, thus, protecting aquatic flora and fauna. Worshipping certain plants like banyan, papal, tulsi etc. has not only preserved them but also encouraged us for their plantation. History recalls numerous instances where people have laid down their lives in protecting the trees. Recent Chick movement in India is one of the best examples. This movement was started by the women in Gopeshwar village in Garhwali in the Himalayas.

Types of Natural Resources :

- Renewable Resources : These are resources such as air, water, and sunlight that refill naturally.
- Non-Renewable Resources: These are resources like fossil fuels and minerals that do not restock reform very slowly.
- Biotic: These originate from living beings and organic material like plants and animals.
- Abiotic: These come from non-living things and non-organic material. These comprise air, water, and land as well as metals like iron, copper, and silver.

Need For Conservation Of Natural Resources

As the population of the world is increasing at an alarming rate, the consumption of natural resources is also increasing. Hence, these resources should be conserved to maintain ecological balance and save them for future generations. The proper management of a resource to prevent its destruction or exploitation is called conservation.

Nature provides us with all the essentials for our daily needs. Due to overpopulation and human negligence we started to over-exploit our resources. If this continues, there will no resources left for our future generation. The need to conserve the resources are

- To support life by supporting ecological balance
- To ensure that the future generations will be able to access the resources
- To preserve the biodiversity
- To make sure human race survives.

How To Conserve The Resources ?

Soil

- **Reforestation :** Planting trees helps in reducing soil erosion.
- **Terracing :** Terrace farming helps to control the fast flow of water which takes away soil with its flow. It is usually practiced in hilly areas.

- **Soil fertility :** Maintenance of soil fertility is obtained by adding manure or fertilizers or even by crop rotation.

Water

- **Rainwater Harvesting :** It is the process of storing rainwater.
- **Treatment of Industrial Wastes:** The chemical wastes must be treated before releasing them into the water bodies.
- **Dams and Reservoirs :** Dams help to store water and supply them when needed. They also help in producing energy.
- **Growing Flora :** It helps to prevent the flow of water and makes it sink into the soil increasing groundwater levels.

Energy Sources

These include coal, biomass natural gas etc. These are exploited every day in one form or the other. Natural gas is commonly used for cooking and coal is the main source of electricity. Petroleum products are used to run automobiles. These are being consumed daily at a tremendous rate. Thus an urgent need to conserve energy resources is needed as they are non-renewable. The following steps can help in their conservation biomass using energy.

- Promoting green technology like solar panels and other renewable sources of energy.
- Minimize the over-exploitation of these non-renewable energy resources.
- Spreading awareness among people about the need for conservation.
- **Biodiversity**
- **In-situ:** Protecting plants and animals within their natural habitats is called In-situ conservation. For example- National Parks, Wildlife Sanctuaries etc.
- **Ex-situ:** Protecting the plants and animals outside their natural habitat is called Ex-situ conservation. They include Seed Banks, Pollen Banks, Botanical Gardens, Zoo, Gene Banks etc.

Methods Of Resource Conservation

The methods of conservation of resources are as mentioned below:

The three R' 'Reduce, Reuse, Recycle'

Reduce, Reuse and Recycle Called as the "three R's" of waste management, this waste hierarchy is the guidance suggested for creating a sustainable life. "The three R's i.e. **Reduce, reuse and recycle** all the three help to cut down on the amount of waste we throw away. They conserve natural resources, landfill space and energy.

The First 'R' – Reduce

With the help of the concept of reducing what is produced and what is consumed is essential to the waste hierarchy. The basic logic behind it is simple to understand that, if there is less waste, then there is less to recycle or reuse. This process of reducing begins with an examination of what you are using, and what it is used for.

Here Are Some Of Things We Can Do To Reduce The Waste :

1. We should print on both sides of the paper to reduce paper wastage.
2. Prepare electronic mail to sending paper mail.
3. Should cloth napkins instead of paper napkins.
4. Should avoid using disposable plates, spoons, glass, cups and napkins. **5.** Should avoid buying items that are over-packaged with foil, paper, and plastic. This excess packaging goes to waste.
6. We should buy durable goods that have long warranty. They generally run longer and save landfill space.

The second 'R' Reuse :

The concept behind the second R, reuse, is that we should reuse items as much as possible before replacing them. For example, it generally makes more environmental sense to update our computer rather than get rid of it and buy a new one. However, if we do replace your computer, you should ensure that it, or its components, are reused. Many charitable organizations welcome donations of second-hand computers.

The Third 'R' – Recycling

The recycle of something means that it will be transformed again into a raw material that can be shaped into a new item. There are very few resources on the earth that cannot be recycled. One of the issues that facing by the communities that want to become more involved with a recycling effort is that while the relying collection and sorting process may be affordable to implement, there still has to be facilities to receive and transform the discarded waste into a raw material.

8 Ways to Conserve Natural Resources at Home

There are several ways to conserve natural resources in your very own home, such as :

1. **Use less water**. Taking shorter showers or turning off the faucet while brushing your teeth can reduce water waste in your home. Only use your dishwasher or washing machine when there is a full load, and switch to energy-saving appliances if possible.
2. **Turn off the lights**. Turn off any lights or televisions after you leave a room. Unplug appliances like portable air conditioners, toasters, and coffeemakers when not in use, as they can continue to use small amounts of electricity. Additionally, LED light bulbs require far less wattage than standard bulbs, so switching to this alternative lighting method can also help conserve resources.
3. **Use renewable energy**. Although renewable energy consumption has been in practice for centuries, recent years of climate change and global warming have pushed many scientists and researchers to look for ways to incorporate more green practices into our everyday lives. Renewable energy replenishes itself, cutting down on our need to harvest new resources. Using solar panels or wind energy can significantly reduce our reliance on natural gas and cut back on resource depletion over time.
4. **Recycle**. Making new products requires the use of resources, but recycling helps reuse the materials we already have. Manufacturing fewer new materials reduce waste, which helping decrease groundwater and air pollution. Find a center that accepts items like plastic bottles, cardboard, or aluminum for recycling. Switch to paperless billing and buy recycled paper to limit the need for logging and deforestation.
5. **Compost**. Composting is a great way to convert your food scraps into useful materials for your home garden. Composting enriches your soil and reduces the need for watering by improving runoff, which reduces soil erosion. Composting also attracts beneficial organisms that cut down on the need for pesticides or harmful chemicals. Composting encourages sustainability and can lessen the amount of waste and pollution produced by food waste.
6. **Choose reusable goods**. Avoiding single-use plastics is another way to conserve resources. Instead of buying water bottles, plastic cups, or paper plates, opt for ceramic, metal, or glassware. Use your own fabric grocery bags rather than plastic bags. Reusing items is a great way to reduce waste and keep excess trash out of landfills.
7. **Manage your thermostat**. Heating and air conditioning make up approximately half of your energy bill, but lowering the heat by just two degrees in the winter can help conserve energy in your home. Raising the thermostat two degrees in the summer will also have energy-saving effects and help reduce your monthly bill.
8. **Thrift shop**. It can take over 600 gallons of water to make a single cotton t-shirt. Buying secondhand clothing can reduce the amount of reusable clothing that ends up in landfills by extending its lifecycle. Thrift shopping increases the amount of time between the use and disposal phase of a garment's lifecycle, giving us more out of our used clothing, which can decrease the need for overproduction and manufacturing.

Conclusion

Of all the natural resources used by humans, two stand out as having the biggest impact on human survival and environmental quality. Mineral and fossil fuel resources are largely responsible for moving human civilization from hunter-gatherer societies to heavily industrialized urban ones. Today, demand for these vital resources continues to grow, while the Earth's supply does not. The cultures that took the most advantage of these resources have caused their depletion through overconsumption and environmental destruction.

The article covers all the important basic aspects of natural resources such as their classification, conservation, and associated problems. Types of natural resources, need for conservation of natural resources, methods of resource conservation, ways to conserve natural resources at home.

References

1. "Natural Resources - 3rd Five year plan". PLANNING COMMISSION, GOVERNMENT OF INDIA. Archived from the original on 28 September 2018. Retrieved 23 July 2013.
2. "Mining industry association requests export duty rollback". The Times of India. Chennai, India. 22 March 2013. Archived from the original on 2 July 2013.
3. "Plan to set up tech plant". The Telegraph. Bhubaneswar, India. 25 October 2011.
4. "Kyanite, Sillimanite and Andalusite - Indian Minerals Year book - 2011" (PDF). Indian Bureau of Mines, Ministry of Mines, India. October 2012. Archived from the original (PDF) on 11 August 2013. Retrieved 10 July 2013

5. "Garnet - Indian Minerals Year Book - 2011" (PDF). Indian Bureau of Mines, Government of India. October 2012. Archived from the original (PDF) on 11 August 2013. Retrieved 10 July 2013.
6. "INDUSTRIAL & FERTILIZER MINERALS" (PDF). Geological Survey of India. 2011. Archived from the original (PDF) on 16 October 2013. Retrieved 2 July 2013.

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WATER LITERACY IS THE NEED OF THE EDUCATION

Smt. Archana Pandurang Kshirsagar
Assistant Professor, Mahila College of Education, Market Yard, Kolhapur – 416005.
Email Id -archana110781@gmail.com, Mobile No. – 9423717238

Abstract:

To understand the value of invaluable an priceless water there is need of water literacy comes through proper education. Especially when it comes to understanding managing and using water resources education becomes far more important. Water literacy may be considered generally as the culmination of water-related knowledge, attitudes and behaviors. It holds growing importance for sustainable water resources use and management. The high goal is to make India a "water efficient nation" by raising awareness about water scarcity and establishing rainwater harvesting in all areas in India. Time has come to realize and understand that water is not free, in fact there is huge investment on its infrastructure in any watershed programme there is huge investment in water harvesting related structures to make water available to the people for different day today uses. To address knowledge gaps using a suite of approaches drawn from the published literature including enhanced visuals, place-based learning, interdisciplinary curricula, reflective and interactive development of future water literacy initiatives.

Introduction :

"Save water and it will save you" a quate that is worth more than million dollars ! Water is now becoming one of the rarest of natural resources. The reasons may be many but it is high time now to wake up and call attention of each & every one to save water. Water literacy is knowledge about water resources, water management and water-related issues. Water literacy educates those citizens who are able to associate daily life with social issue and contributes to the recovery of a variety of relations between water and humans. To improve the current situation and to develop sustainably both for human beings and the global environment.

Water Literacy : Definition :

The Concept of literacy has been expanded to include other genres of literacy such as scientific literacy, media literacy, information literacy and environmental literacy.

Important Of Water Literacy:

Water literacy will help them understand the value of water management and make them aware of the basics of water resources and their cycle. Water literacy is a powerful tool to educate the masses about the value of water. Water literacy is the overall process of educating the public about how the water use daily in delivered and treated. The quality and safety of that water and saving water is important that water and saving water is important. Water literacy is required to understand the water can be conserved through rainwater & harvesting and waste water management.

All know water is a limited source. In recent years, wastage of water & increase in water consumption have led to severe problems related to water crisis. The proper water-crisis management has become the dire need of the hour. Water literacy is the only out as it ensures a detailed understanding of :

- Water footprints and their calculation
- The use and demand of virtual water.
- Adopting ground water recharge to meet human consumption.
- Processing of surface water
- Water, wellbeing and sanitization.

Water Literacy Principles:

1) Water Has Unique, Physical And Chemical Characteristics – The nature of the water molecule determines the physical properties of water & its behavior. The physical & chemical Properties of water are unique & complex.

2) Water Connects All Earth Systems - Water is an integral part of earth's structure & plays a unique role in earth's processes. It is found in the atmosphere, on the surface and underground. The water cycle is central to life on earth & connects Earth systems.

3) Water Resources Are Managed – Multiple use of water resources leads to diverse and some times conflicting demands, which require water resource management practices management decision involve the distribution of water resources & the protection of acceptable water quality & quantity.
4) Water Resources Exist Within Cultural Constructs – Cultures express connections to their unique water environments through art, music, language and customs. Cultures around the world hold similar and contrasting views toward the water.
5) Water Is Essential For All Life Of Exist - Life process, from the level of the cell to that of the ecosystem depend on water. Both the quantity & quality of water contribute to the sustainability of life on Earth.
6) Water Is A Natural Resources – All living things use water. The available freshwater supply on Earth is limited and must sustain multiple users. Multiple uses of water can lead to water resource issues.
7) Water Resources Exist Within Social Constructs – Over time societies develop water management systems and practices to meet the needs of diverse water users. People's value, attitudes and beliefs shape political & economic systems that are dynamic.
Water Literacy Programme: The goal of foundation is to raise awareness about water shortages & implement harvesting systems in farms houses and industries.
1) Rooftop rainwater harvesting
2) Lake type bore well recharging
3) Infiltration wells
4) Stream water harvesting
5) Seepage recharging
6) Sump type bore well recharging
7) Non-imgational agricultural practices
8) Tree-based Agriculture
9) To raise awareness
10) The foundation attends rallies.
11) To sponsors lectures
12) Gives talks at conferences
13) School Education programs
14) World water day events

The foundation publishes books that instruct farmers to implement rainwater harvesting systems by themselves. The foundation is helped by international volunteers.

A Better Water Literacy Education:

1) Start Young start early
2) Conscious inculcation in students
3) Go beyond subject & Content classification
4) Physical field experience (get out, get down)
5) Make connections with the real world
6) Address from a lifestyle change (be actively involved & correctly informed)
7) Schools are essential and should be actively involved encouraging & developing the desired from & level of water literacy in students from a going one.
8) Interdisciplinary water course.

Literacy Works By:

Decoding – Decoding is the ability to read words by converting written symbols into speech sounds. When we read, we make sense of letters on a page. Letters are simply symbols that represent speech sounds.
Monitoring For Meaning – Literacy is not only the ability to sound out a word; it also involves being able to make sense of the word.
Reading In Context – Literacy Links helps the student put words into context. So they can fully grasp the meaning of sentence they read.
Phonemic Awareness –The ability to identify and manipulate the sounds within words. Cognitive knowledge was the most detailed in water literacy definitions and provided the most distinction among knowledge sets.
Cognitive knowledge was the most detailed in water literacy definitions and provided the most distinction among knowledge sets.
Science And Systems Knowledge - is based on water's unique scientific properties and its significance for living systems, including the water cycle and water's ability to transport dissolved and solid materials. This category encompasses ecosystem needs and flows hydrological processes, cycles and functions and water's

chemical and physical properties An understanding of "Watershed concepts" and ability to define watersheds are also included in this knowledge set.

Local Knowledge - encompasses an understanding of local water sources water infrastructure and current water demands and uses. There is a particular focus on knowing where one's water comes from including a familiarity with the watershed one live in.

Hydrosocial Knowledge – Refers to the bidirectional and continuous interactions between society and water resources. A number of definitions emphasized how human actions impact water quality and health of water resources and at the same time, how the health and quality of water resources directly impact human health and welfare. This knowledge set reflects the increasing recognition of the hydrologic cycle as intricately intertwined within and around social and cultural processes.

Functional Knowledge - Represents a bridging knowledge set that connects water-related knowledge to real world application by Who make "informed and responsible decisions about water resources that have the capacity to "reduce individual…impact" on Water quality and water quantity. In contrast, collective action refers to the water-conscious actions of a large group of people. It is the act of making informed decisions at a "societal level" in order to reduce the "Collective impact of humans.

Together, these knowledge sets highlight that the concept of water literacy is multi-faceted and complex. While a standardized definition of water literacy may be infeasible, the identification of common elements and knowledge sets provides a holistic framework for water literacy on which to build.

underscoring the difference between how water is currently used and how water should be used. This includes awareness of how to use water sustainably how to conserve and how to protect and or restore watersheds.

The affective application of water-related knowledge is represented by the attitudes and values knowledge set. Beyond a general mention definitions specify that water literacy should include "attitudes toward watershed health" a "Scientific water attitude" or regionally-specific elements such as valuing the role and function of the Great Lakes in the U.S.

Finally, the two behavioral domains of water literacy include individual action and collective action. Individual action refers to the actions of single persons or households.

Conclusion :

The impact of water literacy on the overall growth of the country cannot be judged only at the primary level. With proper implementation of water literacy in rural area, the agriculture sector night witness a boost, which will eventually contribute to the country's economy. By educating the masses & successfully implementing correct measures to ensure proper water-crisis management. It takes the right amount of effort at the ground level to any problem.

References :

1) https://encyclopedia.pub
2) https://watershedpedia.com
3) https://www.researchgate.net
4) https://www.ritewater.in
5) https://www.projectwet.org
6) https://aurosociety.org
7) https://www.globalwateralliance.net

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IMPACT OF CLIMATE CHANGE ON MENTAL HEALTH

Utkarsha Dadasaheb Gaikwad[1] Dr. Charulata S. Pradhan[2]
[1]*Research Student, Kohinoor arts, commerce and science College, Khultabad.*
[2]*Research Guide, Kohinoor arts, commerce and science College, Khultabad.*
Email ID- utkarshagaikwad24396@gmail.com

Abstract

Climate change is referred to as a long term shift in temperatures and weather patterns. These shifts may be natural, but since 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas) which produces heat trapping gases. Climate change is the long term change in the average weather patterns that have come to define Earth's local, regional and global climates. The year 2014 has been declared as the hottest year globally by the Meteorological department of United States of America. Climate change is a global challenge which is likely to affect the mankind in substantial ways. Climate change is not only expected to affect physical health but it is also likely to affect mental health. Increasing ambient temperatures is likely to increase rates of aggression and violent suicides, while prolonged droughts due to climate change can lead to more number of farmer suicides. Droughts otherwise can lead to impaired mental health and stress. Increased frequency of disasters with climate change can lead to posttraumatic stress disorder, adjustment disorder, and depression. It can also lead to increased rates of physical illnesses, which secondarily would be associated with psychological distress. This paper concludes with a discussion of what can and should be done to tackle the expected mental health issues consequent to climate change.

Introduction:

The mechanics of the Earth's climate system are simple. When energy from the sun is reflected off the Earth and back into the space (mostly by clouds and ice), or when the Earth's atmosphere releases energy the planet cools. When the Earth absorbs the Sun's energy, or when atmospheric gases prevent heat released by the Earth from radiating into the Space (The Greenhouse Effect), the planet warms. The earth has gone through warming and cooling phases in the past, long before humans were around. Forces that can contribute to climate change includes the Sun's intensity, volcanic eruptions, and changes in naturally occurring greenhouse gas concentrations. But the records indicate that today's climate warming particularly that which has occurred since the mid 20th century is happening at a much faster rate than ever before, and it can be explained by natural causes alone. According to NASA, these natural causes are still in play today, but their influence is too small or they occur too slowly to explain the rapid warming seen in the recent decades. A variety of factors, both natural and human, can influence the Earth's climate system. Climate change refers to relatively stable changes in the meteorological parameters like precipitation and temperature over a period of time in a specific region. Such a climate change has been described as a critical global challenge, especially due to the fact that human activities have been contributory to changes in global climate. It has been observed that over least few decades the average global temperature has risen by 0.5°C. Such gradual increase in temperatures is likely to be associated with melting of ice caps, submergence of coastal areas, adverse precipitation events, and floods and droughts in different regions. Such change in climate on a global scale is likely to affect the mankind in many different ways. The effect of global climate change is likely to be more severe in developing countries. According to the World Economic Forum's Global Risks Report 2021, the failure to mitigate and adapt to climate change is 'the most impactful' risk facing communities worldwide- ahead of even weapons of mass destruction and water crisis. Blame its cascading effects; As climate change transforms global ecosystem, it affects everything from the places we live to the water we drink and the air we breathe. Attention has been drawn to the variety of health impact of climate change. Mental health comprises an important component of health and is also likely to be affected by global climate change.

Climate Change And Mental Health:

Climate change can lead to extreme weather, and it has effects not only on physical health but also on Mental Health. The Mental health consequences of events linked to a changing global climate includes mild stress disorders, high risk coping behavior such as increased alcohol use and mental disorders such as depression anxiety and post-traumatic stress. Increased frequency of disasters with

climate change can lead to posttraumatic stress disorders, adjustment disorder and depression. Change in the climate and global warming may require population to migrate which can lead to acculturation stress.

Heat waves:

Increased exposure to heat is likely to become more common with the rise in the global temperatures. It has been suggested that there is a relation between temperature rise and aggressive behavior. Increase in rates of criminality and aggression have been observed during the hot summer months, suggesting a link between aggressive behaviors and temperatures. With global warming, it is possible that the rates of aggression may increase over time. Heat waves have been associated with mental and behavioral disorders. A study from Australia suggests that heat waves are associated with increased rates of admissions for mental disorders also, in conjunction with other disorders such as cardiovascular and renal illness. Such heat waves have been associated with mood disorders, anxiety disorders, dementia and anxiety related disorders among others. Extreme heat exposure can lead to physical as well as psychological exhaustion. A study from Thailand suggests that occupational heat stress is associated with greater psychological distress among the workers. Similar other studies have found an association between increased temperatures in the work place and greater psychological distress.

Drought:

Global climate change is likely to exacerbate droughts in the years to come. Changes in precipitation patterns are likely to lead to increased floods in some areas while prolonged droughts are expected in other areas. A relationship has been found between the occurrence of drought and farmer suicides.

Natural Disasters:

Individuals who have been exposed to life threatening situations are at a considerable risk of developing posttraumatic stress disorder (PTSD).The symptoms of PTSD include flashbacks of the event, increased arousal and avoidance of cues to the memory of the event. In many cases, the symptoms of PTSD may have a delayed onset, months to years after the experiencing of threatening disaster situation. Development of PTSD is associated with impairment in the quality of life and significant subjective distress. There is a strong link between natural disasters and mental disorders. In the future climate change will bring about An increasing frequency of extreme weather.

Increase In Sea Level

Societies dependent on agriculture are likely to be quite impacted by the changing climate. Agricultural land may be encroached upon by rising sea levels, desiccation or flooding. Moreover, extreme heat makes agricultural work less productive due to fatigue of the workers. Decreasing agriculture produce also hampers the production in agricultural industries which leads to economic hardship which can result in an increase in mental health problems. Heat, drought, and flood related events are likely to be associated with increased rates of cardiovascular disorders, respiratory, gastrointestinal disorders, and renal problems often leads to Mental Health issues. We know that the weather changes may induce psychopathological phenomena such as seasonal affective disorders to weather sensitivity and metropathic conditions. On the other hand, meteropathic subjects are those individuals who develop a specific illness or the worsening of the existing disease as a consequences of climate changes. Psycho-physical symptoms include; mood disturbances, irritability, anxiety, mental and physical weakness, hypertension, headache, hyperalgesia and pains, and autonomic symptoms. Weather can impact everyday activity and changes in the behavior result from physical characteristics of the environment**.**

Exposure Groups:

Certain people are indeed more vulnerable to the potential impacts of climate change on Mental Health. There are communities that are more vulnerable to such events. This impact implies psychological effects especially in vulnerable groups like children, the elderly, the chronically ill, people with mobility impairments, pregnant and postpartum women, people with mental illness, and those with lower socioeconomic status. Climate change is a social determinant for Mental Health. Strong impact has been noted on refugees and migrants, ethnic minorities, the homeless or vulnerable populations such as the poor in countries like India, China and Brazil. Women those with low socioeconomic status, living in poverty, with scarce economic and social resources, reduction of social support, and mental health problems existing before the events, along with traumatic experience and stressors, represent vulnerable groups that tend to develop new mental disorders or see their previous problem worsen. After climate disasters, children typically show more severe disturbances than adults, with more severity and prevalence with regard to the onset of PTSD and Depression.

How to know if a change is needed when a change in environment is not possible, everything from the house, city and the State you live in to the weather in your area, the social climate, and your work

environment can affect your mental health. These places you spend a lot of time in can have a significant impact of your wellbeing- both physically and Mentally. So, it makes sence to take a closer look at how the environment affects your Mental Health. But with so many factors playing a substancial role, you might be wondering which once to focus on to improve your Mental Health. Here we take a look at the role the environment plays in your overall Mental Health, how to know if a change is needed, and what you can do to start feeling better.

Conclusions:

Based on the studies and literatures reviewed for this paper, there appears to be strong evidence of the influence that the climate change exerts on the mental health. this research focuses on the extreme events, such as those produced by temperature increase, heat waves, tornadoes hurricanes and wildfires. Consequences have been described in terms of distress symptoms and clinical Disorders such as depression, anxiety post-traumatic Stress Disordes and sleep disorders etc. Even though some of these events may occur in a slower and less acute manner. In short all of these issues need to be more extensively observed and clinical experience should be gained in order to support these conclusions. the Challenge of climate change will be protracted in the upcoming years. Therefore this branch of Eco psychiatry will surely be supported by new data and further studies. Efforts to increase access to mental health services and attempts to mitigate the climate change with time would be appropriate responses to deal with the challenge of climate change in the time to come. Meanwhile, provision of adequate treatment facilities for managing Promoting positive mental health is another way to mitigate the psychological distress due to climate change.

"Developing countries like India have also developed and articulated their policies toward challenging the impact of climate change. The National Action Plan on Climate Change (NAPCC) documents the Indian government's plan to deal with the issue of climate change".

References:

1. Anderson CA. Heat and violence. Curr Dir Psychol Sci. 2001.
2. Kjellstrom T, Crowe J. Climate change, workplace heat exposure, and occupational health and productivity in Central America. 2011;17:270
3. Nitschke M, Tucker GR, Hansen AL, Williams S, Zhang Y, Bi P. Impact of two recent extreme heat episodes on morbidity and mortality in Adelaide, South Australia: A case-series analysis. Environ Health. 2011;10:42.
4. Berry HL, Bowen K, Kjellstrom T. Climate change and mental health: A causal pathways framework. Int J Public Health. 2010;55:123–32.
5. Pandve HT. Global initiatives to prevent climate change. Indian J Occup Environ Med. 2008;12:96–7.
6. APA. Mental Health and our Changing Climate: Impacts, Implications and Guidance, Washington, DC (2017).
7. Nath PK, Behera B.A. Critical review of impact of and adaptations to climate change in Developed and Developing Economies. Environ Dev Sustain (2011)

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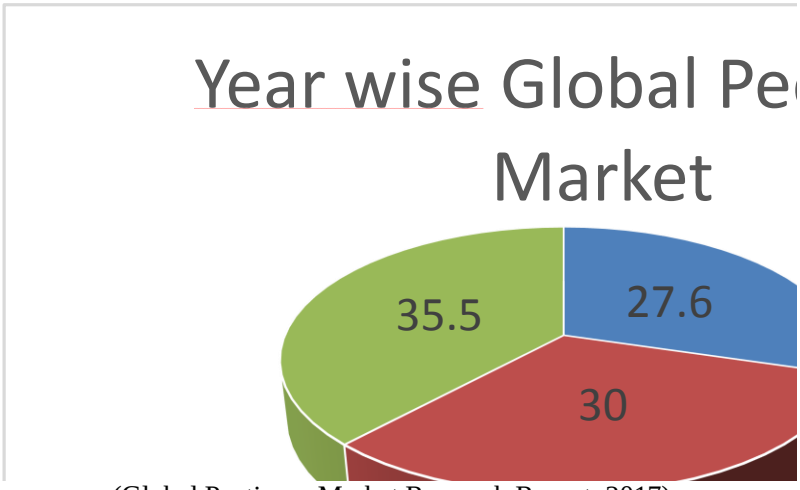
INSIGHTS ON SUSTAINABLE ,ECOFRIENDLY MICROBIAL PECTINASE AND ITS CONTINUOUSLY EXPANDING INDUSTRIAL APPLICATIONS.

Lokare S.S
Department of Botany,Balbhim Arts,Commerce and Science college,Beed

Abstract:
Pectinase are group of pectin degrading enzymes, required in production of plethora of good products in the biotechnological sector. These pectinases are biocatalysts and are very specific, sustainable, ecofriendly and nontoxic. Hence pectin and pectinase are essential biomolecules with continuously increasing industrial applications. Pectinase demand is also expanding in new sectors. But high cost of substrates used for the culturing of microbes limits the production of pectinases. Hence low cost or no cost substrates like agricultural wastes are focused in pectinase production. Importance of pectinase encompasses diverse areas like extraction of DNA, protoplast isolation from plant, bioethanol production, fruit juice industry, wine industry. Hence from this review I have illustrated the different microbes and different sustainable agricultural substrates for commercial production of pectinase. This review also describes plethora of its applications.
Keywords: pectinase structure, microbial sources, low cost agricultural substrate, expanding industrial application.

Introduction:
Over the last few centuries, there has been a markedly increase in the application of enzymes in wide sectors of industry. This is because the enzymes are nontoxic substitute for some toxic chemicals that were previously used in food processing. Pectinase are showing accelerating increase in their market (Kavuthodi and Sebastian, 2018; Roy et al., 2018), maintaining the average annual growth rate of 2.86% from 27.6 million $ in 2013 to 30.0 million $ in 2016, and estimated to boost up to 35.5 million $ by 2021



(Global Pectinase Market Research Report, 2017).

Fig 1: Yearwise Global Pectinase market.

Structure of Pectin and Pectinase

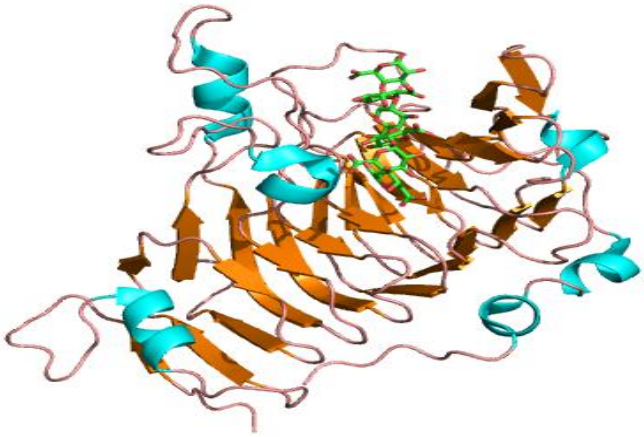


Fig-2 Structure of Pectinase

Microbe-borne enzymes like amylase, cellulase, glucosidases, invertase, keratinases, lactase, ligninase, lipase, penicillinase, protease, xylanase, etc.were developed and commercially popularized because of their highly significant action as well as economic feasibility (Gurang et al., 2013 ; Nigam et al 2013).

The enzyme pectinase has engrossed interest worldwide as a biological catalyst in various industrial processes. This enzyme breaks down pectin commonly found in the plant cell wall and, hence, is well-known for the commercial preparation of clear fruit juice, liquefaction and saccharification of plant biomass, paper making, as well as coffee and tea fermentation (Kashyap et al.,2001). Pectin is a structural acidic heteropolysaccharide rich in galacturonic acid with carboxyl groups esterified with the methanol. The acidic heteropolysaccharide is a major component in cereals, vegetables, and fruits. Pectic substances are high in molecular weight, biocompatible, non-toxic, anionic natural polysaccharides, and foremost constituents of the middle lamella and primary cell wall of plants (Chen J et al.,2015). Pectinase has a complicated enzymatic system which causes the degradation of pectic substances like pectinic acids, propectins, pectins, and pectic acids (kittur F. S et al.,2003). Generally, pectinase represents the mixture of distinct enzymes, including pectate lyase (PL), polygalacturonase (PG) and pectinesterase (PE) (Kashyap et al.,2001; Rebello et al., 2017).

The primary chain of pectin partly comprises methyl esterified 1,4D-galacturonan and a demethylated form of pectin which is also known as pectic acid (pectate) or polygalacturonic acid. Basically, the pectinase acts by splitting glycosidic linkages and converts the polygalacturonic acid into monogalacturonic acid (Raju et al.,2013). Microorganisms and plants have a proven record of being the major sources of the pectinase enzyme. However, because of technical and commercial viability, pectinase generation from microbial sources is becoming a primary area of research interest (Raju et al.,2013;Garg G2016). Furthermore, scientists are also emphasizing enabling or modifying pectinase so that it could be of application in different bioprocessing industrial sectors (Minten IJ et al.,2014;Xu Z et al.,2020).

Different Microbes And Different Substrates For Pectinase Production:

More than 30 different genera of bacteria, yeasts and moulds have been used for the production of Pectinases.(Jayani et al.,2005).fig 3 &fig 4 illustrates that.

Table 1: Substrates used for Pectinolytic enzymes production by bacterial species.

Micro organism	Substrate	Product	Source
Aeromonas salmonicida		Pectinase	Pavan, et al. [43]
Bacillus sp.	Wheat bran	Pectinase	Kashyap et al. [39]
Bacillus pumilus		Thermostable pectinase	Sharma and Satyanarayana [44]
Bacillus subtilis	Wheat bran	Thermostable pectinase	Ahlawat, et al. [45]
Bacillus subtilis	Wheat bran	Alkaline Pectinase	Ahlawat, et al. [46]
Bacillus subtilis	Pectin	Pectinase	Swain and Ray [47]
Bacillus sphaericus	Citrus pectin	Polygalacturonase	Jayani, et al. [27]
Bacillus subtilis	Date syrup	Pectianse	Qureshi, et al. [48]
Bacillus sp	Cassava waste	Pectinase	Mukesh Kumar et al. [49]
Bacillus firmus	Pectin	Pectinsae	Roosdiana et al. [50]
Erwinia cartovora	Pectin	Pectinase	Kothari and Baig [51]
Bacillus pumilus	Agricultural wastes	Exo-pectinase	Tepe and Dursun [52]
Bacillus licheniformis	Apple pectin	Pectinase	Rehman et al. [53]
Bacillus subtilis	Hazlenut Shell hydrolysate	Pectinase	Uzuner & Cekmecelioglu [54]
Bacillus subtilis	Pectin	Pectinase	Takci & Turkmen [55]
Bacillus pumilus	Wheat bran, citrus limetta peel	Pectinase	Kaur, et al. [42]
Bacillus licheniformis	Pectin	Polygalactouronase	Jahan, et al. [56]
Bacillus sonorensis	Pectin	Pectinase	Mohandas, et al. [57]
Chryseobacterium indologenes	Citrus pectin	Pectinase	Roy, et al. [34]
Enterobacter tabaci		Pectinase	Obafemi, et al. [58]
Bacillus subtilis	Pectin	Pectinase	Mahto, et al. [59]

Fig 3:Different bacterias and different substrates used for the production of bacterial Pectinase.(source- https://juniperpublishers.com/aibm/images/AIBM.MS.ID.555884.T001.png)

Table 2: Substrates used for Pectinolytic enzymes production by fungal species.

Micro organism	Substrate	Product	Source
Aspergillus niger	Sucrose	Pectinase	Friedrich, et al. [60]
Penicillium occitanis	Apple and citrus	Pectinase, pectin methyl esterase	Jain, et al. [61]
Penicillium frequentans	Citrus pectin	Pectinase, pectin esterase	Said S, et al. [33]
Aspergillus foetidus	Wheat bran	Pectinase	Sebastian, et al. [62]
Aspergillus niger	Soy and wheat bran	Pectinase	Castilho, et al. [29]
Aspergillus niger		Ectopectinase	Diaz-Godinez, et al. [15]
Aspergillus awamori	Wheat	Pectinase	Blandino, et al. [63]
Penicillium viridicatum	Orange bagasse and wheat bran	Pectinase	Silva, et al. [4]
Thermoascus aurantiacus	Orange waste, sugar bagasse, wheat bran	Pectinases	Martin, et al. [64]
Aspergillus niger		Invertase, pectinase and tannases	Gonzalez et al., [65]
Aspergillus niger		Pectinase	Patil & Dayanand [30]
Aspergillus niger	Citrus peel	Pectinase	Dhillon, et al. [31]
Aspergillus niger	Sugar beet pulp	Pectinase	Bai, et al. [8]
Aspergillus awamori	Grape pomace	Pectinase, xylanase	Botella, et al. [66]
Penicillium decumbens	Wheat bran	Pectinase	Sun X, et al. [67]
Aspergillus fumigates	What flour	Pectinase	Palaniyappan, et al. [68]
Aspergillus heteromorphus	Orange peel	Pectin methyl esterase	Mandhania, et al. [69]
Fomes sclerodermeus	Soy and wheat bran	Polygalacturonase	Salariato, et al. [70]
Mucor circinelloides	Pectin methyl ester	Polygalacturonase	Thakur et al. [71]
Penicillium chrysogenum	Sucrose	Pectinase	Banu et al. [72]
Aspergillus foetidus	Mango peel	Pectinase	Kumar et al. [25]
Rhizomucor	Pectin	Pectinase	Siddiqui et al. [73]
Rhodotorula glutinis	Citrus pectin	Pectinase	Taskin [74]
Aspergillus foetidus	Mango peel	Pectinase	Yannam et al., [75]
Aspergillus oryzae	Lemon peel	Pectin lyase	Koser, et al. [12]
Aspergillus sojae	Wheat bran	Polygalacturonase	Demir & Tari [76]
Trichoderma viridae	Orange peel	Pectinase	Irshad et al., [77]
Aspergillus niger	Banana peel	Pectinase	Barman, et al. [10]
Aspergillus niger	Orange waste peel	Pectinase	Ahmad, et al. [13]
Aspergillus oryzae	Citrus waste	Pectinase	Biz, et al. [9]
Aspergillus terreus	Banana peel	Pectinase	Sethi, et al. [78]
Aspergillus niger	Orange pomace	Pectinase	Mahmoodi, et al. [79]
Aspergillus niger	Orange peel	Pectinase	Rangarajan, et al. [80]

Fig 4:Different fungii and substrates used for the production of Pectinase.
(Source-https://juniperpublishers.com/aibm/images/AIBM.MS.ID.555884.T002.png)

Applications

Fig 5: Application perspective of pectinases in various biotechnological and industrial sectors

Fruit Juice Industry:

Pectinolytic enzymes are one of the upcoming enzymes of fruit industries. Fruit juices are naturally cloudy mainly due to the presence of pectin polysaccharides (Sharma et al. 2017). The high concentration of pectin leads to colloid formation in the juice, which leads to create problem in the processing of clear fruit juices. The role of acidic pectinases in bringing down the cloudiness and bitterness of fruit juices is well established (Kashyap et al. 2001; Jayani et al. 2005).

Pharmaceutical Industry:

Many pharmaceutical products are produced from the fermentation of pectic substances present in fruits and vegetable peels using pectinase. The products thus produced are used as a fiber supplement for the treatment of diabetes and obesity (Satapathy et al. 2020).

Paper And Pulp Industry:

In paper industries, the sheet formation step is the most crucial, and the presence of pectin in pulp reduces dewatering. In the past, the filter fiber used to have bigger holes so that water gets easily removed from paper, and peroxide bleaching reduces cationic demand (Reid and Ricard 2000; Samanta 2019).

Textile Industries:

In textile industries, pectinases are used with other enzymes like amylase, lipase, cellulase, and hemicellulase to remove sizing agents from cotton safely and ecofriendly (Hoondal et al. 2002; Bristi et al. 2019).

Degumming And Retting Fiber:

Degumming is the procedure of removing heavily coated gum from outside the xylem, phloem, or pericarp of the plant fiber like ramie and sun hemp before its use for textile making. The enzymatic processing of fiber is energy conservative, eco-friendly, non-toxic, non-biodegradable, and non-polluting. The combination of chemical and enzymatic treatment in fiber reduces chemical and energy consumption (Iconomou et al. 2010; Chamani et al. 2012)

Coffee, Cocoa, And Tea Fermentation:

Pectinases decrease foam formation in the instant coffee/tea powders, remove the thick layer consisting of pectic substances from coffee beans, accelerate the fermentation of coffee/tea, and develop chocolate flavor in cocoa fermentation (Samanta 2019).

Pectinolytic enzymes are employed in many industrial applications but are mainly utilized in food industries in specific operations such as the clarification of fruit juices and wines and the extraction of vegetable oils. They are also widely used in the processing and elimination of pectin, which is crucial in coffee and tea processing,

Wine Industries:

Pectinases containing low pectin methylesterase are used not only in the extraction of wine. Still, they are also used to increase juice yield and accelerate filtration. The main problem in winemaking is a cloudiness that makes filtration of wine difficult due to the presence of pectin. The addition of pectinase

hydrolyzes pectin and removes the cloudiness present in wine. Also, pectinase enhances the aroma and taste of the wine (Garg et al. 2016; Rollero et al. 2018).

Protoplast Preparation:

Purified forms of pectinase, which are commercially isolated from different fungal species, have a great role in plant protoplast culture studies as they help to generate.

good yields of viable protoplast when treated with cellulose (Chamani E et al.,2017). Pectinases, in combination with cellulase, is used for the efficient isolation of protoplast (Solís et al. 1996).

Other:

Pectinases are also used in macerating of plants and vegetable tissue, treatment of wastewater, bleaching of paper, and as an additive in the poultry feeding and textile industries (Jayani R.S et al.,2005; Bhardwaj V et al., 2017).

However, like other enzymes, this one is also more activated during its commercial production at 30 to 50◦C and a pH of 4.5 to 8.5, but the effectiveness is more specific to the source of particular microorganisms and other environmental factors (Garg G,2016). Hence, due to market and economic demand, the detailed information about the source and substrate of pectinase is must.

Conclusion:

Agricultural waste and fruit waste like wheat bran,rice bran,lemon peels,orange peels,banana peels are used as substrate for production of crude pectinase from many bacterial and fungal species in the present study, may be an efficient carbon source and has good potential as a substrate for pectinase production as they are cost effective, renewable and available in large quantities.Pectinase has wide industrial applications in industries like fruit juice production, pharmaceutical industry, Paper and pulp industry, Textile industries, Degumming and retting fiber, Coffee, cocoa, and tea fermentation**,** Wine industries, Protoplast preparation.In this review I have tried to elaborate above all points along with microbial strains and substrates for the pectinase production which is very essential to enhance the pectinase production.

References:

1. Bhardwaj V, Degrassi G, Bhardwaj RK. Microbial pectinases and their applications in industries: a review. Int Res J Eng Technol. (2017) 4:829–36. doi: 10.1007/s00253-002-1061-1
2. Chamani E,Tahami SK,ZareN,Asghari-ZakariaR,Mohebodini M,Joyce D. Effect of different cellulase and pectinase enzyme treatments on protoplast isolation and viability in Lilium ledebeourii Bioss. Not Bot Horti Agrobot. (2012) 40:123–8. doi: 10.15835/nbha4028055
3. ChenJ,LiuW,LiuC,LiT,LiangR,LuoS.Pectinmodifications:areview.Crit Rev Food Sci Nutr. (2015) 55:1684–98. doi: 10.1080/10408398.2012.718722 7.
4. Garg G, Singh A, Kaur A, Singh R, Kaur J, Mahajan R. Microbial pectinases: an ecofriendly tool of nature for industries. 3 Biotech. (2016) 6:47–59. doi: 10.1007/s13205-016-0371-4
5. .Gurung N, Ray S, Bose S, Rai V. A broader view: microbial enzymes and their relevance in industries, medicine, and beyond. Biomed Res Int. (2013) 2013:329121. doi: 10.1155/2013/329121 4.
6. Jayani RS, Saxena S, Gupta R. Microbial pectinolytic enzymes: a review. Process Biochem. (2005) 40:2931–44. doi: 10.1016/j.procbio.2005.03.026
7. https://juniperpublishers.com/aibm/images/AIBM.MS.ID.555884.T001.png
8. https://juniperpublishers.com/aibm/images/AIBM.MS.ID.555884.T002.png
9. Kashyap ,D.R., Vohra, P.K., and Tewari, R.(2001). Applications of pectinases in thecommercialsector:areview.BioresourceTechnology,77(3),215–227. https://doi.org/10.1016/S0960-8524(00)00118-8
10. Kittur FS, Kumar ABV, Gowda LR, Tharanathan RN. Chitosanolysis by a pectinase isozyme of Aspergillus niger—a non-specific activity. Carbohydr Polym. (2003) 53:191–6. doi: 10.1016/S0144-8617(03)00042-0
11. Minten IJ, Abello N, Schooneveld-Bergmans MEF, van den Berg MA. Postproduction modification of industrial enzymes. Appl Microbiol Biotechnol. (2014) 98:6215–31. doi: 10.1007/s00253-014-5799-z 12.
12. .Nigam PS. Microbial enzymes with special characteristics for biotechnological applications. Biomolecules. (2013) 3:597– 611. doi: 10.3390/biom3030597
13. Raju EVN, Divakar G. Production of pectinase by using Bacillus circulans isolated from dump yards of vegetable wastes. Int J Pharm Sci Res. (2013) 4:2615–2622. doi: 10.13040/IJPSR.0975-8232.4(7).2615-22
14. Rebello, S., Mohandas A, Mathachan Aneesh E, Sindhu R, Binod P, Pandey A (2017) Recent advancements in the production and application of microbial pectinases: an overview. Review in Environmental Science and Bio/technology. https ://doi.org/10.1007/s1115 7-017-9437-y.

15. Researchgate.https://www.researchgate.net/profile/Pei-Jun-Li/publication/323844431/figure/fig1/AS:646752294158337@1531209171858/Applications-of-pectinases-in-various-industries.png.
16. Roy et al.Extracellular Pectinase from a Novel Bacterium Chryseobacterium indologenes Strain SD and Its Application in Fruit Juice Clarification.Hindawi (2018) 1:1-7. DOI:10.1155/2018/3859752
17. Sharma HP, Patel H, Sugandha (2017) Enzymatic added extraction and clarification of fruit juices–a review. Crit Rev Food Sci Nutr 57(6):1215–1227. https://doi.org/10.1080/10408398.2014.97743 4
18. StructureofPectinase (2022),https://upload.wikimedia.org/wikipedia/commons/5/50/2ntb.png
19. Xu Z, Cen Y, Zou S, Xue Y, Zheng Y. Recent advances in the improvement of enzyme thermostability by structure modification. Crit Rev Biotechnol. (2020) 40:83–98. doi: 10.1080/07388551.2019.1682963

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CONCEPTUAL ANALYSIS OF SANSKRIT LEXICON WITH SPECIAL REFERENCE TO NOUNS FROM THE VIEW OF PRINCETON WORD- NET

Dr.Haripada Mahapatra
Asst. Professor Department of Sanskrit
Sankrail Anil Biswas Smriti Mahavidyalaya. Jhargram.

Abstract:

Most of the Indian languages now recognized in the Indian Constitution originated from Sanskrit, the classical and the most ancient language of India. With the untrimmed course of Prakrit, Pali and other foreign languages had the influences resulting alteration from Sanskrit come up in the present form of different Indian languages. To have control over any language knowing grammer is one of the most important factors and in case of Sanskrit authentic grammar yet plays the most vital role. The study has been conducted with the objectives-to find out what noun in Sanskrit is, to find out the use of Nouns in Sanskrit and to study the difference in the use of noun gender wise. The study is a conceptual analysis based study. Hence the required information is based on secondary sources i.e different books, journals and word net and internet sources.

Keywords: Lexicon, Noun, Word Net, Grammer, Language.

Introduction:

Sanskrit is a frozen language having grammatical rules of vowels and consonants; formation of words on the basis of letters, formation of sentences.Panini's grammar is considered as one of the best example for grammar. Sanskrit is different from artificial language involving equivocal words, figures of speech. It also gives us enough freedom to analyse a given expression in different ways. Considering Sanskrit as the language of the study, leads to the problem of explaining regional languages and other languages apart from Sanskrit.

Regional languages called Dialect words also have meanings as that of words in Sanskrit language. Therefore, there is no way to determine whether Sanskrit words have primary meaning and regional languages have only derived meaning, or conversely.

According to the philosophers who opposed Gadadhara theory that God created the world, and also everything including language in this universe it cannot be said that God created only Sanskrit language. Hence it cannot be concluded that all regional languages were derived from Sanskrit. The modern comparative philologists also attempt to propose and construct a Proto-Aryan language from which all the Indo-European languages have evolved. But that also tends to support the theory that God created only one language, just the name of Sanskrit is not there. Jagadisa and other Navya-Nyaya philosophers believe that theories for different regional languages may develop.

The Nyaya School philosophers believed that Sanskrit is a divine language created by God. They viewed God being the creator of this universe, created all languages, including Sanskrit. Reason behind this theory is that language has been developed without any artificial effort and not by congregation. According to Navya-Nyaya philosophers that God created both objects , sounds, and related the sounds with objects. Owing to this relation, sounds become a medium of expressions or communication.

Objectives: The study has been conducted with the following objectives-

- To find out what noun in Sanskrit is.
- To find out the use of Nouns in Sanskrit.
- To study the difference in the use of noun gender wise.

Method:

The study is a conceptual analysis based study. Hence the required information is based on secondary sources i.e different books, journals and word net and internet sources.

Discussion:

Most of the Indian languages are derived from Sanskrit, the oriental language of India. In due course the influence of language like prakita, pali and other foreign language has resulted changes from Sanskrit to appear in the present form of different Indian languages. The scientific and technically same sound grammar of Sanskrit plays a vital role in all other Indian languages. Thus we can use Sanskrit Word-

Net, hereafter known as Sanskrit-Net as a pivot for an effective Machine translation. Keeping this in mind I am developing a machine readable lexical database of Sanskrit language.

1. Noun In Sanskrit: गजः गच्छति-- **gajaḥ** gacchati--- **The elephant** goes.

The syllable pattern for the entire sentence is "light, heavy, heavy, light, light." (gajaḥ gacchati). The ḥ-sound, which is called the 'visarga', is pronounced one of two ways: either likes the "h" in "house," or as a softer sound of the vowel in front of it, like the English "ah."

Now, what do we notice about this word? This is not enough, so lets bring about another another example:-

गजाः गच्छन्ति -- **gajāḥ** gacchanti-- **The elephants** go.

Now we notice something! The ending of the noun has changed.

Just as end with verb, noun endings are attached to a "base" form end with noun. For nouns, this base is called the *stem*, . For example, the noun above is gaja. It is the most basic part of a noun; there is no such thing as a noun "root." The noun gets changed with the change of number. Nouns have number, just like verbs.

We can also see that the noun and the verb change accordingly with the change of number. That is, the word gajāḥ is not *only* an elephant rather it refers to elephants. The verb gachhanti refers to iy as plural. Two words referring to the same entity in a sentence must have the same number. Thus it can be said that the noun must be in agreement with the verb in a sentence.

2. Pronouns And Noun Person: अहम् गच्छामि - **aham** gacchāmi - **I** go

What's changed? What's stayed the same?

What we notice first is that our subject is different. This word "I," is part of a larger class of word like "he," "they," "you," and so on. These types of words can have person and number, but they offer no further directions. Such words are called *pronouns*. We say that aham is a first-person pronoun. We also sees that our verb has changed. Here, the person of the verb has changed to match the person of the noun. The subject bof a sentence must agree with the verb on the basis of person.

Gender:

Many nouns are like the verb or the nouns are sometime used as verb in many cases:

- Both verb and noun have a root form, but this root form is never used by itself.
- Suffixes are added to the root form to create new suitable form.
- Both varies on the basis of number i.e. singular,dual,and plural.
- Both changes on the basis of person i.e first person, second person, and third person.

But nouns have some qualities which are not alike verbs. Let's look at one of those qualities. Consider the two examples below:

बालः गच्छति	**बाला** गच्छति
bālaḥ gacchati	**bālā** gacchati
The boy goes.	**The girl** goes.

Let's compare the first sentence to the second. By doing so, we see that the the end of the word gets changed and the meaning has also got changed. As Compared the first sentence with the second sentence the 'boy' turned into girl- here the change occurs in the gender.

But maybe "gender" is an unfamiliar concept. Let's look at "gender" in English. We have four genders in English, Masculine, Feminine, Neuter and common gender .

- This is a man. **He** is tall.
- This is a woman. **She** is tall.
- This is a tree. **It** is tall.
- This is a **child.**

In English, we use pronoun "he" for Masculine gender, so "he" is called a *masculine* pronoun. We use "she" for Feminine, so "she" is called a *feminine* pronoun. We use "it' for both living and non living things, so "it" is called a *neuter* pronoun. This is the full extent of gender in English. 'Child' refers to both masculine and feminine. So it is a common gender.

- In Sanskrit language there are three types of gender- punṃliṅga ("masculine")
- strīliṅga ("feminine")
- napuṃsakaliṅga ("neuter")

'pung ling,stri ling and clib ling', but they are used in different ways. Some nouns have genders that make sense — "man". Hence they are masculine nouns i.e masculine gender (pung ling), "girl" is a feminine noun, and so it is feminine gender (stri ling) and so on — but there are other nouns which do not make sense of any gender like fruit, etc . "Fruit" is neuter, but "tree" is masculine as tree gives birth or

produces fruits and denotes a feminine sense. In a broder sense it can be said that there are many nouns refers to a certain gender by default and a noun's gender can ot be identified just by looking at a noun's meaning. So, we should learn both the noun's root and the noun's gender to make proper use of them. Fortunately, a noun's root often gives us enough information to determine the gender.

Hence it is noticed that the Sanskrit terms have the same meanings as well as sense as their English counterparts. So just like in English gender is not only a part of grammatical concept but it is one of most vital factors of the grammar.

Grammatical Case**:** Let's look at one more sentence.

गजः **बालम्** गच्छति

gajaḥ **bālam** gacchati

The elephant goes **to the boy**.

What's changed? What's stayed the same?This sentence has two nouns. However, the two nouns 'gaja' and 'balam' don't work in the same way. The first noun (gaja/elephanṭh) is the subject of the sentence. The second noun (bālam/boy) is complement of the sentence. It's like a destination. We say that this is a change in the noun's *grammatical case*, or just *case* for short. Sanskrit nouns have eight different cases, and each modifies the role in the sentence.

More examples can be followed:

गजः **बालेन** गच्छति	गजः **बालाय** गच्छति.
gajaḥ **bālena** gacchati	gajaḥ **bālāya** gacchati.
The elephant goes **with the boy**.	The elephant goes **for the boy.**

गजः **बालात्** गच्छति

gajaḥ **bālāt** gacchati

The elephant goes **from the boy**.

In this lesson, we've learned the following terms:

Definition:

Noun: Something that **can be named**. It may be name of person, place, thing or quality. Noun ending: A basic part of the Sanskrit noun. The ending is **attached to the end** of the noun stem, and it contains information about the noun's number and case.

Noun stem: A basic part of the Sanskrit noun. We **add suffixes to it** to produce a suitable noun.

Agree: When different words refer to a single idea and the words **match** in some way, they are said to be in agreement. For example two words will agree only when their number agrees.

Agreement: The **quality of agreeing** with something.

Gender: A vague concept. In one sense, it refers to **biological identity**. In another, it refers to **grammatical behavior**. It sometimes defies expectations.

Masculine gender:

The "male" gender.

Feminine gender:

The "female" gender.

Neuter gender:

The "non-female and non-male" gender.

Conclusion:

Nouns in Sanskrit-Net can be related through 7 aspects. These 7 aspects are known as 7 semantic relations mentioned above, which are relational and functional. It also consists of 'English Meaning', 'Example', 'Morphological Information' and 'Definition' as other relations. Sanskrit language has a rich derivational system. The sense of nominal word is defined on the basis of its derivation. They have categorized as derivative, conventional, derivatively conventional and derivative and conventional.

Reference:

1. Avacchedakatva- nirukti of Jagadisa, Edt., Dattatrya Ogle, Chawkhambha Sanskrit Sansthan (CSS), Varanasi, 1976.
2. Astadhyayl-sutrapatha of Panini, Edt., Brahmadatta Jijnasu,Amritasar,1969.
3. Bhasapariccheda of Visvanatha, Edt, Shastri Panchanana,CSS, Varanasi,1984.
4. Bhattacarya G.M. Navya Nyaya: Some Logical Problems in Historical Persective, Bharatiya Vidyaprakashanam, New Delhi, 1978.
5. Bhatta V.P. Theory of Verbal Cognition (Translation & Critical Edition on Gadadhara's Vyutpattivada) Vol. I & II, Eastern Book Linkers Delhi, 1990.

6. Chomsky N. Studies on Semantics in Generative Grammar, The Hague, London, 1972.. Chowell E.D. et.al, Sarvadarsana Sangrahah (Edt,) Parimal Publication, Delhi, 1981.
7. Dash K.C Relations in Knowledge Representation, Garib Dass Oriental Series No. 115, Delhi, 1991.
8. Johnson D.E – On the Role of Grammatical Relations in Linguistic Theory , Chicago Linguistic Society, 1974.
9. Joshi S.D – Vyakarana-Mahabhasya-(Karakahnika), University of Pune, (1975).

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DEMOCRACY AND SUSTAINABLE DEVELOPMENT IN INDIA

Dr, N. M. Moghekar[1], Dr. K. R. Kadam[2]
[1]HOD Dept. of English, Nagnath college Aundha (Nagnath)
[2]Asst. Professor, Nagnath college Aundha (Nagnath)

Introduction:

India got independent in 1947 and process of modern development began after 1947 with five-year planning. It does not mean that India was not in the process of development before that. It is a fact that process of development is universal and continuous process. With each and every Step of human beings or in other words social behaviour of a human in itself is process of development changed test, style, attitude and internal hobbies etc. are born out of the process of development. "Sustainable development" is a recent term that means "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The given meaning of the term stresses on two important points. First is needs of the present and second one is abilities of future generations. In short sustainable development is a bridge that joints present with future. Furthermore, this process ensures continuity of development with uncountable opportunities for investment and innovation. Democracy itself is an unlocked social and political system that provides equal opportunities for all the citizens. The recent modifications in policies and attitudes suggest that India is moving towards sustainable development in social economical, agricultural and commercial sector.

Democracy Defined:

Democracy is an ideal of government, moreover, Dr. Babasaheb Bhimrao Ambedkar calls it, 'associated with mode of living'. It symbolizes mutual understanding and collaborative efforts for public welfare. It is not only related to the type of government; however, the concept of democracy is related to social lifestyle of a society where rights and duties walk hand and hand. The history of not only the world but our nation also suggest that the sustainable development has been done effectively in democratic countries in comparison with other type of governments. In medieval period of the history there were emperors and kings who failed to uplift the territories they ruled. It was happened due to centralization of power and unfair politics. In nineteenth and twentieth centuries majorities nations accepted democracy as the formof ruling. There may be direct and indirect democracy or presidential or parliamentary democracy. But importance of democracy was widely known by the world. India one of the largest countries in the world, accepted parliamentary democracy, that means there will be elections regularly after five years and there are vey less chances of either dictatorship or monarchy. Moreover, there is no chance of mutiny of army as it happens in our neighbouring country Pakistan. As it is mentioned earlier sustainable development is a continuous process of development which is most probably possible in democracy. Public welfare is the basic aim of a democratic country. Hence, president of U.S.A. Abraham Linkan defined democracy as, "for the people, of the people, by the people". There are innumerable chances for the participation of people directly and as a result one can see new India, a worldly power on the basis of sustainable development.

Micro Planning:

In democracy there is decentralization of power and every thing or every idea appears on its micro level reports either from top to bottom or bottom to top reach through proper process. With the changing scenario of the society, new necessities and possibilities are taken in to account by assigned mechanism. As far as Indian context is concerned our needs are growing with growing populations. Hence, use of recycled pattern became a crucial issue. From central to state government including non-government organisation inspired youth to suggest new ways for recycling process. The plan was introduced on its micro level checking out the possibilities, certain foreign technologies are also taken in to account and as a result useless material was used to meet the needs of present. For example, the useless plastic material used in recycled form for road construction. The plants of recycling water used for domastic use is also a huge success to decrease water pollution and to save biodiversity along with human lifr itself. We have witnessed that revers were flowing with fresh and cool water are polluted so much that even animals cannot drink its water. The issue was discussed nationwide and need of water Har wasting, water management, water saving was becoming a movement. Since the planning was done on micro level, the

water level of deserted cities has been increased. This happened only because of democratic way of life in India.

Opportunities For Youth:

Democratic nation always provides opportunities of development to all its stack holders. In particular youth are supposed to be the real wealth of nation. They have immense potential and capability to do something out of box. Almost every government in India dreamed to be self-sustained on the power of youths. Hence, the government introduced novel scheme for youths. Not last but least youths were benefited and they invested their skill in small scale industries. There are numberless examples throughout the country which signify the success of hopeful youths. There are opportunities of partnership, transportation and guarantee of celling the products in the nation or abroad. Since sustainable is a continuous process these youths investors deal with modifications of the products.

Socio- Political Will:

Democracy is such a fair form of ruling that takes in account the contribution of last man in the line. The recent example of Padma Vibhushan and Padma shri award is a symbol of democratic way of life. These awards have been given to those people who really deserved it. In a nation where dictatorship exists such examples are outside for sustainable development socio political will power effects as a magic. The leadership is like a torch holder who shows the way in the darkness. the will power of leadership that is elected by the people is expected to be the ideal of people. This will power motivates the youth and as a result new experiments are done in various fields.

Vision:

Vision of a democratic nation is a broad and related to public good. public welfare is prime aim of democracy. Since government is a part of society, social work is always preferred, moreover,A democratic government have to function responsibly. Because the government carries all the responsibilities on its shoulders. In democracy there is no certainty of forming government. there are public elections after every five years and the ruling parties have to face public for elections. As far as Indian democracy is concerned, we observe that every political party declares their agenda for upcoming years in which they include crucial issues. In the changing social scenario where majority voters are educated, they keep a close eye on the manifesto of ruling political party. Hence, the government try to fulfil the words and assurances given to society before election. If the government fails to do so the cleaver voters never vote cast their valuable vote for them. As a result, the elected government efforts for sustainable development so that they could face the general voters proudly. It is the pressure of public that force the government to be transparent in the policy.

Natural And Manmade Disasters:

At the present the human world is under the threat of natural and manmade disasters. The issue of global warming is crucial issue from last few years. It may be the least Ozon or rising level of ocean water. The scientist now and then warns the world and appeal the world to decrease the global warming. These issues are very important for each and every country in the world. As a matter of fact, the harmful garbage and its use became the matter of close discussion. The reuse of used objects is a way to stop the production of new harmful objects. On the world level so many governmental organizations had launched the movements to keep the ocean clean. In India clean Ganga movement is a part of it. Decreasing the level of all types of pollutions is a mission now a days. Recently during nationwide lockdown, we have experienced a life free from pollution. And our policies are marching towards clean atmosphere.

Conclusion:

Sustainable development is hereby, dynamic concepts. It encompasses the entire world and human life in it. A disease less heathy life with all sorts of facilities is our dream. Each and all individuals demand such a clean and healthy atmosphere that he could breathe freely. This dream can be easily or forcefully fulfilled in a democratic nation. Since democracy is a faire way of ruling, all the citizens expect development in almost all fields of life.

References:

1. Sustainable Development Goals: Directive principal for sustainable India by 2030. By Ayaj Ahlawat, Notion press,
2. India Sustainable Development and Good Governance issue, By Binayak Ray, Atlantic book.
3. Sustainable Development and Environment by Snigdha Tripathi, Ankit publication.
4. https; // www. Yourdictionary.com

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AN EXPLORATION OF RURAL DEVELOPMENT IN AN INDIAN CONTEXT

Savita Sadanand Jadhav
S.M. Collage, Akluj.
Email- savitajadhav223@gmail.com

Abstract:

India is facing poverty as a serious problem. The Indian government runs several departments, such as Pradhan Mantri Gram Sadak Yogana (PMSGY) and GNERGA, which run different programs, yojana, and schemes. Rural development is at the core of the progress of the country. One-third of the population is a core of those below the poverty line. One-third of the people in India are dependent on agriculture. That's why the government focuses and provides enough facilities to elevate the living standards of rural areas. Rural development basically focuses on improving the economy. Some other areas that demand new initiatives and attention are education, public health, infrastructure, women's empowerment, and employment opportunities. It also invokes the system of upraising the quality of life and economic well-being of individuals. Rural development is important for the overall economic growth of the nation. The initial task in the development of a nation is to control famines that exist in 70% of rural areas and provide them with healthy and sufficient food. development is being discussed in every field, such as literature, politics, history, and philosophy.

Keywords: Employment, Development, Economic, Industrialization

Introduction:

Rural development is the procedure of upgrading the quality of life and economic well-being of humankind living in sparsely and isolated populated areas. Rural people's progress has traditionally been focused on the exploitation of natural resources, which is land-intensive; however, increased urbanisation and changes in global production networks have changed the character of rural areas. Rather than only producing incentives for resource and agricultural-based businesses, the need for rural society to develop an attitude from a broad perspective Entrepreneurship has gradually displaced resource extraction and agriculture as subservient economic drivers., physical infrastructure. education, and social infrastructure play an important role in the development of rural regions. This is also based on its emphasis on locally produced economic development activity, which is deliberated upon to further the economic and social development of rural people. It aims at finding ways to upgrade rural lives with the contribution of rural people themselves. The outsider does not understand the cultural, setting, languages, and other things prevalent in the local areas. People within rural areas themselves have to get involved in their sustainable rural development.

Rural development is also based on the agricultural development of that particular area. Agriculture was the key development in the uprising of sedimentary human civilization. It is basically the cultivation of livestock and plants. Over one-third of the global workforce is underemployed in agriculture fields. India is a nation of villages and has the largest democracy in the world. The rural economy and life are central to India's identity and existence. Indian village communities are based on agriculture. In the village, people lead a simple life. In India, we have seen revolts and resistance movements against British rule. Indian literature is basically focused on Indian society. Its culture and conditions are the soul of India; and literature gives breath to the soul. In Vedic literature, there is a depiction of ancient rural India and its customs. The Arthashastra gives us a picture of an ancient village, with Manu smriti classifying villages in terms of their habitation and size. The Grihya sutra and the dharma sutra focus on several aspects of the village. Considered a mirror of society, literature reveals the veracities of society. The moralistic stories like Jatak Kathas, Panchatantra, Hitopdesh, Kadambari, and Dashkumarcharita were written earlier than the western novels of Scott, Hugo, and Dickens, and before writers who were upper class Bengalis such as Romesh Chandra Dutt, Toru Dutt, Bakimchandra Chatterjee, and Rabindranath Tagore. Practiced to establish novel writing in accordance with the old Indian tradition of simple villagers, the noteworthy writing of Rabindranath Tagore, associated with the life of common villagers, Novel Gora considers rural life with a feeling and penetrative depth. In the novel 'Hari, The Jungle Lad", Gopal depicted a young boy who lives in a village on the outskirts of a forest. K.S. Venkataraman has narrated. An ideal village based on the Gandhian concept of devotion Love and sacrifice are central themes in his novels, Murugan, the Tiller, and The Patriot. In Murgan, The Tiller also talks about the urbanisation and industrialization of the

village. The social development of the South Indian village of Kantapura is the subject of a rural novel. During this period, Indian rural people in villages faced problems such as illiteracy, poverty, caste discrimination, unemployment, etc. yet Raja Rao portrayed a total reformation of a village. Where backwardness and superstition, caste distinction have no place but women's participation, self-employment, social awareness, and the pride of their Sthalapurana.

Gandian's influence can be seen in Indian English fiction. The work of B.R. Ambedkar and Gandhiji in Indian politics indicates an over-all transformation of the norms enforced by the bourgeoisie class. Gram Swaraj was a central concept that had a great impact on Indian writers. The concept of Gram Swaraj is all about self-sustaining villages. Which should provide all the amenities required by the rural communities in the era of Gandhi, several writers from rural India were depicted in the freedom struggle against social evils like hunger, poverty, and exploitation. The plight of the peasants is the main theme of the novel. Mulk Raj Anand's Two Leaves and a Bud and Untouchable are based on the ideology of Gandhi. Gandhian ideology spread not only among English writers but also among Hindi authors such as Premchand, who inspired and depicted Gandhian philosophy in his novels. Godan and Karma Bhumi are realistic rural narratives. The writer described, psychologically, the social and individual's life. Jawaharlal Nehru was a staunch champion of industrialization whose idea of rural industrialization was inspired. Nehru's desire was to make India an industrialised, modern, and democratic socialist nation-state. The concept of technological advancement and industrialization brought about significant changes in rural areas as well as in Indian English literature. Post-modern writers considered a village as a "global village" when they began to depict various aspects of village culture. In the post-Independence period, most women writers emerged and made significant contributions to Indian English literature. Some of them described rural India effectively and also depicted the lives of women under the impact of their rural background. Feminism began as a means to combat women's inferior and secondary status in male-dominated societies. Kamala Markendaya's novel "Nectar in a Sieve" is about rural women and peasant society fighting against their fate. Women writers raised their voices in support of basic rights: economic, religious, social, and political. "The God of Small Things," written by Arundhati Roy, is set in rural India. It is an enormous village narrative which concerns the ravages of caste discrimination in a few south Indian villages in Kerala and the struggle of females in a patriarchal society.

Different from the 1930s and 50's, the year 1980 marks eminent changes in the progress of rural India. Development is a continuous process in the context of an Indian village. They portray their own experiences and how they have come to live in rural life. From the British colonial period to the modern period of the 20th century, they depicted traditional rural modes and manners. Shashi Deshpande, through her novel, manifests the emergence of the 'New Women' in the Indian firmament. In these novels, the female character from a rural background exhibits the change in their traditional life. Modernity is their search for independence, identity, and the fulfilment of their dreams. Like Amitav Ghosh, with 'The Circle of Reason" 'and Upamanyu Chatterjee's English, August (1888), several writers have written about urban-rural relationships, the displacement and relocation of their village narratives due to urbanisation and industrialization, also on the basis of geographical, sociological, and development concepts such as political, economic, and regional etc. The village has endured significant change after the 1960s in significant ways. Indian literature depicting the impact of new political equations, new economics, and cultural remapping of village life in Indian English literature is rooted in the Indian culture of the village, but being a social reformer also depicted in the tradition bound rural culture. We reveal and explore the shifting of traditional customs to modern values through Indian English literature focused on village culture and tradition, as well as the impact of time on village life.

The noteworthy perseverance of government expenditure will be made up of rural areas, which will be the foremost stream of development with the cumulative availability of all-weather connectivity through PMGSY). This provides all the road and transportation amenities for all villagers and those living outside of villages. This Yogena provides a positive impact and upsurges employment and annual income for labour and transport systems, which are necessary for sustainable economic development and modernization. The growth of GDP and the transport sector have a positive relationship. The government of India undertakes rural economic development through Sadak yogena, and its success will be achieved when all the villagers are connected with all-weather roads. Another significant yogena is the Mahatma Gandhi Rural Employment Guarantee Act (MGNREGA), also known as 'Silver Bullet," which works on unemployment and rural poverty. It provides an unusual source of livelihood, which will have an impact on restricting children, Labor, migration, reducing poverty and making villages self-sustaining through creation like soil and water conservation work, road construction, providing clean drinking water and employment are considered the largest anti-poverty programs.

Reference:

1. Moseley, Malcolm J. (2003). Rural development : principles and practice (1. publ. ed.). London [u.a.]: SAGE. p. 5. ISBN 978-0-7619-4766-0.
2. Ward, Neil; Brown, David L. (1 December 2009). "Placing the Rural in Regional Development". Regional Studies. **43** (10): 1237–1244. doi:10.1080/00343400903234696.
3. Rowley, Thomas D., ed. (1996). Rural development research : a foundation for policy (1. publ. ed.). Westport, Conn. [u.a.]: Greenwood Press. ISBN 978-0-313-29726-7.
4. Moseley, Malcolm J. (2003). Rural development : principles and practice (1. publ. ed.). London [u.a.]: SAGE. p. 7. ISBN 978-0-7619-4766-0.
5. Van Assche, Kristof. & Hornidge, Anna-Katharina. (2015) Rural development. Knowledge & expertise in governance. Wageningen Academic Publishers, Wageningen
6. Chigbu, Uchendu Eugene (2012). "Village renewal as an instrument of rural development: Evidence from Weyarn, Germany". Community Development. **43** (2): 209–224.
7. Agrawal, B.R., and M.P. Sinha. Major Resent Trends in the Post-Independence Indian English Fiction. New Delhi: Atlantic Publishers, 2003.
8. Banga, Indu, ed. The City in Indian History. New Delhi: Manohar Publications and Urban History Association of India, 1991.
9. Betnes, Hans. The Idea of the Postmodernism: A History. London and New York: Routledge, 1995. Bhabha, Homi. Nation and Narration. London: Routledge, 1990. Borade, Gaynor. "Village Life in India." April 13, 2009.
10. Bhargava, Rajul, ed. Indian Writing in English: The Last Decade. New Delhi: Rawat, 2002.
11. Bharucha, Nilufer E. and Vilas Sarang. Indian English Fiction 1980-90: An Assessment. New Delhi: B.R. Publishing, 1994.
12. Desai, S.K., ed. Experimentation with Language in Indian Writing in English (Fiction). Kolhapur: Shivaji University, 1974. E.V. Ramakrishnan. Narrating India: The Novel a S

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SUSTAINABLE DEVELOPMENT CHALLENGES IN URBAN TOURISM: A STUDY OF VARANASI CITY

Pragya, Professor Ujjwala Khare

Abstract:

Urban tourism has evolved in the recent years wherein large urban agglomerations have become the leading destinations. Tourism has always been one of the important sources of income for many countries; hence the revolutionary development of cities keeping in mind the tourist's satisfaction has taken toll globally. Varanasi being one of the largest cultural tourist destinations in India faces the wrath of sudden developmental changes which pose a great threat on sustainability of resources. This paper is a theoretical analysis of the sustainable development issues and challenges faced by the city. It is a descriptive study and an amalgamation of early literature and other sources of tourism management.

Key Words: Urban Tourism, Sustainable Development, Carrying Capacity, Pro-poor tourism.

Introduction:

Urban agglomerations have been the centre of socio-cultural experiences, and thus urban tourism has evolved, where non-agricultural economy is prominent characteristic. Fifty four percent of the world's population in 2015 resided in urban areas, which is expected to reach sixty percent by 2030 (UNWTO). Tourism plays a pivotal role in making the geography and socio-economic elements of the city. The development of many cities has been around urban tourism, which acts as a driving force to make human settlements more resilient and sustainable. Being a diverse and culturally rich country, India's ten percent of the national income comes from the tourism sector (Tourism Statistics, India). But due to some reasons like, lack of proper infrastructure, safety and security, inaccessibility, etc. are responsible for this sector slow economic gain.

Varanasi, being the oldest living city in the world, has always attracted tourists due to its ethnicity and cultural diversity. It attracts more than sixty lakh domestic and international tourists per year. Thus, tourism happens to be the second largest sector of the city (Uttar Pradesh Tourism Statistics). With such huge tourist inflow, the carrying capacity of the city resources is highly compromised in the process of urban developmental plans, leading to immense sustainability issues. There is a need for a transformative approach of tourism development in the city along sustainable patterns. Tourism overlaps with many other sectors and hence arises the need for a more radical change in the sector leading to sustainability.

Sustainability Issues:

The term 'sustainability' although emerged in nineties but was introduced for the first time in the travel and tourism industry in Agenda 21. It says that tourism acts as a factor in promoting the economy of the local people. The tourist destination as well as the tourists are collectively responsible for the protecting the environment of the place. World Tourism Organization (WTO), says that sustainable tourism is a synthesis of protecting the cultural and biological diversity of the place in a way that socio-economic aspects of the place is fulfilled. The inadequacy and inefficiency of the city to handle large tourist influx has affected the local environment, greatly. Tourism is a combination of local environment, tourists and the native peoples of the place. Neither of the three can be ignored in the process of developing sustainable tourism practices.

A not so healthy relationship between uncontrolled urbanization and sustainable tourism has been seen in the city. The city struggles to match up to tourists' satisfaction by compromising with the needs of the local people. Some of the tourist destinations are highly developed while others are largely ignored leading to unstable conditions. High traffic flow in more developed regions of the city, lead to a whole lot of problems like pollution, congestion, traffic jams, etc. infrastructural developments of the city have been more rapid in the recent years which are so rampant and haphazard that the historicity of the city seems to be completely forgotten. The forest cover of the city has fallen to less than five percent of the total area with an exceptional rise in built-up area by fifty three percent (District Handbook, Varanasi)

Due to urbanization and uncontrolled infrastructural developments the city's air quality has been degrading in the recent years. The Climate Agenda campaign, installed a pair of artificial lungs at the Assi Ghaat, in Varanasi. The same experiment was done in Bengaluru and Delhi, where the artificial lungs blackened in eighteen and six days respectively. Whereas in Varanasi, it took only three days for the artificial lungs to black out, indicating more polluted air than the capital city Delhi. This is an alarming

situation for the city. With the river Ganga being the prime source of drinking water for the city, tourism does affect the carrying capacity of the city's water management facilities. The water of the river Ganga is so much polluted that it's not even safe to bathe in it, let alone using it for drinking purposes. The flora and fauna of the river ecosystem is largely at stake due to high pollution levels found in the water.

The overall sewerage and sanitation facility of the city is in very poor condition. Just thirty percent of the total area is provided with underground sewer network (JNNURM). The present sewer network is very old and is not sufficient enough to handle city's constantly increasing population. This again shows how the carrying capacity is compromised at large, with huge tourist influx. People are highly ignorant of how injurious it is to burn plastic as it is carcinogenic in nature. Also, people in the slum areas have asbestos roofing, which is again harmful to environment being carcinogenic. People don't know about the concept of 3 R's, pollution management, water conservation, renewable energy or other such sustainable concepts which they can practice in their day-to-day life. It is alarming to know how people are unaware of the harmful effects of material they use on a daily basis, when they burn garbage along with plastic and other non-biodegradable materials. Vehicular emission, industrial pollution and dust are the other environmental problems of the city.

Conclusion:

As the population increases, the human settlement pattern of the city did not grow in a homogenous manner. Urban growth has been high and the city faces the challenge of managing the resources for the local people and catering to the needs of the tourists. In the due course of development, the city suffered from many environmental problems like, increased air pollution, lowering of groundwater table and intensive pollution of the river Ganga. If one takes an auto from Assi ghat to the Godowlia area where is the newly constructed Vishwanath Corridor, during evening when the ghats bustle with activities of Ganga Aarti, it's difficult to even breathe in the air. Heavy traffic congestion is seen during this peak hour. This year in March itself, the temperatures soared to forty-one degrees, breaking the earlier records. Climate change is prominent now in the weather conditions of the city.

The path towards sustainability has some barriers like lack of financial resources, funds allocated by the government, lack of knowledge and awareness among people and also lack of skilled staff. The government can use the pandemic times to re-think and re-build tourism along sustainable pattern. Technology can play a vital role in this with enhancing digital tourism. Focusing on new collaborations and change of target markets also helps in tourism's improved quality. Tourism sector does not require highly skilled labour, and thus the poor can be benefitted. Pro-poor tourism policies have been on governments agenda, but a lot has yet to be achieved in this field. Sustainable development has to be inclusive in nature, taking care of the needs of the poorest and most vulnerable section of the society. Government strategies has to be dynamic and collaborative in nature so that it reaches to all the strata of the society.

Reference:

1. District Handbook of Varanasi, 2011.
2. Census of India, 2011.
3. India Tourism Statistics, 2019.
4. Jawaharlal Nehru National Urban Renewal Mission (JNNURM), 2006, City Development Plan for Varanasi.
5. United Nation World Tourism Organization (UNWTO), 2020.
6. Uttar Pradesh Tourism Statistics, 2017.
7. World Trade Organization (WTO), 2020.

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BIODIVERSITY LOSS, THREATS AND ITS CONSERVATION

S.S.Bhosle
Balbhim College, Beed.

Abstract:

Biodiversity or Biological diversity is a word that describes the array of living beings in terrain. In short, it is described as level of discrepancy of life. Biological diversity includes microorganism, plants, animals and ecosystems such as coral reefs, forests, rainforests, deserts etc. Biodiversity also refers to the number, or abundance of different species living within a particular region. It represents the wealth of biological resources available to us. The main cause of the loss of biodiversity can be attributed to the influence of human beings on the world's ecosystem, In fact human beings have deeply altered the environment, and have modified the territory, exploiting the species directly, for example by fishing and hunting, changing the biogeochemical cycles and transferring species from one area to another of the Planet.

Keywords: Biodiversity, Biological resources, Exploiting.

Introduction:

Biodiversity loss is the extinction of species (plant or animal) global, and also the local reduction or loss of species in a certain habitat. The latter observable fact can be impermanent or permanent, depending on whether the environmental degradation that leads to the loss is reversible through ecological restoration / ecological resilience or effectively permanent (e.g. through land loss). Global extinction has so far been proven to be irreversible. The word biodiversity was coined by Walter G. Rosen in 1986, and it is highly popularized during the recent times. Biodiversity, as this assemblage of life forms is referred to, has now been acknowledged as the foundation for sustainable livelihood and food security.

Even though permanent global species loss is a more remarkable phenomenon than regional changes in species composition, even minor changes from a healthy constant situation can have striking effect on the food web and the food chain in so far as fall in only one species can badly influence the entire chain (coextinction), leading to an overall reduction in biodiversity, possible alternative stable states of an ecosystem aside. Ecological effects of biodiversity are usually counteracted by its loss. Reduced biodiversity in particular leads to reduced ecosystem services and eventually poses an immediate danger for food security, also for humankind.

The current rate of global diversity loss is estimated to be 100 to 1000 times higher than the (naturally occurring) background extinction rate and expected to still grow in the upcoming years.

Locally bounded loss rates can be measured using species richness and its variation over time. Raw counts may not be as ecologically relevant as relative or absolute abundances. Taking into account the relative frequencies, a considerable number of biodiversity indexes has been developed. Besides richness, evenness and heterogeneity are considered to be the main dimensions along which diversity can be measured.

The threats to biodiversity are stated as follows:

- Alteration And Loss Of The Habitats: the transformation of the natural areas determines not only the loss of the vegetable species, but also a decrease in the animal species associated to them.
- Introduction Of Exotic Species And Genetically Modified Organisms: species originating from a particular area, introduced into new natural environments can lead to different forms of imbalance in the ecological equilibrium. Refer to, "Introduction of exotic species and genetically modified organisms".
- Pollution: human activity influences the natural environment producing negative, direct or indirect, effects that alter the flow of energy, the chemical and physical constitution of the environment and abundance of the species;
- Climate Change: for example, heating of the Earth's surface affects biodiversity because it endangers all the species that adapted to the cold due to the latitude (the Polar species) or the altitude (mountain species).
- Overexploitation Of Resources: when the activities connected with capturing and harvesting (hunting, fishing, farming) a renewable natural resource in a particular area is excessively intense, the resource itself may become exhausted, as for example, is the case of sardines, herrings, cod, tuna and many other species that man captures without leaving enough time for the organisms to reproduce.

Biodiversity is the result of 3.5 billion years of evolution. It has been subject to periods of extinction. The latest and most destructive stage of extinction is Holocene extinction, which has occurred due to the impact of human beings on the environment.

Biodiversity has a number of roles on the Earth. These are as follows:

- Maintaining Balance Of The Ecosystem: Recycling and storage of nutrients, combating pollution, and stabilizing climate, protecting water resources, forming and protecting soil and maintaining ecobalance.
- Provision Of Biological Resources: Provision of medicines and pharmaceuticals, food for the human population and animals, ornamental plants, wood products, breeding stock and diversity of species, ecosystems and genes.
- Social Benefits**:** Recreation and tourism, cultural value and education and research.

The role of biodiversity in the following areas will help make clear the importance of biodiversity in human life:

- Biodiversity And Food**:** 80% of human food supply comes from 20 kinds of plants. But humans use 40,000 species for food, clothing and shelter. Biodiversity provides for variety of foods for the planet.
- Biodiversity And Human Health**:** The shortage of drinking water is expected to create a major global crisis. Biodiversity also plays an important role in drug discovery and medicinal resources. Medicines from nature account for usage by 80% of the world's population.
- Biodiversity And Industry: Biological sources provide many industrial materials. These include fiber, oil, dyes, rubber, water, timber, paper and food.
- Biodiversity And Culture: Biodiversity enhances recreational activities like bird watching, fishing, trekking etc. It inspires musicians and artists.

Conclusion:

Though biodiversity loss is occurring at a rapid rate, examples from all over the world show that people are beginning to make choices and take actions that benefit biodiversity. However, we need more action if further biodiversity loss is to be averted. It's important to carefully consider the choices you make and their impacts, and to encourage other groups such as businesses and governments to do the same.

References:

1. Pullaiah T (2012) An overview on biodiversity and conservation perspectives. Bioherald 29:1–14.
2. Liu, J., Daily, G. C., Ehrlich, P. E. & Luck, G. W. Nature 421, 530–533 (2003); advance online publication, 12 January 2003 (doi:10.1038/nature01359).
3. Cohen, J. How Many People Can the Earth Support? (Norton, New York, 1995).
4. Boserup, E. Population and Technological Change (Univ. Chicago Press, 1981).
5. Population, Environment and Development: The Concise Report (United Nations, New York, 2001).
6. Ehrlich, P. & Holden, J. (1971).: Science 171, 1212–1217
7. Crenshaw, E., Ameen, A. & Christenson(1997)., M. Am. Soc. Rev. 62, 974–984

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USE OF NATURAL RESOURCES AND ENVIRONMENT

Dr. Manik D. Savandkar
Assistant Professor, Nutan Mahavidhyalaya, Selu.
E-mail : savandkarmd@gmail.com

Abstract:

The Environmental damage has in turn caused in waste of arable land as well as economic crop and trees. Since much of the damage is foreseeable if the natural resources must be developed both the government and the natural resource industry must be involved in taking precautionary and remedial measures that can minimize the ill effects of natural resources mistreatment.

The natural resources Exploitation, Exploration, Mining and Processing have caused different types of environmental damages which include Ecological disturbances, Destruction of natural flora and fauna, Pollution of air, Water and Land, Instability of soil and rock masses, Landscape squalor, Desertification and global warming. Emphasis should shift from waste disposal to waste minimization through organization, recycling, bioremediation, afforestation, manure treatment and pollution control, while the government should provide the regulatory legislation with appropriate sanctions or where these regulatory bodies already exist. the implementation of laws and policy implementation is of paramount importance. The oil and gas industries, taking out companies and other natural resources exploitation bodies are expected to carry out compulsory precautions, remedies or compensation for harm done.

Introduction:

We begin by defining what we actually mean by a changing environment. We reconnoiter some of the policy relevant aspects of these changes that contribute to an understanding of the concept of sustainable development surrounding population growth and urbanization public awareness of extreme weather events, attitudes to climate change guesses and perceptions of the power of governments to make change.

In spite of substantial enhancements in the production of systematic information regarding changing environments and their impacts on natural resources, the use of available knowledge to inform policy continues to be hindered by low levels of self-assurance in much of the data and in many of the assumptions on which they are based. It considers international and multidisciplinary research mark of the possible impacts that changing biophysical and social environments can have on the sustainability of natural resources and explores how such evidence is being used globally and nationally to effect policy decisions.

The availability of healthful food, clean air and water are important components in fostering ecosystems for a healthy life and improved well being. In the early twentieth century, Mahatma Gandhi pronounced his belief that "the earth provides enough to satisfy every gentleman's need but not every gentleman's greed". He also specified that what we are doing to the forests of the world is a reflection of what we are doing to ourselves and to one another. The analytical power of his words has even greater application in the twenty first century, as awareness has grown that the damage to the environment could be due to human factors, prompting action by researchers and policymakers to standstill the degradation of natural resources, as typified in reports by the United Countries' Intergovernmental Panel on Climate Change and as voiced in the Millennium and Sustainable Development Goals.

We examine the varying approaches accepted internationally and by different disciplines in the collection and use of signal. it reviews the ways in which researchers, professionals and practitioners from public, private and third sectors have wanted to influence policy decisions and their employment. It draws on large and small scale educations conducted in different regions of the world, spanning country's like North and South America, Africa, Asia and the Middle East, carried out by researchers from disciplines ranging from engineering and climatology, through the social sciences, to architecture, anthropology and philosophy. In seeking to unknot the three-sided relationship between research evidence, policy and effect at global, national and local levels, attention is given to international targets for sustaining natural resources and the tools used to achieve targets and measure research impacts. Our aim is to demonstrate the importance of developing multi level thinking and planning for long term sustainability, extending beyond short term profit making and partisan politics, as contended by Sachs in his work on paths to

sustainable development, and by Jacobs and Mazzucato with reference to inter sectorial co-production for sustainable and inclusive growth.

The Environment and Natural Resources Research is determined to run the best platform for researchers and scholars worldwide or all over the world to exchange their latest assumptions. The scopes of the journal include but are not limited too.

The following themes:

1. Environmental assessment and management.
2. Environmental health and education.
3. Environmental science and engineering.
4. Environmental protection.
5. Ecological environment.
6. Planning and environmental design.
7. Urban and regional landscape design.
8. Environment and sustainable development.
9. Natural resources use and recycle.

Impacts Of Environmental Natural Resource Use :

Uses of natural resources can top to a variety of environmental impacts -

1) An direct impacts of extraction.

Ex- The impacts on nature and the landscape of opencast excavating.

2) The disruption of materials cycles by the introduction of previously unavailable matter into the environment such as carbon, phosphate and heavy metals or major movements of materials through the biosphere

Ex-The nutrients N and P or the loss of natural areas loss of fixed C, N and P as a result of deforestation and erosion.

Several other environmental impacts are also associated with the use of natural resources, such as bug juice used in the production of food and acidification caused by the burning of fossil fuels.

Natural resources Exploitation, Exploration, Mining and Processing have caused different types of environmental damages which include natural disturbances, destruction of natural flowers and creatures, pollution of air, water and land, uncertainty of soil and rock commonalities, landscape degradation, desertification & global warming. Highlighting should shift from excess disposal to waste minimization over arrangement, Recycling, Bioremediation, Afforestation, Sewage treatment and Pollution control. While the government should provide the regulatory regulation with appropriate approvals or where these regulatory forms already exist, the implementation of laws and policy implementation is of vital importance.

The actual environmental damage has in turn resulted in waste of arable land as well as monetary crops and trees. Since much of the damage is expected if the natural resources must be developed both the government and the natural resource industry must be involved in taking cautionary and remedial measures that can minimize the ill effects of natural resources of exploitation. The Oil and Gas industries, Mining companies and other natural resources mistreatment bodies are expected to carry out required precautions, remedies or compensation for impairment done.

Impact Of Mining On The International Physical Environment :

In the country of Africa, the mining sector is thought to be the second largest source of pollution after agriculture. the sector is resource rigorous and generates high concentrations of waste and sewages.

The Mining is a common practice in Nigeria, the problem with the activity in the country, however it is the inattention of the coalminers and the government to proper mining practices which makes life difficult for these people And many people because of their low level of education, do not know their environmental obligations under the Minerals and Mining Act and that the observance to best global practices in mining is a vital tool for the promotion of supportable growth in the industry.

Conclusion:

The Extraction, Exploration and Exploitation of Natural Resources are the backbone of the national economy. However, the great danger posed by natural resources exploitation is a problem, factors such as economic development, population growth and urbanization habitually place greater demands on the planet and spring the use of natural resources to the maximum. Use of the natural resources at a rate higher than countryside's capacity to reestablish itself can result to environmental immorality, ecological disturbances, destruction of natural Flora and Fauna, Pollution, Global warming and Desertification.

Everything on our earth are interconnected and while the wildlife supplies us with valuable environmental facilities without which we cannot exist, we all depends on each other's actions and the way we treat our

natural resources. It's generally recognized that we are extravagance our natural resources. Perchance, we should adopt a holistic view of nature that it is not an unit that exists differently from us, we are an immutable part of it and we should care for it in the most appropriate manner by development of effective strategies, policy formulation, sustainability and plans to maintain the balance between resource usage and preservation, only then can we possibly solve the environmental problems.

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A NOTE ON WEAKLY CLEAN SEMI-RINGS

Dr. Jyothi. G, Dr.M.Dhanalakshmi
Department of Mathematics, Sri Durga Malleswara Siddhartha Mahila Kalasala Vijayawada, A.P, India

Abstract:
Let S be a commutative semiring with identity. Let S to be a clean semiring if each element of S is an idempotent and sum of a unit. In this paper we study clean semirings and almost clean semirings. We define a semiring S to be weakly clean semiring if each element of S can be an Idempotent and either the sum or difference of a unit.

Keywords: Weakly clean, S-weakly clean, Quasi local, Maximal Ideal.

Introduction:

In this paper, we say that a semiring S is clean if for $a \in S$, 'a' can be written as $a = u + e$ where $u \in U(S)$,the group of units of S and $c \in Id(S)$, the set of idempotents of S. Semiring S is clean if and only if each $a \in S$ can be written in the form $a = u-e$ where $u \in U(S)$ and $e \in Id(S)$.Whether a semiring with the property that, for each $a \in S$, either $a = u + e$ or $a=u-e$ for some $u \in U(S)$ and $e \in Id(S)$ must be clean. Let us call semiring with this property weakly clean. In it was shown that if S has exactly two maximal ideals and $2 \in U(S)$, then each $a \in S$ has the form $a = u +e$ or $a= u - e$ where $u \in U(S)$ and $e \in \{0,1\}$ that is not clean has exactly two maximal ideals and $2 \in U(S)$. For example, we show that a direct product πS_α of semirings $\{S_\alpha\}$ is weakly clean if and only if each S_α is weakly clean and almost one S_α is not clean. A semiring S is almost clean if each $a \in S$ can be written in the form $a = r + e$ where $r \in$ reg(S), the set of regular elements of S and $e \in Id(S)$. Certainly a clean semiring is almost clean, but an integral domain while always almost clean is clean if and only if it is quasilocal .

Definition 1.1: A semiring S is weakly clean if each $a \in S$ can be written as $a = u + e$ or $a = u - e$ where $u \in U(S)$ and $e \in Id(S)$

Definition 1.2: Let S be a non- empty set of idempotents of S, then S is S-weakly clean if each $a \in S$ can be written in the form $a = u +e$ or $a = u - e$ where $u \in U(S)$ and $e \in S$.

Note 1.3: For a clean semiring, the homomorphic image of a weakly clean semiring is easily seen to be weakly clean, more generally if S is S-weakly clean and $\overline{S}$ is a homomorphism image of S ,then $\overline{S}$ is $\overline{S}$-weakly clean where $\overline{S}$ is the image of S.

Note 1.4: We define an S-clean semiring S, each $a \in S$ can be written as $a = u + e$ where $u \in U(S)$ and $e \in S$. However, if S is S-clean, then S=Id(S).We first consider {0,1}-weakly clean semirings i.e., semirings in which each element $a \in S$ has the form $a=u+0=u$, $a=u+1$ or $a=u-1$ where $u \in U(S)$. Equivalently S is {0, 1}-weakly clean if atleast one of a-1, a, a+1 is a unit.

Note 1.5: If S is a semiring has unique maximal ideal and it has local noethicalthen S is called quasilocal.

Note 1.6: Quasilocal semiring is both clean and {0, 1}-weakly clean.

Lemma 1.7: (i). If S is weakly clean or {0, 1}-weakly clean, then so is every homomorphic image of S.
(ii). If S is {0, 1}-weakly clean, then S has almost two maximal ideals.

Proof: i) .Clear, there if $\overline{S}$ is a homomorphic image of S we mean that $\overline{S}$ is $\{\overline{0},\overline{1}\}$-weakly clean.
ii) .Suppose that S has more than two maximal ideals, say M_1, M_2, M_3 are distinct maximal ideals of S. Let $\overline{S}=S/M_1M_2M_3 \cong S/M_1*S/M_2*S/M_3$.By (i) $\overline{S}$ is {0,1}-weakly clean. However (0, 1, -1), (0, 1, -1) + (1, 1, 1) = (1, 2, 0) and (0, 1, -1) – (1 ,1 ,1) = (-1, 0, -2) are all non -units. Which is a contradiction. Suppose that k_1 and k_2 are not of characteristic 2 then k_1*k_2 has exactly two maximal ideals and $2 \in U(k_1*k_2)$. So by the proof of (i), S is {0, 1}-weakly clean. Sufficient condition. Suppose that say char $k_1 = 2$.Then (1,0) –(1,1) = (0,-1),(1,0) and (1,0) + (1,1) = (0,1) are all non-units. Hence k_1*k_2 is not {0, 1}-weakly clean.

Theorem1.8: A semiring S is {0, 1}-weakly clean if and only if either

i. S is quasilocal or
ii. S has exactly two maximal ideals and $2 \in U(R)$

Proof: ⇔A quasilocal semiring {0, 1}-weakly clean and a semiring with two maximal ideals in which 2 is
a unit is {0,1}-weakly clean.

⇔Let S be {0, 1}-weakly clean. Suppose that S is not quasilocal. S has exactly two maximal ideals say M_1 and M_2 then $S/M_1M_2 \cong$ S/M1*S/M2 have characteristics different from (2). Hence $2 \notin M_1 \cup M_2$, so $2 \in U(S)$

Corollary 1.9: An indecomposable weakly clean semiring is either quasilocal or is an indecomposable s emiring with exactly two maximal ideals in which 2 is a unit.

Proof: If S is indecomposable, Id(S) = {0, 1} hence S is weakly clean if and only if is {0,1}-weakly clean

Theorem 1.10: Let S be S-weakly clean where $|S| < \infty$ .If $0 \notin S$ then S has atmost 2|S|-1 maximal ideals. If $0 \in S$, then S has atmost 2|S|-2 maximal ideals. In particular, $|Id(S)| < \infty$ and S is a finite direct product of indecomposable semirings.

Proof: Let S = $\{e_1,e_2 \ldots e_n\}$. Suppose that S has more than 2_{n-1} maximal ideal , say $M_1,M_2,\ldots M_{2n}$ are distinct maximal ideals of S. Let $\overline{S} = S/M_1 \ldots M_{2n} \cong S/M_1 * S/M_{2n}$

Let $\overline{e}_i$ be the image of e_i in $\overline{S}$ and $\overline{S} = \{\overline{e}_1,\overline{e}_2 \ldots \overline{e}_n\}$ .Clearly $\overline{S}$ is $\overline{S}$-weakly clean.

Let $f_1, f_2, \ldots f_{2n}$ be idempotenents of $\overline{S}$ corresponding to the standard basis for $S/M_1 * \ldots . * S/M_{2n}$

Let $x = -\overline{e}_1 f_{1-\ldots\ldots} - \overline{e}_n f_n + \overline{e}_1 f_{n+1} + \ldots . - \overline{e}_n f_n + \overline{e}_1 f_{n+1} + \ldots\ldots + \overline{e}_n f_{2n}$

Then $x+\overline{e}_I$ has i^{th} coordinate $-\overline{e}_i f_i + \ldots . + \overline{e}_i f_i = 0$ and $x-\overline{e}_i$ has $n+i^{th}$ coordinate $\overline{e}_i f_{n+i} - \overline{e}_i f_{n+i} = 0$

Thus no $x \pm e_i$ is a unit in $\overline{S}$, a contradiction . If $0 \notin S$, we are done.Suppose that $0 \in S$. Let $e_1,e_2,\ldots e_{n-1}$ be the non zero members of S. So $e_n=0$ suppose that S has more than 2(n-1) maximal ideals, say $M_1 \ldots M_{2(n-1)+1}$ are distinct maximal ideals of S. Then the notation as above ,we see that for $x = -\overline{e}_1 f_1 - \ldots . - \overline{e}_{(n-1)} f_{(n-1)} + \overline{e}_1 f_n + \ldots + \overline{e}_{n-1} f_{2(n-1)} + 0 f_{2n-1}, x \neq \overline{e}_i$ is a non unit in $\overline{S}$ for each i=1,2…n(Note that in the case where n=1,we have shown that no semiring is {0}-weakly clean). The last statement follows from the fact that $S_1 * S_2 * \ldots * S_m$ has atleast m maximal ideals.

Theorems 1.11: A commutative semiring S is {1}-weakly clean if and only if S is quasilocal and $2 \in U(S)$

Proof: $\Rightarrow$ By Theorem(1.10), S is quasilocal

Since one of 1 ± 1 is a unit, $2 \in U(S)$

$\Rightarrow$Let M be a maximal ideal of S. If $x \in M$, then both $x \pm 1$ are units. Suppose that $x \notin M$. Suppose that both $x+1, x-1 \in M$. Then $2x = (x + 1) + (x - 1) \in M$ implies $\in M$, which is a contradiction.

References:

1. D.D.Anderson and V.P.Camillo, Commutative rings whose elements are a sum of a uit and an idempotent, Comm.Algebra 30 (2002),3327-3336.
2. J.Han and W.K,Nicholson, Extensions of clean rings,comm.Algebra 29(2001),2589-2595.
3. Jyothi.G, Dhanalakshmi.M,Sudha vani.S,Dogo Rangsang Research jpurnal,vol-8,72-75.
4. Y.Ye. semiclean rings .commn Algebra 131,5609-5625.

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CONSEQUENCES OF AGRICULTURAL PRACTICES ON CLIMATIC DYNAMICS.

Smita Basole
Dept. Of Botany, Balbhim Arts, Science And Commerce College, Beed. 431122 (M.S.)
Email - sgbasole@gmail.com

Abstract:

Recent years have seen many efforts to increase the agricultural production. Those improvements were achieved through sustainable techniques and practices. While using the modern techniques, we observe they are the causes for degradation of natural resources. India is the one of the country having agro climatic zones with diversified seasons, crops and farming systems. At the same time it is also vulnerable section of climatic changes. Environment has a direct influence on existence and sustainability of agriculture. In general, the question arises, can we develop and adopt the agriculture farming practices that can produce the food needed to feed an increasing population and simultaneously sustain our environment on long term basis.

The nation faces many prominent effects of climatic changes. To minimize these effect we must adapt integrated systems. The sustainable agriculture hold great potential to replenish ecological damage, to improve agricultural productivity, to meet global & national food securities and improvement in farmer's lively hood. Modern sustainable methodology help to reduce vulnerability with uncertain climatic conditions. But sustainable agriculture alone will not sufficient to reduce agro- eco- socio. problems.

Key words: sustainable agriculture, food security, climatic changes, ecological degradation

Introduction:

The agro-ecosystems of the Indo-Gangetic plains, which have the most fertile soils in India and cover about 13 per cent of the total geographical area , but undergoing severe land degradation due to nutrient depletion. To meet the demands of agriculture goods adequately and to feed the increasing population, the phenomenon of Green Revolution came into existence. Green Revolution, allowed developing countries like India to overcome continual food scarcity by producing more food and other agricultural products by using high-yielding varieties of seeds, modifying farm equipment, and substantially increasing use of chemical fertilizers. For an optimum production of agriculture produce and to feed the growing population, application of chemical fertilizers and pesticides has become necessary. It is well known that about one third of the world's land surface is under agriculture. Growing demands on agricultural land for food, fiber, and fuel are predicted to rapidly increase in coming decades with continued population growth (Bommarco et al., 2013). The Food and Agriculture Organization of the United Nations (FAO) estimates that in developing countries alone 13 million hectares of forest are lost to agriculture each year.

Undoubtedly, agriculture has a greater environmental impact on Earth than any other single human activity. Conventional agricultural farming practices will not provide the food, fiber and fuel needed by increasing population in the future. As a result agricultural land obtaining activities increases leads to greenhouse gases production, at the same time by removing green cover of forests. Forests collect carbon 20 or 40 times more than agricultural lands and most of the carbon is released into atmosphere when forests has been destroyed to open agricultural land (Kamer, and S. Gürlek., 2003). The main reason for the destruction of forest land is to generate agricultural land. In general, the question arises, can we develop and adopt the agriculture farming practices that can produce the food needed to feed an increasing population and simultaneously sustain our environment on long term basis. For increasing agricultural production and productivity, use of chemical inputs such as pesticides and fertilizers has increased. Environmental impacts are the result of intensification of agriculture which signifies unsustainable resource use and use of modern inputs such as chemicals and machinery. These modern technologies affect to agricultural practices and agricultural practices also have effects on environment as destruction of natural resources rapidly.

Pesticides, the chemicals compounds commonly used to eliminate or control a variety of agricultural pests that can damage crops and livestock and reduce farm productivity. They are used to elimination of harmful insects, microorganisms and other pests. The repeatedly use of pesticide results accumulation and mixing with soil, water, air and food, they cause severe problems on the agricultural

foods and affect both human health and natural balance. A pesticide that specialized on a harmful doesn't kill only target, it also kills many harmless organisms. It has reported that alternative implementation designs combining the use of herbaceous riparian buffers with other practices capable of altering nutrient and pesticide loads, riparian hydrology, and in stream habitat are needed (Smiley et.al 2011). According to WHO's classification, 33 pesticides are very dangerous, 48 of them are quite dangerous, 118 of them are moderately dangerous and 239 of them are less dangerous of totally 700 mostly used pesticides. A 75% rate of pesticide usage belongs to developed countries.

The fertilizer combination of 2-3 basic nutrients which are used to improve plant growth, but continuous use of fertilizers damage some features of soil like physical, chemical and biological structure cause to environmental pollution in case of excessive or wrong usage. Using high amounts of nitrogen fertilizer results to soil washing, contaminates to ground water, drinking water, stream and sea water also. Drinking waters shouldn't contain more than 20 ppm nitrate. For this purpose many European countries makes limitation to nitrogen fertilizer usage in ground water conservation regions. The toxic effects of phosphorus become noticeable when agricultural runoff was deposited in lakes, streams and other water sources because excessive amount of phosphorus leads to eutrophication (Litterman et al., 2003, Karr et al., 2003; Trautmann, 1998). Plant hormone term means that some organic substances that created by plants and can be effective even very low intensity, and they moved in plant for growing and development also they increase the yield. Using of plant hormone is harmless in case of appropriate dosage and time, but the same hormone could make toxic effect if it used carelessly.

As intensive use of agricultural techniques are very common , results in yield per area also increased. With regards of increased product, total stem and hay value also has increased, but stem and hay using area decreased rapidly. This situation made faster to stubble burning at developed countries. For elimination of stem, hay and especially secondary product applied agricultural areas; stubble is burned to prepare seed sowing. But it is clear that stubble burning cause to very important environment problems. It cause to wind and water erosion, product lose when it made uncontrolled applications, breaks the natural vegetation and makes the soil unfertile by destroying vitality on the top side of soil. For these harms on the environment, stubble burning prohibited with laws in many countries

Agriculture can either sustain or degrade the environment (Millennium Ecosystem Assessment,2005) has documented agriculture's main negative effects on land and freshwater, as well as the importance of agricultural landscapes in providing products for human sustenance, supporting biodiversity and maintaining ecosystem services. The practice of agriculture has been around for hundreds of years and has become a basic way of life for a majority of the world. Gradually over the years, agricultural processes have flourished and become more efficient. Eco-friendly agriculture has three common applications, these are good agricultural practices, organic agriculture and precision agriculture. Also rotation, sowing of legumes that able to nitrogen fixation and fallowing reduce the negative effect of agriculture on climate change. We suppose to make many researches about the agricultural practices which are featured by sustainability and ecologically friendly methods.

Conclusion:

India is a developing country, so, it should take more serious action related to environment and agriculture. Establishment and implementation of new laws and regulations should be enhanced for the development and transfer of new technologies in the field of agriculture which are environment friendly. Now it is a well-established fact that there is the foremost need to step forward towards our mother earth by nurturing it by going for the organic farming system. Moving back to our ancestor's course by performing organic agriculture is a step towards sustainability. Organic agriculture is a holistic production and management system which is supportive of the environment, health and sustainability (Dubey, 2013). A proper training should be given to the farmers regarding organic farming, its scope, potential, profit and environment sustainability. It has been administered that organic food consumption is increasing in India and this is evident from the fact that many organic food stores are prompt up in India. So, working upon niche area of organic farming is yet to be explored and flourish.

References:

1. Bommarco, R., Kleijn, D. and Potts, S.G., 2013. Ecological intensification: harnessing ecosystem services for food security. Tree. 28 : 230-238. Crissman, C.C., Cole, D.C. and Carpio,
2. Dubey, R.K. 2013.Organic farming beneficial to biodiversity conservation, rural livelihood and nutritional security. Indian Journal of Applied Research, **3**: 18-21.
3. Kamer,F. and Gürlek. S. 2003: Gelişmekte Olan Ülkelerde Tarım-Çevre-Ekonomi Etkileşimi. Doğuş Üniv. Dergisi., **4**(2): 197-206.

4. Karr, Jonathan D., Jennings, Gregory D. and Showers, William J. 2003. Low-level nitrate export from confined dairy farming detected in North Carolina streams. Agri., Ecosystems & Environ. 103-110.
5. Litterman, Adam, Onigbanio, Tolu and Soroka, Teresa, 2003. Environmental Impacts of Agriculture. Princeton University.
6. Trautmann, Nancy M. and Porter, Keith S. 1998. Modern Agriculture: Its Effect on the Environment.
7. Smiley P. C. Jr, King K. W., and Fausey N. R. 2011: Influence of herbaceous riparian buffers on physical habitat, water chemistry, and stream communities within channelized agricultural headwater streams. Ecological Engineering., 37: 1314– 1323.

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SUSTAINABLE ENERGY SYSTEMS THE ROLE OF SOLAR ENERGY DEVELOPMENT

Dr .Kirti Desai
Balbhim Arts, Science and Commerce College, Beed

Abstract:

The basic requirement for human life is energy. Solar Most of the Worlds energy sources are derived from conventional sources Fossil fuels, coals, oil &natural gases. A renewable energy system converts the energy found sunlight.In this paper mentioned topics will be addressed why solar power is the best sustainability & renewable energy developing countries. Solar system are applicable to both homes & villages. Many project on solar power have already been new ideas developing countries. . Solar power is in increasing market for more develop countries which can benefit from less electric expense over time. There are renewable energy sources besides solar it is practically for sunny areas which have less wind.

Keywords: Energy,Renewable,Non Renewable fossil fuel.

Introduction:

The point of view of eco-physics only those energy sources that contaminate the environment minimally are acceptable. The cleanest source of energy is the sun whose irradiation is free of charge and more or less accessible to the whole Earth and the Solar system [1, 2].Present energy save patterns are unstainable leading to a large scale destruction of Environment and natural resources of earth. It is useful for most of the energy needs through fossil fuels and oil is important forenergy needs innew developing countries. Through the government has providing succeeded in providing electricity to large groups of Indian villages electricity at present there are about two billion people without access to electricity all over world tap renewable energy sources. Solar power is in increasing market for more develop countries which can benefit from less electric expense over time. There are renewable energy sources besides solar ,it is practically for sunny areas which have less wind.Application for this energy sources can be from single houses&large electrical grids to car. In the last twenty years sustainable development in different spheres of life and work has been in the limelight worldwide. Regarding this it is essential to look at the relation between energy and sustainable development.

Solar Energy:

Sun energy is clean, inexhaustible and can be transformed into other forms of energy: thermal, electric, chemical, mechanical, .Sun is one of 400 billion stars in the Milky Way Galaxy. Astronomers classify it into "yellow" dwarfs. Sun contains more than 99% of the whole matter in the Solar system. The temperature on the surface of the Sun is 5500 °C. In the Sun nucleus the pressure is 107 Pa, and the temperature is 15·106 K. Sun energy is generated in its nucleus mainly through the thermonuclear reaction of hydrogen fusion into helium. In the form of electromagnetic waves this energy is then transmitted from the nucleus towards the surface of the Sun and further on in the surrounding space. Only the half -billionth part of the Sun energy reaches the Earth.

Two components of the Sun irradiation reach the Earth. One comes directly from the surface of the Sun (direct irradiation) and the other generated by the Sun irradiation dissipation on the impurity particles in the atmosphere (diffuse irradiation). On the intensity of the incoming energy substantial influence is exerted by meteorological.

Renewable energy sources are key factor to face existing challenges. In fact sustainable development relies on renewable energy sources & solar energy is recognized as being very important for many countries from Europe, America,solar energy can change with success in the most of them(3).RES to achieve a low carbon economy(4) The current energy framework can be improved through measures concerning the demand side & by system operation & enhancing instruments in low carbon assets(5).

Importance Of Renewable Energy:

The most significant feature of renewable energy is its plentiful supply. It is infinite. Renewable energy sources are hygienic sources of energy that have a much lesser negative environmental impact than conventional fossil energy technologies. Most renewable energy investments are spent on materials and personnel to build and maintain the facilities, rather than on costly energy imports.

With technological advancements in mass communication, people have now become aware of the demerits of burning Gasoline and other products of petroleum cause similar pollution. These pollutants cause respiratory illnesses and death in humans, produce acid rain that devastates buildings and destroys fragile ecosystems, and deplete the ozone layer through global warming (6).

Application Of Solar Energy:

Applications of renewable energy are broadly classified as "on-grid" and "off-grid". A grid is basically an integration of generation, transmission and distribution system which supplies energy to several consumers. On-grid and off-grid are the terms which describe the way electricity is delivered. Ongrid deals with power stations which are directly connected to grids such as wind farm and solar panels. Offgrid applications, in general, serve only one load, such as a small home or a village house. Off-grid applications can take many forms, from photovoltaic (PV) modules for an individual village home to centralized windmills to power a village water pump or a commercial battery charging facility. These off-grid applications are most generally used in remote or rural settings. A major on-grid application is to generate electricity in mass amounts (7).

The most important application of wind energy is the wind turbine. The wind turbine can convert the energy in the wind to mechanical power which, in turn, can be fed into a generator to generate large amounts of electricity. This electricity may be used to charge batteries or pump water. Wind energy can also be used in wind-powered vehicles. This can save a lot of fuel and can provide increased performance and efficiency. Similarly, solar energy can be used to power photovoltaic panels which are an excellent way of producing electricity at small scales, especially for rural and remote areas, where transmission lines cannot reach. Due to their little maintenance and high reliability, they are ideal to use in isolated and far-flung places. Offices can employ glass PV modules for reliable supply of electricity. Solar energy is also widely utilized in solar water heaters, solar calculators and solar lights. They work on the principle of storing energy from the sun during the day and utilizing it at night time. Geothermal energy is most common amongst farmers. They use this energy to heat their greenhouses which enable them to grow various fruits and vegetables all around the year. In some countries, the heat produced from this energy is also utilized to heat pedestrian walkways and bicycle lanes in order to prevent them from freezing in extreme winters. Solid biomass can be burnt in incinerators to produce heat that can be used to produce steam for electricity generation. Biomass can also be converted to biofuels like ethanol for transportation needs. A widely used application of hydropower is in a compressor. Specially designed compressors can be used for adjusting turbine blades and governor valves. They can also be used to blow out the water to eliminate the load during starting (8), (9).

Conclusion:

The objective in using renewable energy sources is to reduce the pessimistic environmental effects associated with non renewable energy sources such as coal, oil and natural gas. Choosing to use a renewable energy source will not only translate into cost savings over the long-term, but will also help protect the environment from the risks of fossil fuel emissions. Energy conservation awareness campaigns must be initiated at government level to make people aware of the importance of conserving energy. Moreover, power companies should gradually resort to the use of renewable resources as they are profuse and will never deplete. Social media can play a key role in this by educating people about energy sources and their utilization. Colleges and universities should teach a compulsory subject on energy conservation and utilization.

References:

1. J.Radosatjevic,T.Pavlovic . Lambic, Solarna energytika IRO GraderinskaBeograd(2004)
2. T pavlovicB CabricFizikaitehehnikasolarneenergetike, GradevinskKnjlga, Beograd(1999).
3. Martins f,felgueiras(smitkova M 2015)
4. European climate foundation 2021).
5. Client Earth (2013)ECF,E3G,RAP.
6. Moll E., "Importance of renewable sources of energy" [Online], Available at http://homeguides.sfgate.com/importance-renewableresources-energy-79690.html, [Accessed 17th April 2015].
7. Renewable/energyoverview"[Online],Available athttp://www.oas.org/dsd/publications/unit/oea79e/ch05.ht m, [Accessed 17th April 2015].
8. "Applications for solar energy" [Online], Available at http://www.solarpowernotes.com/solar-energyapplications.html#.VTTaAyGqqko, [Accessed 20th April 2015]

9. "Saur Compressors-hydroelectric power plant applications", 3rd April 2012 [Online], Available at http://news.thomasnet.com/companystory/sauercompressors-hydroelectric-power-plant-applications613186, [Accessed 20th April 2015].

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RAPID MULTIPLICATION OF SPATHIPHYLLUM WALLICII AN ORNAMENTAL HERB THROUGH PLANT TISSUE CULTURE TECHNIQUE

Fargade S.A.[1] Shelke M.R.[2]
(Dept.of Agril.Botany)
[1]*College of Agriculture Business Management, Loni*
[2]*College of Agricultural Biotechnology, Loni*

Abstract:

Micropropagation of Spathiphyllum wallicii is presented using tuber segment proliferation on to Murashige and Skoog (MS) medium supplemented with different plant growth regulator concentration. The proliferation response were significantly influenced by the cytokinin type and concentrations. The number of shoots per explant increased in treatment with MS medium and growth regulator. The best length of shoot (3.940.05 cm) was obtained with MS medium with 0.5mg/I BAP treatment within 6 weeks were identified in growth chamber at 25+2 C with light source of 2000-3000 Lux for 16 hr./day. After 6 weeks of shoot multiplication the best length of shoots (4.10.15cm) was obtain with MS medium+0.5 mg/l BAP.

Keywords: Spathiphyllum wallicii, in-vitro, explants, Phytohormones

Plant Introduction:

History of Spathipyllum wallicii

It is a very popular indoor house plant of the family Araceae. Spathiphyllum is genus of about 40 species of monocotyledonous. The selected species of Spathiphyllum such as, Spathiphyllum cochlearispathum, Spathiphyllum floribundum,Spathiphyllum montanum, Spathiphyllum silvicola, Spathiphyllum wallisii.

Spathiphyllum wallisii commonly known as Peace-Lily, cobra plant, spath flower. The genus name means "spathe-leaf". It was discovered in the late 19 century growing wild in Central America and southeastern AsiaIn micropropagation, explants from many other parts of the plant such as spadix, stem section, shoot tip. In vitro methods of propagation are now used for large scale production of ornamental plant to meet the growing demand in both the domestic and the export market. Despite the increasing commercial demand of spathiphyllum plants. Only a few protocols for tissue culture propagation are published. Moreover we could not find any report of In vitro propagation of spathiphyllum wallisii. To overcome slow propagation rate, micro propagation will be a very useful technique for mass multiplication of Spathiphyllum wallisii. Thus, with all this in view and consideration, the current project was undertaken to standardize the necessary cultural conditions of Spathiphyllum wallisii by tissue culture.

Need of micro propagation in Spathipyllum wallicii

1) Conventional propagation of Spathiphyllum through stem cutting and seed germination is slow & inconsistent with the demand.

2) The pollen and the inflorescence both have short lives, which mean a large collection of Spathiphyllum is necessary if cross breeding is to be done successfully.

Objective:

To multiply the Spathiphyllum wallicii an ornamental herb through plant tissue culture tech.

Materials and Methods:

Collection of plant material:

Two to three month old mother plants of Spathiphyllum wallisi were collected from Babulal Nursery Nashik road, Nashik. Tuber segments of Spathiphyllum wallisi were used as explants.

Methods:

Medium preparation:

Murashige and Skoog medium is a plant growth medium used in the laboratories for cultivation of plant cell culture include different organic (vitamins) and inorganic salt, major salts (macronutrients), minor salts (micronutrients) nutrient and iron stock (Murashige and Skoog 1962).

Inoculation of Explants:

All inoculations and aseptic manipulation were carried out in a laminar air flow cabinet. Laminar air flow (LAF) was switched ON and power switch was pressed to turn ON power in system. Pressed the air flow switch to turn ON the blower. Once the blower is turned ON, pressed the UV light switch to start the UV for a minimum 30 minutes before starting the work. The working surface of the laminar air flow

cabinet was cleaned by swabbing with 70% ethyl alcohol. The instruments like scalpel, forceps were sterilized by an alcoholic dip and place in glass bead sterilizer inside the laminar airflow cabinet. Other requirements like bottles, beakers, cotton, distilled water etc. were sterilized. Before the onset of inoculation, hands were washed thoroughly by soap and then swabbing with 70% ethyl alcohol.

Initiation medium were divided into 4 parts given below. Each part contain 1liter MS Medium. First part was free from growth regulator and remaining four parts contains different concentration of BAP-MS Medium (control), 0.5 mg/l BAP, 1.0 mg/l BAP, 1.5 mg/l BAP, 2.0 mg/l BAP. The inoculated culture bottles were incubated at 25 ± 2 ºC temperature for 16 hours light and 8 hours dark per day in 2000-3000 lux light intensity under cool fluorescent white light in the culture room. Shoot multiplication medium were prepared by using 2 liter MS Medium with BAP by following concentration; MS Medium(Control), 0.5 mg/l BAP, 1.0mg/1BAP,1.5mg/1BAP .Shoot proliferation was determined after four weeks of culture. Data were recorded in terms of average shoots length (cm), average number of shoots per explants and survival percentage

Results:

Establishment of Spathiphyllum wallicii in vitro:

Data were obtained after four weeks of initiation of culture showed that tuber segments of Spathiphyllum wallicii could be established

Sr. No.	**Medium + Hormones**	**Average number of shoots per explants**	**Average length ofshoot (cm)**	**Survival %**
1.	MS Medium	5 ± 0.47	3.3 ± 0.3	50
2.	**MS + 0.5 mg/l BAP**	**7.75 ± 0.47**	**6.1 ± 0.2**	**90**
3.	MS + 1.0 mg/l BAP	5.5 ± 0.28	3.7 ± 0.3	80
4.	MS + 1.5 mg/l BAP	2.25 ± 0.47	1.6 ± 0.3	70
5.	MS + 2.0 mg/l BAP	2.25 ± 0.25	1.5 ± 0.2	60

Shoot Multiplication:

The shoot initiation obtained from the in vitro established cultures were subjected to be multiplied.

Sr. No.	**Medium + Hormones**	**Average number of shoots per explants**	**Average length ofshoot (cm)**	**Survival %**
1	MS Medium (Control)	8.50± 0.17	3.0±.027	50%
2	**MS + 0.5 mg/l BAP**	**11.66 ± 0.37**	**6.0 ± 0.47**	**90%**
3	MS + 1.0 mg/1BAP	9.50± 0.13	4.0± 0.17	80%
4	MS + 1.5 mg1/BAP	7.40 ± 0.12	4.7 ± 0.15	70%

Summary and Conclusion

Summary:

The present work has under taken to conserve and standardize the protocol for the in vitro culture establishment and multiplication of Spathiphyllum wallici . After four weeks of initiation, maximum numbers of shoots were obtained in medium supplemented with 0.5 mg/l BAP. The highest survival percentage 90% was obtained when the MS Medium was supplemented with 0.5 mg/l BAP. The shoot initials obtained from the in vitro established culture were subjected to be multiplied.

Shoot multiplication was significantly promoted on the medium containing BAP 0.5 mg/l. The highest survival percentage 90% was obtained when the MS Medium was supplemented with 0.5 mg/l BAP. Different plant hormones like auxins and cytokinins plays important role in the physiological and biochemical process in the plant. The effect of hormone like BAP gave better response in shoot multiplication. The treatment of BAP on shoot had been well studied in different dose hormone. Results were calculated on the basis of observation table.

Conclusion:

As this herb, is an important ornamental plant, it is becoming an large genus species due to its infertile nature. The method of vegetative propagation is not efficient to save this plant. The production of large numbers of Spathiphyllum wallicii plants was possible through in vitro propagation techniques.

References:

1. Chen, J. Qu, L. Henny, R. J. Robinson, C. A. Caldwell, R. D. and Huang, Y, 2000. Response of Spathiphyllum cultivars to chilling temperatures. Proc. Fla. State Hort. Soc. 113:165-169.

2. Das, A. Paul, A. K. Chaudhuri, S., 2000. Micropropagation of Spathiphyllum wallisii - an important ornamental plant. Horticultural Journal Vol. 13 No. 2 pp. 71-75.
3. Henny, R. J. Chen, J. and Mellich, T. A., 2000. Flowering response of three Spathiphyllum cultivars to treatment with three levels of gibberellic acid. Proc. Fla. State Hort. Soc. 113:169-170.
4. Jaime, A. Silva, T. D. Dam, T. T. Zeng, S. Tanaka, M. Dobranszki, J., 2014 Ploidy analysis of Cymbidium, Phalaenopsis, Dendrobium and Paphiopedillum (Orchidaceae). and Spathiphyllum and Syngonium (Araceae). Biologia 69/6: 750-755.
5. Kadlecek, P. Ticha, I. Daniel, H. Vera, C. Christian, S., 2001. Importance of in vitro pretreatment for ex vitro acclimatization and growth.
6. Kakoei, F. and Salehi, H., 2013. Effects of Different Pot Mixtures on spathiphyllum (Spathiphyllum wallisii Regel) Growth and Development. Journal of Central European Agriculture.

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A REVIEW ON NANOMATERIALS IN COSMECEUTICALS

Urusa Ansari[1], Seema I. Habib[2], Tahreem Momin[3], Naheed Azam[4]
Department of Chemistry, G.M.Momin Women's College, Bhiwandi.
Email : [1]ansariurusa27@gmail.com, [2] seemahabib12@gmail.com
[3]tahreem811@gmail.com,[4]naheedazam63@gmail.com

Abstract:

One of the most evergrowing and extensively broad commercial sector's inudtry is Cosmeceutical industry. The cosmetics industry is growing day by day with its high demand and applications, increasing demand lead pressure on its manufacturers to invent newer methods of production to acquire consumers needs and satisfaction with desireable and effective products. For such reasons Nanotechnology and nanomaterials are applied because of its promising properties that can be suitably applied in cosmetic products such as skin care products (moisturizer, lotions, creams, etc.), hair care products (shampoo, conditioner), and other cosmetics products that have been discussed below. Nanomaterial such as Liposome, Nanoemulsion**,** Microemulsions (micelles), Nanocrystals, Gold and Silver Nanoparticals, Inorganic Nanoparticles, Silica (SiO2) are extensively being used in cosmetics. Their occurrence,properties, uses and safety aspects has been discussed in this review article.

Keywords: Liposome, Nanoemulsion**,** Microemulsions (micelles), Nanocrystals, Gold and Silver Nanoparticals, Inorganic Nanoparticles, Silica (SiO2) and safety consideration.

Introduction:

Over 4000 years ago, prehistoric Egyptians, Greeks and Roman researchers were making use of nanotechnology in hair dye preparations[1]. From 1959 onwards, the concept of nanotechnology came into existence in different fields of sciences like biology, physics, chemistry, and engineering[2,3] EU Directive 76/768/EWG defines cosmetics as follows: "A 'cosmetic product' shall mean any substance or mixture intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odours and/ or protecting them or keeping them in good condition"[4,5].

In an attempt to satisfy the ever growing desire of consumers to look beautiful and remain youthful, the sphere of cosmetics (through its manufacturers and researchers) has imbibed nanotechnology for its potentials and is expanding its frontiers rapidly yet steadily. Dendrimers, cubosomes, nanoemulsions are good examples of nanoform particles employed in cosmetics as an application of nanotechnology in the science of cosmetics formulation and manufacture [6,7]. The prefix "Nano" from nanotechnology is a Greek word: "Nanos" – which means "little old man or dwarf". Nanotechnology is a powerful new technology in which a material is reconstructed or engineered at an atomic and molecular level. One nanometer (nm) is one billionth, or 10−9 of a meter. According to the definition of National Nanotechnology Initiative in the US, the scale range of nanomaterial is 1 to 100 nm[8]. As nanoparticles are smaller in size, so, they exhibit different physiochemical properties[9,10] The cosmetics industry is always looking to improve the properties of its products and hence is making more and more use of the developments in nanotechnology. Nanomaterials are used in the manufacture of cosmetics in two important areas: as "encapsulation or carrier systems" to transport agents to deeper skin layers, and as optimal UV protective filters in sunscreens. According to the manufacturers other nanoscale materials can be found in cosmetic products such as nanoparticulate gold and silver, ceramic nanoparticles, pigments, minerals and fullerenes[5,11].

The use of different Nanomaterial in Cosmetis :

The cosmetics industry therefore uses nanodispersion "encapsulation or carrier systems", so that agents penetrate into deeper skin layers where they activate skin metabolism with the aim of improving the skin's appearance. The functions and benefits of these "encapsulation and carrier systems" are:

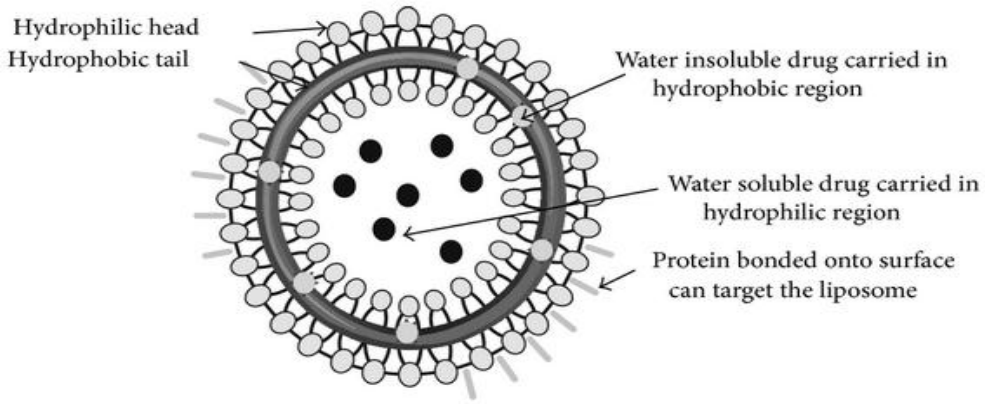
- the controlled release and optimisation of the availability of cosmetic agents in certain skin layers
- the protection of sensitive agents
- longer shelf life and hence greater product effectiveness
- a reduction in the amount of agents and additives used in products

They include liposomes, nanoemulsions, microemulsions (micelles)[5,12]

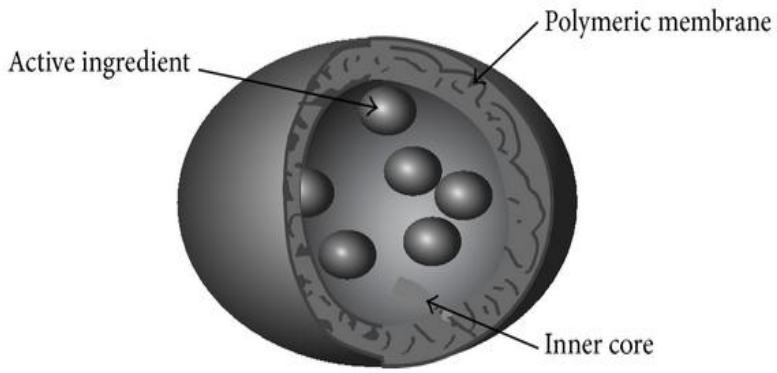
Liposomes:

Liposome size ranges from 30 nm to several micrometers. Liposomes of natural or synthetic phospholipids are similar to those in cellular plasma membranes. This explains their biocompatibility, biodegradability, nontoxicity, and being flexible vesicles are readily utilized by the cells [7,13] Liposomes are used in a variety of cosmeceuticals because they are biocompatible, biodegradable, nontoxic, and flexible vesicles and can encapsulate active ingredients easily. Liposomes have an ability to protect the encapsulated drug from external environment and are suitable for delivery of hydrophobic and hydrophilic compounds.These characteristics make them ideal candidate for the delivery of vitamins and other essential molecules to regenerate the epidermis. One of the main ingredients of liposome is Phosphatidylcholine which has been used in skin care products (moisturizer, lotions, creams, etc.) and hair care products (shampoo, conditioner) due to its softening and conditioning properties. Several active ingredients (e.g., vitamins A, E, and K) and antioxidants (e.g., Carotenoids, lycopene, and CoQ10) have been incorporated into liposomes which increases their physical and chemical stability when dispersed in water. Liposomes fuse with the skin's barrier layer thus increasing the membranes' permeability locally and allowing the agents to penetrate into deeper skin layers[5,20].

Lipophilic compounds such as cholesterol and ceramides have been used in topical skin creams for many years, because they are the lipids found in normal skin tissue, and are easily incorporated into liposomes to improve skin hydration and to make the skin texture softer and smoother. "Capture" was the first liposomal antiageing cream launched by Dior in 1986[7,14,15,16,17].



(a)



(b)

Figure:1

Different types of nanoparticles. (a): liposome showing a phospholipid bilayer surrounding an aqueous interior[18], (b): nanocapsule with different drug-loading modalities [19]

Nanoemulsion:

The term "Nanoemulsion" refers to a thermodynamically stable and isotropically clear dispersion of two immiscible liquids, as mentioned in the definition of emulsions in general. The difference is the size; a nanoemulsion is considered to be a thermodynamically or kinetically stable liquid dispersion of an oil phase and a water phase in combination with a surfactant. The dispersed phase typically comprises small particles or droplets, with a size range of 5 nm-200 nm, and has very low oil/water interfacial tension. [21,22]

Properties Of Nanoemulsions:

Nanoemulsions have many interesting properties that are different from those of larger scale emulsion systems. The most distinguishing properties and advantages are listed below:

1. The dispersed phase have a size range of 5 nm-200 nm, and have a very low oil/water interfacial tension. Because the droplet size is less than 25% of the wavelength of visible light, Nanoemulsions are transparent. [21,22] Ultraviolet–visible spectroscopy of nanoemulsions.
2. Nanoemulsions do not show the problems of inherent creaming (gravitationally driven Creaming), flocculation, coalescence, and sedimentation, which are commonly associated with macroemulsions [21,23].
3. Nanoemulsions have a much more higher surface area and free energy than macro emulsions that maket hem an effective transport system[21,24].
4. Nanoemulsions can be formulated in variety of formulations, it is possible to produce non-toxic and non-irritant formulations, hence they can be easily applied to skin and mucous membranes and they can be produced as foams, creams, liquids, and sprays[21].

NEs have recently become increasingly important as potential vehicles for the controlled delivery of cosmetics and for the optimized dispersion of active ingredients in particular skin layers. Due to their lipophilic interior, NEs are more suitable for the transport of lipophilic compounds than liposomes. Similar to liposomes, they support the skin penetration of active ingredients and thus increase their concentration in the skin. Another advantage is the small sized droplet with its high surface area allowing effective transport of the active to the skin.[23] Companies that manufacture these products claim that nanoemulsions can transport beneficial compounds deep into the skin in high concentrations. For example La Praire's product the Dollars 500 skin caviar in-tensive ampoule treatment uses this technology to deliver the functional ingredients into the skin at their site of action quicker to effect the claims of the product which is to minimize uneven skin pigmentation, remove lines and wrinkles[7].

Microemulsions (micelles):

Microemulsions are a mixture of oil, water and a synthetic emulsifying agent (tenside). When a tenside is dissolved in water, dropletshaped structures are formed which are called micelles, measuring between approximately 5 and 100 nm in diameter. Micelles enable non-water-soluble agents to be transported to deeper skin layers. The tenside content is mostly a disadvantage in skincare products because it retains its emulsifying properties when applied on the skin and the skin's fatty components can be washed out. In people with very sensitive skin some tensides can cause inflammation of the skin[25]. Skin cleansing products contained microemulsions.

Nanocrystals:

Nanocrystals are crystals having size less than 1µm. They are aggregates comprising several hundred to tens of thousands of atoms that combine into a "cluster". Typical sizes of these aggregates are between 10-400 nm [3,26]. Nanocrystals of poorly soluble drugs can also be incorporated in cosmetic products where they provide high penetration power through dermal application. The first cosmetic products appeared on the market recently; Juvena in 2007 (rutin) and La Prairie in 2008 (hesperidin). Rutin and hesperidin are two, poorly soluble, plant glycoside antioxidants that could not previously be used dermally. Once formulated as nanocrystals, they became dermally available as measured by antioxidant effect. The nanocrystals can be added to any cosmetic topical formulation, e. g. creams, lotions and liposomal dispersions [3,27]

Gold and Silver Nanoparticals:

Due to antibacterial properties of silver nanoparticles it can be used as preservatives in cosmetics, and in anti-acne preparation. For example, sil-ver nanoparticles, which have antibacterial activity, are also being incorporated into toothpastes and shampoos as preservatives. Kim et al. observed that silver nanoparticles inhibit the growth of dermatophytes, making them potential anti-infective agent[28,29,30]. Studies with various types of nanoparticles suggest that they may possess antibac- terial and antifungal properties. Silver nanoparticles have been studied extensively in this regard. The literature suggests that, while the antimicrobial activity of silver nanoparticles may be due to the release of silver ions, it is also

possible that they exhibit additional effect that cannot be explained solely by the release of silver ions in solution[31]. Gold and silver nanoparticals are used in cosmetics products(Figure:a) such as deodorants and anti-aging creams. In Europe, the SCCS, due to several major data gaps, has yet to draw any conclusions regarding the safety of colloidal silver in nano form when used in oral and dermal cosmetic products [32,33]. In the USA, cosmetic products cannot claim antibacterial properti es because that claim is based on a physiological function, and therefore it can only be used in drug products an d not in cosmetics [32,34].Kokura et al. [35] studied the use of silver nanoparticles as a preservative in cosmetics, and reported that silver nanoparticles remained stable, without exhibiting sedimentation, for longer than 1 year. In addition, silver nanoparticles showed acceptable preservation efficacy against bacteria and fungi, and did not penetrate human skin [35].Pulit-Prociak et al. [36] studied the application of gold and silver nanoparticles in cosmetic formulations. They reported embedding differences between silver and gold nanoparticles into the structure of a cream. Silver nanoparticles introduced to the cream mixture agglomerate, but gold nanoparticles did not agglomerate after introduction to cream mixtures. They attributed this phenomenon to the greater value of the electrokinetic potential located on the surface of gold nanoparticles. Based on a model dermal membrane study, they have reported concerns over the penetration of nanoparticles into the skin for samples with nanoparticles concentration of 110–200 mg/kg. Due to the complex composition of cosmetic creams, it is not easy to characterize the primary gold nanomaterials in situ [37].Cao et al. [37], developed a practical protocol including separation, quantification, and characterization of gold nanomaterials present in commercially available cosmetic creams.

Title	**Publication number**	**Publication date**	**Applicant**
Cosmetic pigment composition containing gold or silver nano-particles	WO2007011103A1	2007–01-25	Korea Research Institute of Bioscience and Biotechnology
Skin lotion comprising aqueous dispersion of ultra-fine noble metal particles	HU0401663A2	2005–09-28	Phild Co., Ltd.
Anti-microbial body care product	US20020122832A1	2002–09-05	Bernhard Hanke
Method for treating human keratin fibers with organomodified metallic particles	US7186274B2	2007–03-06	L'oreal
Formulations including silver nanoparticles and methods of using the same	WO2015057983A1	2015–04-23	University of South Alabama
Colored nanoparticles for cosmetic and its manufacturing method	JP2009221140A	2009–10-01	National Institute Of Advanced Industrial & Technology
Colloidal silver, honey, and helichrysum oil antiseptic composition and method of application	US5785972A	1998–07-28	Tyler; Kathleen A
Toothpaste or tooth gel containing silver nano particles coated with silver oxide	US20130017236A1	2013–01-17	Robert Johnson Holladay

Table: 01 (Gajbhiye and Sakharwade, 2016) [38]

Inorganic Nanoparticles:

Inorganic nanoparticles are non-toxic, hydrophilic, biocompatible, and highly stable compared to organic nanoparticles. Their major difference—apart from the aforementioned—is that inorganic nanoparticles are synthesized from inorganic elements (Ag, Au, Ti, etc.), while the organic ones are synthesized from polymers. One of the most widely used inorganic nanoparticles for sunscreens is TiO2, and in nanoscale it has a higher sun protection factor (SPF) which makes it more efficient, and has a better cosmetic result due to its transparency, compared to TiO2 pigment. Oftentimes, in the market, companies use words such as “sheer” or “invisible” when nanoscale TiO2 or ZnO are used. It is reported that nanoscale TiO2 and ZnO show great advantages over many products at larger than nano-dimensions [32,39]. Micro-TiO2 and ZnO are used as ingredients in sunscreens due to their UVA and UVB absorption

capabilities. Nanoparticles of ZnO and TiO2 are also widely used in sunscreens as UV filters [40] starting at the size of 20 nm. They show better dispersion and leave a better cosmetic results.

Silica (SiO2):

Silica nanoparticles have attracted interest from the cosmetic industry, because they show hydrophilic surface favoring protracted circulation and thanks to their low production cost [32,41] It has been indicated that silica nanoparticles may help improve the appearance and distribution of pigments in lipsticks, and prevent pigments from migrating into the fine line of lips [43]. Nano Silica is used to enhance the effectiveness, texture, and shelf-life of cosmetic products. It adds absorbency and acts as an anti-caking agent [42] Silica nanoparticles can be found in leave-on and rinse-off cosmetic products for hair, skin, lips, face and nails, and an increase of silica nanoparticles presence in cosmetic products is anticipated [44]. Results are controversial regarding the safety of silica-based nanoparticles and factors such as size and surface modifications should be taken into account when assessing toxicity [44,45]. Therefore, opinions regarding the use and exposure of silica nanoparticles in cosmetics are still inconclusive, and further long-exposure tests are needed.

Safety Considerations Relating To Nanomaterials:

It has emerged from numerous studies that some materials manufactured at the nano-scale show significant deviations in physicochemical properties, interaction with biological systems, and/or toxicological effects, compared to conventional equivalents. For example, nanoparticles (NPs) in the lower nanometre (nm) range may penetrate biological membrane barriers that normally prevent the entry of (larger) particulate materials into cells and tissues (Jani et al., 1990; Geiser and Kreyling 2010; Landsiedel et al., 2012; Treuel et al., 2013; Hougaard et al., 2015; ECHA, 2017b, c; Nakamura and Watano, 2018) [46].

Nanomaterials in cosmetics could have various functions (e.g., UVA and UVB filters in sunscreens, nano-preservatives). The unique characteristics of any given nanomaterial which may lead to the desired function/property of the cosmetic product may also pose a risk to the consumer. With this in mind, a standard safety evaluation of all nanomaterial is necessary, including tests dealing with the nano-characteristics (e.g., penetration into viable skin layers due to their small size as well as inhalation experiments in the case of sprays/powders) [32].

In addition, the potential exposure routes of NMs should be identified, and in vitro and in vivo toxicological data—including studies on dermal penetration and potential inhalation, genotoxicity studies, and possible skin and eye irritation studies—should be conducted. For NMs, in addition to the weight-based concentration of the NM, the concentration should also be given in terms of particle number concentration and surface area. Also, changes in the aggregation and/or degradation/dissolution status of the NM during exposure 16 should be accounted for. Apart from skin exposure, oral exposure—to NMs existing in toothpastes, mouthwashes, and lipsticks—is also possible[32].

As the physicochemical parameters may change in various environments, it is recommended that, as a minimum, characterisation of NMs intended for use in a cosmetic product should be determined at three stages:

- as manufactured (pristine state) to identify the basic NM,
- after addition to the final cosmetic formulation to identify how consumers are exposed, and
- as used for toxicological investigations.

In the case of application in spray products, it is also necessary to determine the concentration of NM in the spray mist released from the container (see section 4). When characterisation of an NM is not feasible at any of these stages, e.g. due to the lack of suitable methods or due to degradation of the NM, this should be justified and documented. It is important to note that environmental impacts of cosmetic ingredients are not considered during safety assessment under the Cosmetic Regulation. They, however, fall under the remit of different regulatory frameworks, such as REACH (EU, 2008)[46].

Conclusion:

In recent times Nanotechnology and the use of nanomaterials has gained atmost importance over conventional methods in almost every aspect of life because of their wide application in scientific reseach and human life. Invention of nanomaterials such as Nonocrystals, nanoemulsion, Gold and silver nanoparticals, inorganic nanoparticals silica and much more has inhances the manufacturing, bulk production and application of leading cosmetic products. Also, increasing consumer attraction because of its promising applications such as longer shelf life and hence greater product effectiveness, biocompatible, biodegradable, nontoxic, and flexible vesicles and can encapsulate active ingredients easily. Nanodespersion with the aim of improving the skin's appearance. Inorganic Nanoparticles has a better cosmetic result due to its transparency and show better dispersion. Besides various beneficial applications

there are some concerns specially for skin products, apart from skin exposure, oral exposure and certain physiological behavior of these NM's should be assest so that standard safety evaluated products can reach the consumers at a reasonable cost.

References:

1. Dureja H, Kaushik D, Gupta M, Kumar K, Lather V. Indian J Pharmacol. 2005; 37(3):155-159
2. Bangale MS, Mitkare SS, Gattani SG, Sakarkar Dm; Int J Pharm Sci, 2012; Vol 4, Issue 2, 88- 97.
3. Kurapati Srinivas *The current role of nanomaterials in cosmetics* Journal of Chemical and Pharmaceutical Research, 2016, 8(5):906-914
4. Council Directive dated 27 July 1976 on the approximation of the laws of the member states relating to cosmetics (76/768/EEC).
5. Sabine Greßler, André Gazso*, Myrtill Simkó, Ulrich Fiedeler, Michael Nentwich : Austrian Academy of Sciences; legal person under public law (BGBl 569/1921; BGBl I 130/2003); Dr. Ignaz Seipel-Platz 2, A-1010 Vienna
6. Raj, S., Jose, S., Sumod, U.S. and Sabitha, M. (2012) Nanotechnology in Cosmetics: Opportunities and Challenges. Journal of Pharmacy and Bioallied Science, 4, 186-193. https://doi.org/10.4103/0975-7406.99016
7. Daniel Ekpa Effiong1*, Timma Otobong Uwah1, Edidiong Udofa Jumbo2, Akwaowo Elijah Akpabio3 Effiong, D.E., Uwah, T.O., Jumbo, E.U. and Akpabio, A.E. (2020) Nanotechnology in Cosmetics: Basics, Current Trends and Safety Concerns—A Review. Advances in Nanoparticles, 9, 1-22. https://doi.org/10.4236/anp.2020.91001
8. Article 2(k) of provisional text for EU Cosmetics Regulation, 2009http:/ /www.europarl.europa.eu/sides/getdoc.do?tye=TA&language=EN&reference=P6- TA-2009-0158.
9. U.S. Food and Drug Administration, "Cosmetics Q&A: FDA's Authority," http://www.fda.gov/Cosmetics/ResourcesForYou/ Consumers/CosmeticsQA/ucm135709.htm
10. Kurapati Srinivas *The current role of nanomaterials in cosmetics* Journal of Chemical and Pharmaceutical Research, 2016, 8(5):906-914
11. www.nanotechproject.org.
12. For an overciew of encapsulation and carrier systems (liposomes, nanoemulsions, microemulsions) see: www.dermaviduals.de/ deutsch/publikationen/spezielle-wirkstoffe/ (accessed on 16.10.08) Dr. Hans Lautenschläger, Kosmetik Konzept KOKO GmbH & Co KG.
13. Singh, A.K. (2016) Introduction to Nanoparticles and Nanotoxicology. In: Engineered Nanoparticles, Academic Press, Boston, 1-18. https://doi.org/10.1016/B978-0-12-801406-6.00001-7
14. I. P. Kaur and R. Agrawal, "Nanotechnology: a new paradigm in cosmeceuticals," *Recent Patents on Drug Delivery & Formulation*, vol. 1, no. 2, pp. 171–182, 2007.View at: Google Scholar
15. D. D. Lasic, "Novel applications of liposomes," *Trends in Biotechnology*, vol. 16, no. 7, pp. 307–321, 1998.View at: Publisher Site | Google Scholar
16. Alka, L., Anurag, V., Himanshi, J., Niti, Y. and Neha, K. (2014) NanotechnologyBased Cosmeceuticals. ISRN Dermatology, 2014, Article ID: 843687. https://doi.org/10.1155/2014/843687
17. C. C. Müller-Goymann, "Physicochemical characterization of colloidal drug delivery systems such as reverse micelles, vesicles, liquid crystals and nanoparticles for topical administration," *European Journal of Pharmaceutics and Biopharmaceutics*, vol. 58, no. 2, pp. 343–356, 2004.View at: Publisher Site | Google Scholar
18. P. Ekambaram, A. A. H. Sathali, and K. Priyanka, "Solid lipid nanoparticles: a review," *Scientific Reviews & Chemical Communications*, vol. 2, pp. 80–102, 2012.
19. D. Bei, J. Meng, and B.-B. C. Youan, "Engineering nanomedicines for improved melanoma therapy: progress and promises," *Nanomedicine*, vol. 5, no. 9, pp. 1385–1399, 2010.
20. Phospholipids, such as phosphatidylcholin (lecithin) as used in cosmetics, regulate cell metabolism of the skin and have an effect on softness and suppleness. They also regulate the skin's pH value and have a greasing effect.
21. Sinan Özgün "Nanoemulsions in Cosmetics" ; Anadolu University, MatS&E Dept. Research Gate.
22. Devarajan V., Ravichandran V., Nanoemulsions: As Modified Drug Delivery Tool, International Journal of Comprehensive Pharmacy, 2, 4, (2011).
23. Sharma S., Sarangdevot K., Nanoemulsions for Cosmetics, IJARPB , 1(3), 408-415, (2012).

24. [24] Shah P., Bhalodia D., Shelat P., Nanoemulsions: A Pharmaceutical Review, Sys. Rev. Pharm. 1, 1, 24-32, (2010).
    International Journal of Comprehensive Pharmacy, 2, 4, (2011)
25. Emulgatoren – Alternativen gesucht. Kosmetik Konzept KOKO GmbH & Co KG, Dr. Hans Lautenschläger, www.dermaviduals.com (Accessed 13.10.08).
26. Lademann J, Weigmann HJ, Rickmeier CH, et al. Skin Pharmacol Appl Skin Physiol. 1999; 2:247–256.
27. SCCNFP Brussels, Belgium: European Commission; 2000. Opinion of the Scientific Committee on Cosmetic
    Products and Non-Food Products Intended for Consumers Concerning Titanium Dioxide. URLhttp://ec.europa.eu/health/ph_risk/ committees/04_scp/04_sccp_en.htm
28. Gajbhiye, S. and Sakharwade, S. (2016) Silver Nanoparticles in Cosmetics. Journal of Cosmetics, Dermatological Sciences and Applications, 6, 48-53. http://dx.doi.org/10.4236/jcdsa.2016.61007
29. Kim, K.-J. (2008) Antifungal Effect of Silver Nanoparticles on Dermatophytes. Journal of Microbiology and Biotech- nology, 18, 1482-1484.
30. Noorbakhsh, F. (2011) Antifungal Effects of Silver Nanoparticle Alone and with Combination of Antifungal Drug on Dermatophyte Pathogen Trichophyton Rubrum. International Conference on Bioscience, Biochemistry and Bioinfor-matics IPCBEE, 5, 364-367.
31. Mukherji, S., et al. (2012) Nano-Antimicrobials Progress and Prospects. In: Cioffi, N. and Rai, M., Eds., 226.
32. Georgios Fytianos 1,2,* , Abbas Rahdar 3 and George Z. Kyzas 1,Review Nanomaterials in Cosmetics: Recent Updates Nanomaterials 2020, 10, 979; doi:10.3390/nano10050979 http://www.mdpi.com/journal/nanomaterials
33. SCCS. Opinion on Colloidal Silver (Nano). Available online: https://ec.europa.eu/health/sites/health/files/
    scientific_committees/consumer_safety/docs/sccs_o_219.pdf (accessed on 14 April 2020)
34. Katz, L.M.; Dewan, K.; Bronaugh, R.L. Nanotechnology in cosmetics. Food Chem. Toxicol. 2015, 85, 127–137. [CrossRef] [PubMed]
35. Kokura, S.; Handa, O.; Takagi, T.; Ishikawa, T.; Naito, Y.; Yoshikawa, T. Silver nanoparticles as a safe
    preservative for use in cosmetics. Nanomed. Nanotechnol. Biol. Med. 2010, 6, 570–574. [CrossRef]
    Nanomaterials 2020, 10, 979 15 of 16
36. Pulit-Prociak, J.; Grabowska, A.; Chwastowski, J.; Majka, T.M.; Banach, M. Safety of the application of
    nanosilver and nanogold in topical cosmetic preparations. Colloids Surf. B Biointerfaces 2019, 183, 110416.
    [CrossRef]
37. Cao, M.; Li, J.; Tang, J.; Chen, C.; Zhao, Y. Gold nanomaterials in consumer cosmetics nanoproducts: Analyses,
    characterization, and dermal safety assessment. Small 2016, 12, 5488–5496. [CrossRe
38. Wei Ting Jess Ong, Kar Lin Nyam, Evaluation of silver nanoparticles in cosmeceutical and potential biosafety complications, Saudi Journal of Biological Sciences,Volume 29, Issue 4, 2022,Pages 2085-2094, ISSN 1319-562X, https://doi.org/10.1016/j.sjbs.2022.01.035. (https://www.sciencedirect.com/science/article/pii/S1319562X22000353)
39. Cornier, J.; Keck, C.; Voorde, M. Nanocosmetics from Ideas to Products: From Ideas to Products; Springer:
    Berlin/Heidelberg, Germany, 2019
40. Raj, S.; Jose, S.; Sumod, U.S.; Sabitha, M. Nanotechnology in cosmetics: Opportunities and challenges.
    J. Pharm. Bioall. Sci. 2012, 4, 186–193. [CrossRef]
41. Nafisi, S.; Schafer-Korting, M.; Maibach, H.I. Measuring silica nanoparticles in the skin. In Agache's Measuring
    the Skin; Humbert, P., Fanian, F., Maibach, H., Agache, P., Eds.; Springer: Cham, Switzerland, 2017.

42. Is It Safe to Use Cosmetics Containing Silica in Nanoform? Available online: https://ec.europa.eu/health/ sites/health/files/scientific_committees/docs/citizens_nanosilica_en.pdf (accessed on 14 April 2020).
43. Poland, C.A.; Larsen, P.B.; Read, S.A.K.; Varet, J.; Hankin, S.M.; Lam, H.R. Assessment if Nano-Enabled Technologies in Cosmetics; The Danish Environmental Protection Agency: Copenhagen, Denmark, 2016.
44. Mebert, A.M.; Baglole, C.J.; Desimone, M.F.; Maysinger, D. Nanoengineered silica: Properties, applications and toxicity. Food Chem. Toxicol. 2017, 109, 753–770. [CrossRef] [PubMed]
45. Park, Y.-H.; Kim, J.N.; Jeong, S.H.; Choi, J.E.; Lee, S.-H.; Choi, B.H.; Lee, J.P.; Sohn, K.H.; Park, K.L.; Kim, M.-K. Assessment of dermal toxicity of Nanosilica using cultured keratinocytes, a human skin equivalent model and an in vivo model. Toxicology 2010, 267, 178–181. [CrossRef]
46. GUIDANCE ON THE SAFETY ASSESSMENT OF NANOMATERIALS IN COSMETICS Scientific Committee on Consumer Safety European Union, 2020 ISSN 1831-4767 Doi: 10.2875/40446 ISBN 978-92-76-15271-2 EW-AQ-20-012-EN-N

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A REVIEW ON TOXICITY OF PB(II), THEIR HARMFUL EFFECTS AND TREATMENT BY CHELATING AGENT

Tahreem Momin[1], Seema I. Habib[2], Urusa Ansari[3], Naheed Azam[4]
Department of Chemistry, G.M.Momin Women's College, Bhiwandi.
[1]tahreem811@gmail.com, [2]seemahabib12@gmail.com
[3]ansariurusa27@gmail.com, [4]naheedazam63@gmail.com

Abstract:

Heavy metals are found naturally in the earth. They become concentrated as a result of human caused activities and can enter plant and animal (including human) tissues via inhalation, diet, and manual handling. Some elements otherwise regarded as toxic heavy metals are essential, in small quantities, for living organism..(Wikipedia) Their toxicity depends on several factors including the dose, route of exposure, and chemical species, as well as the age, gender, genetics, and nutritional status of exposed individuals. Because of their high degree of toxicity, arsenic, cadmium, chromium, lead, and mercury rank among the priority metals that are toxic These metallic elements induce multiple organ damage, even at lower levels of exposure. They are also classified as human carcinogens (known or probable) according to the U.S. Environmental Protection Agency, and the International Agency for Research on Cancer. In humans, heavy metal poisoning is generally treated by the administration of chelating agents.

Keywords: Heavy metals, Sources, Potential for human exposure, Mechanism of lead toxicity, treatment by chelating agent.

Introduction:

Heavy metals are defined as metallic elements that have a relatively high density compared to water [1] [2]. With the assumption that heaviness and toxicity are inter-related, heavy metals also include metalloids, such as lead , arsenic, that are able to induce toxicity at low level of exposure [2][3]. These heavy metals are distributed in the environment through several natural processes such as volcanic eruptions, spring waters, erosion, and bacterial activity, and through anthropogenic activities which include fossil fuel combustion, industrial processes, agricultural activities as well as feeding [4]. These heavy metals do bioaccumulate in living organisms and the human body through various processes causing adverse effects. In the human body, these heavy metals are transported and compartmentalized into body cells and tissues binding to proteins, nucleic acids destroying these macromolecules and disrupting their cellular functions. As such, heavy metal toxicity can have several consequences in the human body. It can affect the central nervous function leading to mental disorder, damage the blood constituents and may damage the lungs, liver, kidneys and other vital organs promoting several disease conditions [5]. Also, long term accumulation of heavy metals in the body may result in slowing the progression of physical, muscular and neurological degenerative processes that mimic certain diseases such as Itai itai disease ,Wilkinson's disease ,Parkinson's disease and Alzheimer's disease [5].

This chapter will highlight on the various sources of Lead and the processes that promote their exposure and bioaccumulation in the human body. More focus will be laid on the various mechanisms that leads to lead toxicity with emphasis on macromolecule and cellular damages, carcinogenesis, neurotoxicity and the molecular basis for their noxious effects. The various toxic effects along with the signs and symptoms and treatment of lead in the human body will be discussed.

Sources Of Lead In The Environment:

Lead (Pb) on routine basis used for storage batteries, ammunition ,cable covering , plumbing, nuclear reactors, paints and manufacture of tetraethyl Pb, radiation shields around X-ray equipment. An oxide of lead is used in producing fine crystal glass and flint glass, solder and insecticides. Lead is highly toxic metal and its routine use has caused excess environmental contamination and health related problems in many parts of the globe[6]. The main source of lead exposure includes industrial processes, food and smoking, drinking water and domestic sources and daily house based sources of lead were gasoline and house paint, which has been extended to lead bullets, pewter pitchers, plumbing pipes, toys, storage batteries and faucets [7]. Exposure to lead occurs mainly via inhalation of lead-contaminated dust particles or aerosols, and ingestion of lead-contaminated food, water, and paints[8] [9]. Poisoning due to lead occurs mainly by ingestion of food or water contaminated with lead. However accidental ingestion of contaminated soil, dust or lead based paint may also result in poisoning[10]. Traditional medicines were

also found to contain heavy metals including lead. A number of diseases have been reported due to consumption of traditional medicine[11]. Ayurvedic medicines are considered to be heavily contaminated with heavy metals. In one recent study the blood lead levels were evaluated in consumers of ayurvedic medicines. Of the 115 participants 40% were found to have an elevated blood lead levels of 10 µg/dL or above and 9.6% had blood lead levels above 50 µg/dL [12][14]. Recently a patient taking Chinese folk remedies was reported to suffer from dysplastic changes in erythroid precursors due to lead poisoning [13][14].Lead toxicity may be caused through fruits and vegetables contaminated with high lead levels from the soils where they were grown. The soil accumulates lead levels generally from pipes, lead paint and residual emissions from leaded gasoline that was used before the Environment Protection Agency issued the regulation around 1980. In order to prevent the general population from domestic lead poisoning, it is necessary to educate people about the major sources of lead poisoning[14]. Lead from water pipes coming into homes is one of the major sources [15].

Sources of lead in environment

Potential For Human Exposure:

Lead is thought to be quickly absorbed in the blood stream and is believed to have adverse effects on certain organ systems like the central nervous system, the cardiovascular system, kidneys, and the immune system [10]. The nervous system is the most vulnerable target of lead poisoning. Headache, poor attention spam, irritability, loss of memory and dullness are the early symptoms of the effects of lead exposure on the central nervous system (CNS)[2]. Morever, the absorption of lead occurs more quickly in children than in adults. Children, due to their childish behaviour, are more prone to ingest and inhale dust contaminated with lead[16] . Anemia may develop with Pb poisoning via the inhibition offerrochelatase and δ-aminolevulinic acid dehydratase (ALAD), the two of many enzymes involved in heme biosynthesis. The inhibition of ferrochelatase and ALAD by lead decreases heme synthesis which leads to anemia[17][24]. Exposure to lead is of special concern among women particularly during pregnancy. Lead absorbed by the pregnant mother is readily transferred to the developing fetus[2] [18]. Human evidence linking preferential exposure to Pb with reduced birth weight and preterm delivery [19], and with neuro-developmental abnormalities in offspring [20]. Several antioxidant molecules such as GSH and GSSG as well as antioxidant enzymes including SOD, CAT, GPx, and glutathione reductase (GR) may have fluctuations due to Pb exposure and consequent oxidative stress. Pb has high affinity to the reactive –SH group of GSH and is able to decrease the GSH levels. GPx, CAT, and SOD are metalloproteins that their antioxidant functions to detoxifying free radicals could be affected due to Pb exposure. Lead can induce oxidative damage in different organs via direct effect on membrane lipid peroxidation and reducing

antioxidant parameters [21][22][24]. The pulmonary function tests (PFT) and respiratory symptoms in 108 battery manufacturingworkers and 100 control subjects were evaluated. The lead concentrations in serum and urine of workers were significantly higher while the PFT values were significantly lower than the control group. In addition, the frequencies of respiratory symptoms including chest tightness (26%), cough (17%), and sputum (16%) were significantly higher in battery manufacturing workers compared to the control group [23][24].

Mechanism Of Lead Toxicity:

One of the major mechanisms by which lead exerts its toxic effect is through biochemicalprocesses which include lead's ability to inhibit or mimic the actions of calcium and to interactwith proteins [8] [2]. Following exposure to lead, the element is absorbed into and transported by the bloodstream to other tissues. Once absorbed, lead accumulates in three compartments: blood, soft tissues, and bone. In blood, approximately 99% of the lead is found in the erythrocytes, leaving about 1% in the plasma and serum [25][32]. The concentration of lead in plasma is more significant than that in whole blood as the means of distribution to target organs, i.e. brain, lungs, spleen, renal cortex, aorta, teeth, and bones [26][27]. The kinetics of lead transfer from blood to soft tissues is low and takes approxi-mately 4 to 6 weeks [26]. Lead in blood has an estimated half- life of 35 days [28], in soft tissue 40 days [29], and in bones 20 to 30 years [30]. The biological half-life of lead may be considerably longer in children than in adults [29]. The initial distribution of lead through- out the body is dependent on blood flow to the tissues. More than 95% of lead is deposited in skeletal bone as in- soluble phosphate [26]. Within the skeleton, lead is incorporated into the mineral in place of calcium. Lead binds to biological molecules and thereby interfering with their function by a number of mechanisms. Lead binds to sulfhydryl and amide groups of enzymes, altering their configuration and diminishing their activities. Lead may also compete with essential metallic cations for binding sites, inhibiting enzyme activity, or altering the transport of essential cations such as calcium [16] [31].The adverse effects of lead appear even with blood concentrations as low as 10 µg/dl. The best understood toxic effects of lead involve heme synthesis, as lead inhibits three impor-tant enzymes participating in the process, i.e. delta aminole-vulinic acid dehydratase, delta aminolevulinic acid synthase,and ferrochelatase [33]. It is suggested that the inhibition ofdelta aminolevulinic acid dehydrates starts at values as lowas 5 µg/dl. At higher lead concentrations this inhibition is very pronounced, reaching 50% inactivation at blood lead levels of 16 µg/dl and 90% inactivation at 55 µg/dl, resulting in the accumulation of delta aminolevulinic acid in plasma and its excretion in urine. Because this enzyme is normally present in great quantities, the inhibition of its activity may pass unnoticed [33][34]. Ferrochelatase is the enzyme that catalyzes the incorporation of iron into the porphyrin ring. If, as a result of lead toxicity, the enzyme is inhibited and its pathway is interrupted, or if adequate iron is not available, zinc is substituted for iron, and zinc protoporphyrin concentrations increase. The critical target, however, seems tobe the enzyme's heme synthesis, essential for the insertionof iron into the precursor, protoporphyrin IX [35][36]. The major consequences of this effect, which have been evaluated in both adults and children, are reduction of circulating levels of hemoglobin and the inhibition of cytochromeP 450-dependent phase I metabolism [35]. Lead clearly inhibits normal hemoprotein function in both respects, which results in basophilic stippling of erythrocytes related to clustering of ribosomes and microcytosis when blood lead levelsare 20 µg/dl. Thus microcytic hypochromic anemia is often diagnosed in victims of lead exposure. In vitro and in vivo studies indicated that lead compounds cause genetic damage through various indirect mechanisms that include inhibition of DNA synthesis and repair, oxidative damage, and interaction with DNA-binding proteins and tumor suppressor proteins[16][37].

Treatment Of Lead Poisoning:

It is recommended to frequently wash the children´s hands and also to increase their intake of calcium and iron. It is also recommended to discourage children from putting their hands, which can be contaminated, in their mouth habitually, thus increasing the chances of getting poisoned by lead[38]. The first step is to perform a confirmatory venous lead level assessment. This should be performed immediately if the screening result is >70 µg/dl, within 48 hours if the result is between 45 and 69 µg/dl, within 1 week if the result is 20 to 44 µg/dl, and within 1 month if the result is 10 to 19 µg/dl. If the confi rmatory lead levels are still between 10 and 14 µg/dl, lead level testing should be repeated within 3 months [59]. Chelation therapy may be considered, but is not routinely recommended at blood lead levels of <45 µg/dl [39].

Chelating Agents:

1. Dimercaprol (Bal):

Dimercaprol, also known as British Anti-Lewisite (BAL). It increases the urinary excretion of heavy metals through the formation of stable, nontoxic, soluble chelates. BAL lacks stability in water and is administered in an oil solution as a deep intramuscular injection. It was the first chelating agent found to be useful in the treatment of childhood lead poisoning. Despite the high incidence of side effects (fever, allergy), BAL has remained in use for more serious lead poisoning because of concerns that CaNa2EDTA therapy may translocate lead into the central nervous system and increase the potential for encephalopathy. Traditionally, pre-treatment with BAL has been recommended to avoid precipitation of encephalopathy [40].

2. Calcium Disodium EDTA (Cana2edta):

Lead poisoning is generally treated by using chelating salt disodium calcium edentate, which is the calcium chelate of the disodium salt of ethylene-diamine-tetracetic acid (EDTA). Such chelating agents have a great affinity to the removing agent. The chelating agent for lead has a greater affinity to lead than calcium and so the lead chelate is formed by exchange. This is then excreted in urine ,leaving behind harmless calcium. It increases the urinary excretionof lead through the formation of a non-ionizing, soluble chelate. Because the use of CaNa2EDTA may cause increased lead concentration in the central nervous system, it should be administered after BAL is given[40][41].

3. Succimer (2,3-Meso-Dimercaptosuccinic Acid Or DMSA)

This is an oral chelation agent that is approved by the United States Food and Drug Administration (FDA) for the treatment of lead poisoning in children and is also effective in adults. It is chemically similar to BAL, but has greater solubility in water, has a high therapeutic index, and is absorbed through the gastrointestinal tract. The recommended doseby the manufacturer is 10 mg/kg three times a day for five days, followed by 10 mg/kg twice a day for two weeks. This dose, which has been found to be acceptable in treating some adults, can be quite high for others, especially for heavier adults. Due to the lack of data on adult treatment with DMSA, an adult dose level of 500 mg twice a day for two weeks has also been given as a sensible maximum limit until additional clinical data become available for adults [40].A new technique called nano-encapsulation of antioxidants may provide improved biodistribution and bioavailability of poorly soluble therapeutics through solubilisation . Encapsulation of curcumin in a pluronic block copolymer demonstrated a slow and sustained release of curcumin and showed anticancer activity comparable with free curcumin (42).

Conclusion:

In this review we summarized sources , effect and treatment of lead poisoning.Failure in heavy metal exposure can cause adverse effect on living organism and surrounding environment .Potential health hazard of lead poisoning still exist and are increased due to lack if knowledge regarding dangerous for working with lead. Lead toxicity is significant and preventable health problem. Large population screening based studies are needed to find strategies to control harmfull effect of metal toxicity. Chelation theory has contributed in reduction of mortality for acute lead encephalopathy and chronic renal damage.

References:

1. Fergusson JE, editor. *The Heavy Elements: Chemistry, Environmental Impact and Health Effects.* Oxford: Pergamon Press; 1990. [Google Scholar]
2. Paul B Tchounwou, Clement G Yedjou, Anita K Patlolla, Dwayne J SuttonNIH-RCMI Center for Environmental Health, College of Science, Engineering and Technology,Jackson State University, 1400 Lynch Street, Box 18750, Jackson, MS 39217, USA.
3. Duffus JH. Heavy metals-a meaningless term? Pure Appl Chem. 2002; 74(5):793–807.
4. 4.Florea A-M, Dopp E, Obe G, Rettenmeier AW. Genotoxicity of organometallic species. In: Hirner AV, Emons H, editors. Organic Metal and Metalloid Species in the Environment: Analysis, Distribution, Processes and Toxicological Evaluation. Heidelberg: Springer-Verlag; 2004. pp. 205-219
5. 5.Monisha J, Tenzin T, Naresh A, Blessy BM, Krishnamurthy NB. Toxicity, mechanism and health effects of some heavy metals. Interdisciplinary Toxicology. 2014;7(2):60-72
6. Sharma P, Dubey RS, Lead toxicity in plants,Brazilian Journal of Plant Physiology, 2005, 17;1:35–52.
7. Jacobs DE, Clickner RP, Zhou JY, et al. The prevalence of lead-based paint hazards in U.S. housing. Environ Health Perspect. 2002, 110:A599–A606.
8. Agency for Toxic Substances and Disease Registry (ATSDR. Public Health Service. Atlanta: U.S. Department of Health and Human Services; 1999. Toxicological Profile for Lead.

9. Agency for Toxic Substances and Disease Registry (ATSDR). Case Studies in Environmental Medicine - Lead Toxicity. Atlanta: Public Health Service, U.S. Department of Health and Human Services; 1992.
10. Bergeson LL. (2008). The proposed lead NAAQS: Is consideration of cost in the clean air act's future?. Environmental Quality Management 18: 79–84
11. Karri SK, Saper RB, Kales SN. (2008). Lead Encephalopathy Due to Traditional Medicines. Curr Drug Saf 3: 54–9
12. Breeher L, Mikulski MA, Czeczok T, Leinenkugel K, Fuortes LJ. (2015). A cluster of lead poisoning among consumers of Ayurvedic medicine. Int J Occup Environ Health. Apr 6:2049396715Y0000000009. [Epub ahead of print].
13. Lv C, Xu Y, Wang J, Shao X, Ouyang J, Li J. (2015). Dysplastic changes in erythroid precursors as a manifestation of lead poisoning: report of a case and review of literature. Int J Clin Exp Pathol 8: 818–23.
14. Ab L atif WANI 1, Anjum ARA 1, Jawed Ahmad USMANI 2
    a. Section of Genetics, Department of Zoology, Faculty of Life Science, Aligarh Muslim University, Aligarh, Utter Pradesh, India
    b. Department of Forensic Medicine, Faculty of Medicine, Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh, Utter Pradesh, India
15. Moore MR. (1977). Lead in drinking water in soft water areas--health hazards. Sci Total Environ 7: 109–115.
16. Landrigan PJ, Schechter CB, Lipton JM, Fahs MC, Schwartz J. (2002).Environ-mental pollutants and disease in American children. Environ Health Perspect 110: 721–8.
17. Mense, S. M., and Zhang, L. (2006). Heme: a versatile signaling molecule controlling the activities of diverse regulators ranging from transcription factors to MAP kinases. Cell Res. 16 (8), 681–692. doi:10.1038/sj.cr.7310086 .
18. Ong CN, Phoon WO, Law HY, Tye CY, Lim HH (1985) Concentrations of lead in maternal blood, cord blood, and breast milk. Arch Dis Child 60, 756-759
19. Andrews KW, Savitz DA, Hertz-Picciotto I (1994) Prenatal lead exposure in relation to gestational age and birth weight: a review of epidemiologic studies. Am J Ind Med 26:13-32
20. Huel G, Tubert P, Frery N, Moreau T, Dreyfus J (1992) Joint effect of gestational age and maternal lead exposure on psychomotor development of the child at six years. Neurotoxicol 13, 249-254
21. Gurer-Orhan, H., Sabır, H. U., and Özgünes¸ H. (2004). Correlation between
22. clinical indicators of lead poisoning and oxidative stress parameters in controls and lead-exposed workers. Toxicol. 195 (2-3), 147–154. doi:10.1016/j.tox.2003.09.009
23. Kasperczyk, S., Birkner, E., Kasperczyk, A., and Kasperczyk, J. (2005). Lipids, lipid peroxidation and 7-ketocholesterol in workers exposed to lead. Hum. Exp. Toxicol. 24 (6), 287–295. doi:10.1191/0960327105ht528oa
24. Khazdair, M. R., Boskabady, M. H., Afshari, R., Dadpour, B., Behforouz, A., Javidi, M., et al. (2012). Respiratory symptoms and pulmonary function testes in lead exposed workers. Iran. Red Crescent Med. J. 14 (11), 737. doi:10.5812/ircmj. 4134.
25. Mahdi Balali-Mood 1, Kobra Naseri 1, Zoya Tahergorabi 1, Mohammad Reza Khazdair 2 and Mahmood Sadeghi 1
    a. Medical Toxicology and Drug Abuse Research Center, Birjand University of Medical Sciences, Birjand, Iran,
    b. Cardiovascular Disease Research Center, Birjand University of Medical Sciences, Birjand, Iran
26. Flora SJS, Saxena G, Gautam P, Kaur P, Gill KD. Lead induced oxidative stress and alterations in biogenic amines in different rat brain regions and their response to combined administration of DMSA and MiADMSA. Chem Biol Interac. 2007; 170:209–220.
27. Philip AT, Gerson B. Lead poisoning – Part I. Clin Lab Med,1994; 14: 423–44.
28. Skerfving S, Nilsson U, Schutz A, Gerhardsson L: Biological monitoring of inorganic lead. Scand J work Environ. Health, 1993; 19(Suppl.1): 59–64.
29. Roberts JR, Reigart JR, Ebeling M, Hulsey TC: Time required for blood mlead levels to decline in nonchelated children. J Toxicol Clin Toxicol, 2001; 39: 153–60
30. Guidelines for drinking water quality, 2nd ed. Vol. 2. Health criteria and other supporting information. Geneva, World Health Organization, 1996; 254–75

31. Rabinowitz MB, Wetherill CW, Kopple JD: Kinetic analysis of lead me-tabolism in healthy humans. J Clin Invest, 1976; 58: 260–70
32. Flora SJS, Saxena G, Gautam P, Kaur P, Gill KD. Lead induced oxidative stress and alterations in biogenic amines in different rat brain regions and their response to combined administration of DMSA and MiADMSA. Chem Biol Interac. 2007; 170:209–220.
33. Nikolas C. Papanikolaou1, Eleftheria G. Hatzidaki2 , Stamatis Belivanis2,3 , George N. Tzanakakis4 , Aristidis M. Tsatsakis 3
    a.Venizelion General Hospital of Heraklion, Heraklion, Crete, Greece
    b.University General Hospital of Heraklion, Heraklion, Crete, Greece
    c. Center of Toxicology Science and Research, School of Medicine, University of Crete, Heraklion, Crete, Greece
    d.Department of Histology, School of Medicine, University of Crete, Heraklion, Crete, Greece
34. Piomelli S: Childhood lead poisoning. Pediatr Clin N Am, 2002; 49:1285–304,vii
35. Hernberg S, Nikkanen J, Mellin G et al: Delta-aminolevulinic acid dehydrase as a measure of lead exposure. Arch Environ Health, 1970; 21:140–45
36. Alvares AP, Fischbein A, Sassa S et al: Lead intoxication: effects on cytochrome P 450 mediated hepatic oxidations. Clin Pharmacol Ther,1976; 19: 183–90
37. Philip AT, Gerson B: Lead poisoning-Part II. Effects and assay. Cin Lab Med, 1994; 14: 651–70
38. Roy N, Rossman T. Mutagenesis and comutagenesis by lead compounds. Mutat Res. 1992; 298:97–103. [PubMed: 1282217]
39. Baselt RC. (2008). Disposition of Toxic Drugs and Chemicals in Man (8th ed.).Biomedical Publications. pp. 823–6.
40. Treatment guidelines for lead exposure in children: American Academy of Pediatrics, Committee on Drugs. Pediatrics, 1995; 96: 155–60
41. Treatment guidelines for lead exposure in children: American Academy of Pediatrics, Committee on Drugs. Pediatrics, 1995; 96: 155–60
42. Rogan WJ, Dietrich KN, Ware JH, Dockery DW, Salganik M, Radcliffe J, Jones RL, Ragan NB, Chisolm JJ Jr, Rhoads GG. (2001). The effect of chelation therapy with succimer on neuropsychological development in children exposed to lead. N Engl J Med 344(19): 1421–1426
43. Flora G, Gupta D, Tiwari A. (2012). Toxicity of lead: A review with recent updates. Interdiscip Toxicol 5: 47–58.

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ENVIRONMENTAL ASPECT OF SUSTAINABLE DEVELOPMENT

Riswan, M.[1] Nisfa, M.N.F.[2]
[1]Senior Lecturer, [2]Second Year Special, [1&2]Department of Sociology,
Faculty of Arts and Culture, South Eastern University of Sri Lanka, Oluvil, Sri Lanka.
Corresponding email: mriswan2008@gmail.com

Abstract:

The global agenda of sustainable development has been adopted by the UN member countries to reach its 17 goals by 2030. The sustainable development goals have major three dimensions namely; social, economic and environmental aspects. These three dimensions need to be incorporated, balanced and integrated to achieve sustainable development globally. This paper mainly focused on understanding the environmental aspects of sustainable development using secondary information. This conceptual paper has employed data from research articles, reports, website material and news, and other relevant electronic sources. This study revealed that the environmental aspect is one of the most important and vital elements in the sustainable development framework. The human and other living conditions are surviving on the earth with different natural resources which are purely associated with environmental aspects. So, this study concludes that protecting the environment is the best way for ensuring sustainability in global development. Sustainable development cannot be achieved without considering environmental aspects towards the development agenda of 2030. Thus, environmental protection and conservation of natural resources should be done by the governments to ensure sustainable development in the globe by satisfying the present without compromising the future generation.

Keywords: Sustainable Development; SDGs; Natural Resources; Environmental Aspect

Introduction:

Sustainable Development (SD) is a global development agenda and it is becoming a more substantial concept all over the world. The United Nations and its 193 member countries agreed to implement 17 SD goals to be achieved by 2030. This development concept mainly concentrates to fulfil the basic needs of the present communities without compromising with future generations (Web source-1). According to this agenda, mainly sustainability requires consideration of three aspects such as; environmental, social and economic aspects. These are the main pillars for implementing the development projects towards sustainability. In this backdrop, SDGs linked with these three dimensions and these components cannot be separated in the process of development.

In the SD progress, three dimensions have close association with each other. Therefore, one aspect cannot be incorporated with the development agenda in order to achieve success and sustainability of any development initiatives. Among these three dimensions, the environmental component has more significant elements such as water, air, food etc. So, people can meet their basic needs and economic requirements through environmental conservation (Web source-2). So, by considering one aspect, it is not possible to achieve sustainability in development programs. According to the above discussion, it has been noticed that every development project must include environmental, social, economic aspects with the integrated method in order to achieve a success and sustainability of development plans. Integrating three components would be the main goal to achieve this SD agenda globally.

The idea of SD has vital consideration to implement development activities in any developed or developing countries. The concept of sustainability is linked with all stages of development projects. Hence, this paper tries to emphasize and evaluate the environmental aspect of sustainable development. The data for this article has been collected from secondary sources. Research articles, reports, published materials and electronic sources used in this study to gather information, and the major discussions were presented in a qualitative manner. No field data employed in this study as it is purely qualitative concept paper.

Sustainable Development (SD):

The concept of SD has been described by many scholars but the most frequent definition was introduced by the Bruntland Report in 1987. This report indicates that "sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Bruntland, 1987). This development agenda mainly focus on the two themes namely;

- Give first priority for poorer people to fulfill their needs, and
- Meet the needs of the current and future generation and understand the environment in decision making.

The concept of SD is playing a major role to fulfill human needs and improve the quality of society. It is designed to enhance the ability of humans to meet their socio-economic needs without damaging the environmental resources. To meet the global development agenda in 2030, SD program indicated that "achieving SD in three dimensions – economic, social, and environmental in a balanced and integrated manner". The interconnection of these three dimensions are the main frame to achieve sustainability in the development projects (UNESCAP, 2015). In all these aspects, the environment has instinctive value. It is facing numerous challenges and various threats. There are some major environmental challenges such as; Green-house effect, Global warming, Acid rain, Ozone destruction, Synthetic, Pesticides, Radiation, Loss of forest and wildlands, Soil erosion, Demands on water and air, climate changes, Plastic pollution, Polar ice melting etc. These issues have created serious impacts on the earth. In this sense, SD progress is mainly acting to abolish all above environmental crises and use the environmental sources for current needs and also safeguard the natural resources for the upcoming generation.

Environmental Aspects Towards Sustainable Development:

The identification of environmental aspects is an essential step towards recognizing their impacts in the world. Environmental aspects mean "Element of an organization's activities, products or services which can interact with the environment". All human activities have direct interaction with the environment. An appropriate protection and proper management are very fundamentals to achieve the global development agenda. Based on this statement, environmental aspects are more essential components for setting and formulating objectives to mitigate environmental issues (Ganguly, n.d).

Environment is made up of various components such as; air, water, land which are essential for survival of living forms in the world. The environmental protection and conservation of natural resources are very important aspects in each part of the development plans. This is a more considerable idea for ensuring a good standard of living in every society (Wielewska, 2014). It is very difficult to achieve sustainability without considering environmental aspects when designing and or planning and implementing development programs. Environmental aspects of sustainable development are determined to protect the planet from environmental vulnerability. Many environmental issues emerged after the industrial revolution due to human activities. As a result, global warming and climate changes have occurred as major issues in the contemporary world. NASA stated that global temperature has risen by 1.7-degree Fahrenheit and it is directly linked to reduction of arctic ice 13.3% per decade (Web source-3). It is mainly caused by usage of fossil fuel, greenhouse gases, increasing of CO^2 gas in the environment and etc.

Meanwhile, the reduction of natural resources has also become another environmental issue which is heavily felt in the last half century. It is stated that 45 years between 1970-2015, (compared with early years) more than triple the percentage of natural resources consumed by human society, this will continue more than double from 2015 to 2030 (Web source-4). Air pollution is the biggest environmental crisis in the world. WHO estimated that every year, air pollution causes the death of 4.2 to 7 million people globally, and 9 out of 10 people breathe highly polluted air (Robinson, 2022). Air pollution is mostly caused by industrial sources, motor vehicles, burning biomass and many human behaviors etc. Contamination of water issues has also become another serious threat to human survival on the globe. Lack of access to clean water leads to infectious diseases like; cholera, diarrhea, dysentery, hepatitis, typhoid and polio. Researchers stated that each year 1.2 million deaths occurred due to unsafe drinking water sources (Ritchie & Roser, 2021).

Deforestation has also been found as a major threat to the ecosystem. Current data estimate that the planet is losing 80,000 acres of tropical forest per day (Web source-3). Agriculture, development activities, wood extraction, urbanization have influenced to create such issues. Likewise, Ozone layer depletion, Plastic pollution, overfishing, greenhouse effect, soil degradation, Acid rain are known as the most influential environmental hazards which are mostly emerged by human activities. Thus, these environmental hazards can damage the ecosystem very badly. There should be a solution mechanism to protect the environment and to create better opportunities for the survival of people at present and in future.

Environmental protection is the core idea behind every sustainability concept. So, sustainable development policy also includes the environmental aspects for the purpose of providing a better place not only for the present but also for the future generation as well. SDGs pave the best way to safeguard the environment through various strategies and development frameworks. SD goals are including clean water and sanitation, affordable and clean energy, responsible consumption, production, climate action and life

on land (Web source-5). According to SDGs, the development agenda focuses on understanding the nature of environmental catastrophe before implementing any development projects.

Sustainable waste management programs are a key concept for overcoming environmental issues. It is a process of protecting the environment from the toxic effects of inorganic and biodegradable elements mixing or existing with waste. It emphasizes prevention from waste related issues, changing the patterns of consumption, and introducing more useful production methods for waste management with an appropriate focus on recycling (UN-SDGs, 2011). Similarly, soil conservation is also found as one of the environmental sustainability issues. It focuses on protecting soil through a combination of several techniques and practical methods. Because soil protection has a close link with the environmental aspect of sustainable development (Web source-6).

So, renewable energy programs are also observed as a sustainable development element. Using Sunlight for generating solar energy, and wind energy, hydro energy, Tidal energy, and Biomass energy for ensuring renewable energies towards sustainable development. Recent researches indicate that today 26% world electricity is generated from the Renewable energy sources but, according to the international energy agency, it is expected to reach 30% by 2024 (Web source-7). Water resource development and management remain at the heart of SD. It is the process of planning, developing, and managing water resources. The other program is reforestation which is replanting the areas affected by deforestation. So, it is very important to follow the green innovation ideas towards achieving SD. It refers to all forms of plans that decrease environmental damage and ensures that natural resources are used in the most effective way possible. This is one of the resources of sustainability (Mishra, 2021). Conservation of natural resources will help all living forms to receive more benefits at present and in future. SDGs agenda mainly focuses on the environmental aspects towards which present society should own their needs and they want to give the sources to fulfill the needs of the future generation.

Conclusion:

The environmental perspective of sustainable development mainly aims to protect the environment and maintain the ecological balance for future generations by using technologies and policies. And also, this aspect focuses on reducing serious effects and environmental pressure which occur from the environmental threats such us; deforestation, global warming, climate changes, greenhouse effect, water and air pollution, soil erosion, etc. The SDGs cannot be achieved without considering the environmental aspects. SD mainly focuses on finding the ways for handling an appropriate mechanism to reduce environmental issues. The concept of SD helps to safeguard the whole environment towards sustainability. The Global Risk Report addressed that all countries have more responsibilities to adhere to the guidelines of SDGs (Kataeva et.al. 2021). Every country must have a long term sustainable strategy to consider environmental aspects when implementing development initiatives. The SD is the only way to protect the environment, and conserve the natural resources along with social, cultural and economic aspects in the development process. Sustainability can be achieved through inclusiveness and integration of social, economic as well as environmental aspects. This integral model would help ensure sustainability for both present and the future generation.

References

1. Bruntland, G.H. (1987). Our Common Future - Call for Action. Environmental Conservation. 14(4): 291-294. DOI: 10.1017/S0376892900016805
2. Ganguly, D. (n.d). Environmental Aspects: The Basics. https://www.ars.usda.gov/ARSUserFiles/20320000/EMS/EnvironmentalAspectsTheBasics.pdf
3. Kataeva, N., Sysolyatin, A., Feoktistova, O., and Starkova, D. (2021). The concept of sustainable development: environmental aspects and project approach. E3S web of Conferences. https://doi.org/10.1051/e3sconf/202124411027
4. Mishra, P. (2021). What is green Innovation? – Types and example. https://www.feedough.com/what-is-green-innovation-types-examples/
5. Ritchie, H. Roser, M. (2021). "Clean Water and Sanitation". Published online at OurWorldInData.org. https://ourworldindata.org/clean-water-sanitation
6. Robinson, D. (2022). 12 Biggest Environmental Problems of 2022. https://earth.org/the-biggest-environmental-problems-of-our-lifetime/
7. UN-SDGs. (2011). Waste Management. UN Sustainable Development Goals Knowledge platform. https://sustainabledevelopment.un.org/index.php?page=view&nr=6&type=504&me
8. UNESCAP. (2015). Integrating the Three Dimension of Sustainable Development: a framework and tools. Greening of Economic Growth Series. https://hdl.handle.net/20.500.12870/3161

9. Wielewska, I. (2014). Selected Environmental Aspects of Sustainable Development in Rural Areas. Oeconomica. 77(4): 159-166. University of Science and Technology.

Web sources:

1. Important of Sustainable Development. (2022). Byjus. https://byjus.com/commerce/importance-of-sustainable-development/
2. Sustainable Development. (2021). Quebec. https://www.environnement.gouv.qc.ca/developpement/Foire_questions/index-en.htm
3. Environmental Issues: Top 17 List of Problems. (2016). Ecavo. https://ecavo.com/top-environmental-problems/
4. Tons of resources extracted from earth. (2020). The world counts. https://www.theworldcounts.com/challenges/planet-earth/state-of-the-planet/resources-extracted-from-earth/story
5. Environment and sustainable Development. (n.d). United Nation (UN). https://www.un.org/en/conferences/environment
6. Soil conservation Guide: important and practices.(2022). Maryville University. https://online.maryville.edu/blog/soil-conservation/
7. Types of renewable energy. (n.d). EDF Web Source. https://www.edfenergy.com/for-home/energywise/renewable-energy-sources

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WATER POLLUTION AND HUMAN BEHAVIOUR: A BRIEF ANALYSIS

Riswan, M.[1] Sinfa, M.S.F.[2]
[1]Senior Lecturer, [2]Second Year Special, [1&2]Department of Sociology, Faculty of Arts and Culture, South Eastern University of Sri Lanka, Oluvil, Sri Lanka.
Corresponding email: mriswan2008@gmail.com

Abstract:

Water is a basic necessity and more essential resource for all living forms on earth. However, water pollution occurred everywhere in the globe, and it created numerous challenges including health hazards among people. On the contrary, human behaviour is also identified as one of the serious factors that caused water pollution through various activities. This paper aimed to underline major human activities that cause water pollution around the globe. This is a conceptual paper which presents major discussions using secondary sources of published research articles, reports, previously published materials and web sources. It highlighted that human behaviour is a major factor that causes contamination of water – through the various activities – use of fertilizers and chemicals in agriculture sector, urbanization process and urban lifestyle, mining activities, marine dumping, deforestation, and waste disposal etc. This paper suggests adhering to the Sustainable Urban System (SUS) – in association with the global agenda of Sustainable Development Goals – to mitigate the serious issue of water pollution, as water is a universal basic requirement for human and other living conditions.

Keywords: Water; Water Pollution; Human Activities; Agriculture; Industry; Waste Disposal

Introduction:

Numerous environmental hazards are taking place all over the world. The environmental issues like global warming, ozone layer depletion, acid rain, deforestation, natural disaster and many more affect every human, animal and all other living forms on this earth (Web resource: 1). Mainly these environmental issues are created by natural and some human behaviours. Due to continuous environmental catastrophe, people and other living forms have been struggling and affected in different ways. Likewise, environmental pollution is one of the serious concerns globally that affects biodiversity, economic systems, human lives, water, and health, etc. (Jan et.al. 2016).

Pollution can be categorized by the nature of pollutants and pollution of environmental components. In this sense, Air Pollution, Water Pollution, Soil Pollution and Noise Pollution are known as major environmental pollution. Among these types of pollution, 'water pollution' has become a very serious concern that affects all living organisms. Water is an essential element for survival of all living conditions in the universe. It plays a major role in all requirements of people, including drinking, cooking, washing, health, sanitation, hygiene, social and technological needs. Without water it is so difficult to survive on the earth, not only by humans but also the other living forms. Water is a limited resource, and it is estimated that there is 71% of water on earth, but only 2.5 % of the water is freshwater in a drinkable condition. So, water is seen as the primary necessity of human and other living things in the world (Denchak, 2018). But unfortunately, more quantity of water on earth is polluted and subsequently water scarcity is also found as a severe crisis experienced by the people (Nova Biological Team, 2018). And all countries are preparing mechanism to overcome water crisis in the present and the future even though world is fighting for safe drinking water, particularly in the developing and underdeveloped nations.

Therefore, this paper mainly aimed to examine the link between human behaviour and water pollution. Hence, it focuses on the major themes such as; water pollution, impact of water pollution, and human behaviour and its influences on contamination of water. The preventive mechanism is also presented in this paper to overcome the issues. As it is purely qualitative work, the data have been gathered only through secondary sources. The previously published research articles, reports, organizational report and articles, and electronic source have been used in this study to construct the major discussion and present a summary of the study qualitatively.

Water Pollution

Water plays a key role among the natural resources. It is truly a unique gift from nature to humans (Phair, 2022). And it is a needed source for every living organism including human, animals, plants, food production and economic development (Halder & Islam, 2015). But nowadays getting pure

water has become a globally challenging issue. Because water pollution has been on the rise over the last few decades. It is a serious and major problem of 21st century. Water contamination and water scarcity problems are major challenges faced by developed and developing countries (Chaudhry & Malik, 2017).

The term 'water pollution' has been defined in various ways. The National Resources Defence Council (NRDC) defines that, "Water pollution occurs when harmful materials, often chemicals or microorganisms contaminate a stream, canal, river, ocean or other water bodies, degrading water quality and rendering it toxic to humans or the environment" (Scavetta, 2022. Also, the World Health Organisation (WHO) emphasizes that polluted water is unusable water, which composition has been changed to the extent. Moreover, it is called a poison mixed water that cannot be drink or used for essential purposes like agriculture, industries, personal usage and every year more than 500,000 people affected by the water issues through many diseases like diarrhoea, cholera, dysentery and typhoid in worldwide (Web resource: 2).

According to the above definitions, it can be designated that water pollution is the contamination of the water bodies namely, lakes, river, and oceans, etc. which is the result of natural phenomenon and human behaviours. It ruins the quality and colour of the water that makes it undrinkable and toxic to the environment. However, human activities are the vital element to having poor-quality water. Through urbanization, industrial wastage, improper sewage disposal, oil spills, chemical waste dumping, deforestation, etc.

Moreover, polluted water affects both humans and all other aquatic organisms. It is clearly observed that the dearth of drinking water is one of the effects or results of water contamination. According to the UN report, globally in rural areas there are billions of people who have no access to clean water to drink or sanitation and it was quantified that almost 47% of people around the world will struggle to find enough sources of drinking water by 2050 (Web resource: 2). Also, it is collapsing the food chain / food production. Due to the contamination of water bodies, people who suffer from health problems such as; cancer, cholera, diarrhoea and typhoid etc. The WHO defined that annually 120,000 cholera-related deaths reported due to water pollution (Lorenz, 2019). Further, this water pollution is also destroying the ecosystem, national economy, and social wellbeing as well. Humans are more vulnerable due to water pollution. However, it is very important to understand how human behaviour causes contamination of water.

Water Pollution And Human Behaviours:

Water is polluted by both natural phenomena as well as human activities. Contamination of water does not only come from individuals, families but also as businesses, industries and farmers contribute. However, we can point out the major reason for water contamination is human actions and its consequences. So, human behaviours are the inevitable part of the water contamination through their improper ways of living and manufacturing activities (Trivedi et al, 2012). It is more important to look into human behaviours and underline how human behaviour is associated or determine water pollution.

i) Agriculture: The agriculture community is the most important consumers of freshwater. In order to protect their paddy field from bacteria and insects, farmers often use chemical fertilizers and pesticides which encourage the growth of the crops, but at the same time it pollutes water bodies (Web resource: 3). Because, when raining, the chemical fertilizers mix-up with rainwater, then it flows into rivers and canals that filter into the ocean, which causes further water pollution. In the United States, Agriculture is contributing to the main cause of pollution in water bodies (Smith, 2020). Also, it could be very harmful to human health.

ii) Industrial Wastage: Industries wastage are the major factors that contribute to water contamination around the world. There are many companies that do not have a proper waste management system. They pour their production of chemical wastes, electronic waste and food processing wastes into the rivers and oceans. Federation of Indian Chamber of Commerce and Industries (FICCI) indicate that, In India per day 20,500 metric tons of waste is produced by four metropolitan cities (Trivedi et al, 2012). So, more companies are not properly discharging waste. This improper behaviour leads to water pollution.

iii) Urbanization: Due to urbanization, most of the waste is mixtures with water especially in urban areas, and due to the lack of accommodation, people dump their household waste into the water bodies, and groundwater is often polluted by faecal waste in cities (Govindarajan, 2022). In cities, due to the overpopulation, building of houses, road construction, and industries are highly affected on water bodies through rapid use of chemicals and metals. In the rainy season, those chemicals are mixed-up with the rivers and streams. Water is highly polluted in urban areas due to some of these human behaviours, as a result of the growing urbanization process.

iv) Fracking Rocks: It is one of the human behaviours that is indirectly associated with water pollution. The word fracking means the system of deblocking oil, natural gas and minerals from rocks. For this process, they used to crack the rock with more water and chemicals at high pressure. This leads to contaminants in the underground water supplies (Smith, 2020).

v) Improper Waste Disposal: Dispose of waste from shops, hotels and homes is a regular phenomenon. But at present, the people dispose of their kitchen waste, toilet waste near the drainages, littering in water bodies, and dumping of solid waste into the water bodies. Sometimes they washed their vehicles near the pond, which led to vehicle fuel spilling into the water. Moreover, in cities, the government or even an individual also does not properly dispose of the sewage waste. So, these behaviours influence water pollution.

vi) Mining Activities: Mining is known, digging the rock or land and extracting coal, gold and other chemical minerals from the underground. While excavated, the chemicals, metal waste, mineral waste and sulphides are combined or mixed with the underground water to make the water toxic (Web source:4) which causes massive pollution of water.

vii) Deforestation: Trees play an inevitable role in the water cycle. Every year the people cut and burn millions of trees. These deforestation activities lead to water contamination. Because during the flood, rain water drains away surface minerals, chemicals, garbage, polythene bags and mixed with water bodies.

viii) Marine Dumping: In this modern era, household garbage like aluminium, plastic, rubber and glass are still collected and dumped into the oceans by many countries all around the world. Moreover, nowadays there are various kinds of chemicals dumped into the ocean by many factories. It pollutes the ocean water and destroys the survival of marine life.

ix) Deliberate Discharges Of Waste / Illegally Dispose Of The Waste: Due to the high cost of proper waste disposed many countries illegally discharge the waste into water bodies. This human behaviour is directly associated with water pollution.

x) Global warming: Global warming is seen as a factor related to human behaviour. The Greenhouse effect, hydroelectric production and deforestation are some human activities that increase the earth's temperature. Also, this increase in temperature reduces oxygen and causes a change in the composition of the water (Web source: 5). so, it raises the temperature of the water and destroys aquatic life and many marine species.

So, these are some prominent human behaviours that are directly and indirectly associated with water pollution which can be seen throughout the world. Water pollution is not a recent phenomenon. It has long been caused by some human activities. Presently, many countries have faced water scarcity as a result of severe contamination of groundwater. As a result, people are struggling with many challenges to have proper access for safe water to meet their basic requirements. Already water shortage prevails all over the world, and available water is also contaminated due to human activities and other factors that contribute to increased water pollution as well as water scarcity.

Conclusion:

In the contemporary era, water contamination is a well-known environmental hazard.it is closely related to natural disaster and human activities. Water contamination is mostly associated with human behaviours rather than natural calamities. The world is severely facing water crisis in both urban and rural regions in almost all the countries. Water scarcity is not just a problem of countries, but it is a global crisis that will create more effects in future too. The available water is also contaminated through various activities of humans. This human behaviour is a major factor of water pollution. So, this issue needs to be settled or mitigated in a proper way. Thus, this paper suggests to adopt and exercise a Sustainable Urban System (SUS), never pour household garbage and industry chemical waste down the drain, and reduce the usage of fertilizers in farming (Nova Biological Team, 2018).) And reduce the amount of plastic usage and recycle the plastics correctly. So, water pollution can be controlled by doing or implementing these activities. Also, many countries are making various efforts to control water pollution. No matter how much control the government imposes, nothing will change until humans change their behaviour, so change the behaviour of people and provide access to clean water for our future generations.

References:

1. Chaundhry, F. N., and Malik, M. F. (2017). Factors Affecting Water Pollution: A Review. Journal of Ecosystem & Echography. 7(1): 1-3. DOI: 10.4172/2157-7625.1000225
2. Denchak, M. (2018). Water pollution: Everything You Need to know. https://www.nrdc.org/stories/water-pollution-everything-you-need-know
3. Govindarajan, S. (eds.). (2022). Water Pollution. Vikaspedia. https://ta.vikaspedia.in.

4. Halder, J. H., and Islam, M. N. (2015). Water Pollution and its Impact on the Human Health. Journal of Environmental and Human. 2(2015): 36-46. DOI: 10.15764/EH.2015.01005
5. Jan, S., Rashid, B., Azooz, M.M. et.al. (2016). Genetic Strategies for Advancing Phytoremediation Potential in Plants: A Recent Update. In: Ahmad, P. (eds.). Plant Metal Interaction: Emerging Remediation Techniques. Elsevier. 431-454. https://doi.org/10.1016/B978-0-12-803158-2.00017-5
6. Lorenz, A. (2019, December 10). Types and Effects of Water Pollution. The Green Web Foundation. https://www.fairplanet.org/story/types-and-effects-of-water-pollution/
7. Nova Biological Team. (2018 October 26). Top 6 Causes of Water Pollution and How to Reduce the Risks. https://www.novatx.com/drinking-water/top-6-causes-water-pollution-reduce-risks/
8. Phair, M. (2022). Effects of Water Pollution and Control Measures. Journal of Pollution Effects & Control. 10(1): 1-2. DOI: 10.35248/ 2375-4397.22.10.326.
9. Scavetta, A. (2022). How do Human Activities Cause Water Pollution?. Aquasana Web portal. https://www.aquasana.com/info/man-made-water-pollution-pd.html
10. Smith, A. (2020). What effects does water pollution have on human health?. https://www.medicalnewstoday.com/articles/water-pollution-and-human-health
11. Trivedi, R., Kumar, R., & Rout, S. K. (2012). Effect of Human Behavior on Aquatic Environment: A Case Study. J. Exp. Zool. 15(1): 9-16. [Research Gate].

Web Sources:

1. What are Environmental Concerns?. (2022). Conserve Energy Future. https://www.conserve-energy-future.com/top-25-environmental-concerns.php
2. Water pollution: how to protect our source of life. (n. d). Iberdrola. https://www.iberdrola.com/sustainability/water-pollution
3. What are the Causes of Water?. (2019). ECU. Pollutionhttps://online.ecok.edu/articles/causes-of-water-pollution/
4. What is Water Pollution? (2022). Conserve Energy Future. https://www.conserve-energy-future.com/sources-and-causes-of-water-pollution.php
5. How Does Water pollution Affect Us?. (n. d). Acciona. https://www.activesustainability.com/water/causes-consequences-water-pollution/?_adin=11551547647

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HUMAN RESOURCE MANAGEMENT - A KEY TO SUSTAINABLE DEVELOPMENT

Prof. Mohan Kumar H.T
Assistant Professor of Economics, Government First Grade College, Yelahanka, Bangalore, Karnataka, India-560064, email: mohankumar050270@gmail.com, Mobile: 9741902569

Introduction:

Human resource professionals should play a significant role in creating and implementing sustainability strategies for their organizations, according to a research report by the Society for Human Resource Management (SHRM) and two other organizations. The main objectives of this research paper is to study the historical development of managing human resources, propose claims for recognizing sustainability as the future of managing human resources, to establish the need for Green HRM, a new paradigm towards employee satisfaction and loyalty as an important priority for the efficient management of human resources evaluate how the various instruments of sustainable HRM create an impact on organizational overall performance.

Now the time has come for sustainable development. Environmental policies should be embraced to ensure that this world remains a good place to live in. Organizations may make a positive contribution in maintaining an ecosystem that would be cleaner and safer via incorporating multiple essential ecological initiatives. This simple theoretical paper deals with a step taken by organizations to encourage sustainable growth and ecological initiatives. This research suggests that human resources management departments must incorporate green and environmentally friendly practices in their organizations. Green HRM is a concept that further adds to the basic understanding of this idea.

Research Methodology:

The researcher has used reference from secondary sources like books, articles and newspaper reports to understand the issue regarding Sustainable Human Resource Management, hereinafter Sustainable HRM.

Objectives Of The Study:

The main objective of this article is to analyze the Human Resource Management - A Key to Sustainable Development in India. The following are the objectives of the study:

1. To review the historical evaluation of HRM in India.
2. To analyses of impact of HRM on Sustainable Development.
3. To evaluate the recent scenario of HRM in India.
4. To provide suitable suggestions to achieve effective HRM in India.

Review Of Literature:

Sustainability and strategic HRM are very rich literature. However sustainable HRM is a growing, rapidly emerging field. The term sustainability can be used in different aspects which are concerned with meeting the needs of people today without compromising the ability of future generations to meet their own needs. (World Business Council for Sustainable Development, 2005).

Sustainability and sustainable development are synonymously used for the notions (Filho, 2000). Dyllick and Hockerts (2002) noted that the term sustainability has been influenced mainly by three different stakeholder groups; ecologists, business strategy scholars, and the United Nation's World Commission on Environment and Development (WCED, 1987), called the Brundtland Commission. Some authors believe sustainability first appeared as a concept in the forestry sector, before it was adapted by the ecological movement concerned with the over-exploitation of natural and environmental resources (Leal Filho, 2000).

From a business perspective, sustainability has been defined as a company's ability to achieve its business goals and increase long-term shareholder value by integrating economic, environmental and social opportunities into its business strategies (Symposium on Sustainability, 2001, Wirtenberg et al 2007).

Evidence is accumulating rapidly that corporate social-environmental performance maybe strongly associated with financial and marketplace success (Cusack, 2005; Innovate Strategic Value Advisors, 2006; Wirtenberg et al 2007), and that the investment community and corporate people appear to

be focused increasingly on the degree to which firms are managed with the compliance of sustainability (Dixon, 2003).

The three-fold approach to sustainability focuses both on an organization's external influences and on its internal influences. It also addresses the sustainability of short-term and long-term effects on a variety of the organization's shareholders. In other words, sustainable HRM is economically rationale for companies to invest in the survival of their sources for resources if the functioning of these is endangered (Ehnert 2006).

Sustainable HRM is long-term oriented conceptual approaches and activities aimed at a socially responsible and economically appropriate recruitment and selection, development, deployment, and release of employees. (Zaugg & Thom, 2004: 217). Sustainable HRM could help sustain employee dignity in the case of staff reduction and warranting their employment on the job market (Zaugg & Thom, 2001). Thom & Zaugg (2004) stated that, a sustainable HR policy focuses on implementing proper, transparent procedures for recruitment and retention, training and development, performance management and motivation and employee engagement and it is a conceptual approach and long-term oriented activity in developing socially viable and responsible policies for recruitment and retention, employee engagement, deployment, and motivation.

Wirtenberg et al (2007) mentioned that, implementing sustainable human resource policies help in creating a more productive and motivated workforce which eventually led to organizational success. Ehnert (2009) mentioned that, sustainable HR model is that it anticipates on the short term and long-term effects of implementing a policy and measures organizational success in social and environmental dimensions and not just by the financial aspect. It also utilizes the power of human resource management to develop and empower employees by building a conducive work environment.

Several studies have shown the connection between sustainability and the management of human resources; and a new approach was established as sustainable management of human resources.

Ehnert (2006): Sustainability issues and human resource management - The Sustainability perspective of HRM raises awareness for ambiguities and dualities in HRM, unintended negative side effects of HR practices, social rationalities.

Ehnert (2009): Sustainability and Human resource management - Sustainable HRM is about to change a traditional way of managing human resources for long-term viability and sustain development. This approach covers treating HR socially responsible and to foster well-being and health in dimensions of social justice and social legitimacy.

Kramer (2014): Strategic HRM and sustainable HRM - Applications of sustainability concepts in human resource management emerged a new approach- Sustainable HRM has different features from Strategic HRM. It acknowledges social or human outcomes rather than financial outcomes.

A. Historical Evolution Of Human Resource Management:

Human Resource Management is a field of constant evolution and transition. As well, there is no standard model or an ideal type of HRM approaches, to suit all organizations, and thus, there are different models to describe HRM evolution and management (Ahmed and Kazmi, 1999; Gratton and Truss, 2003).

The concept and processes of Strategic Human Resource Management (SHRM) developed in the late The 1970s and the 1980s as a way of managing employees in an increasingly turbulent and fast-changing, uncertain environment. One of the most prominent factors in history for the management of human resources was primarily scientific research (1903) by Frederic W. Taylor, who proposed three principles that were the basis of modern HRM according to Jamrog and Overholt (2004):

- The Human Resource appointed for the job must be physically, mentally fit for the job and those who aren't fit must be removed.
- The Human resource must have trained to carry out the given specific task.
- The Human Resources must be given incentives or rewards. [xxii]

Between 1950 and 1960, was the deployment of the automobile industry, promoting concern for efficiency and performance, and parallel to it, the implementation of the sub systems of HR, known as the Technicity phase by Wood (1995). During this period, despite the knowledge and understanding of how people behave in organizations, the personnel management function was still regarded as a records unit with operational character (Jamrog and Overholt, 2004).

The transition from personnel management to Human Resource Management had begun mainly with the concepts divulged by North American authors between the 1960 and 1970 and since then, the term HRM" has been increasingly adopted worldwide (Ahmed and Kazmi, 1999).

The 1980s also saw the evolution of HRM to the Strategic Management of Human Resources. From the moment they began to identify the link with organizational effectiveness was justified for its

approval and its role within organizations (Ewing and Caruana, 1999), no longer being seen only to answer legal questions.

HRM encompasses Strategic HRM, which is a more specific approach to managing people to improve organizational performance and measures the impact of these strategies on organizational performance. The concept of Strategic HRM evolved in several ways. Strategic HRM can be expressed in terms of planned human resource activities and deployments designed to achieve an organization's objectives Strategic HRM integrated the HRM activities with organizational strategic objectives in an organizational context.

These include the development of theoretical frameworks, views about the specific contributions to organizational performance and the specific bundles of HR practices which include high-performance work systems (HPWS) which consist of selective recruitment and selections, extensive employee development and participation in decision-making. It also assumes that effective HRM activities improve organizational performance. (Schuler and Jackson 2005; Boxall and Purcell 2008).

There is a need for more discussion on what sustainable HRM is, what is the role of HRM in implementing the idea of sustainability in the organizations and what is the role of HRM in developing sustainable HRM? As consequences of actions, there is a need for empirical research on how organizations and employees perceive sustainable HRM, and, how sustainable HRM implemented.

B. Sustainable Development & Human Resource Management:

The time of Sustainable HRM has come. Governments should seriously consider working out mechanisms with the private sector to draft out plans favoring and protecting the environment. Organizations under the name of Corporate Social Responsibility (CSR) claim to pay-back to the environment, but they need to go beyond normal activities and adopt more practices in routine for the better implementation of their green initiatives, and these green initiatives can be a part of the broader CSR as well (Mandip, 2012).

Ahmad (2015) highlights the introduction of areas such as Green Accounting, Green Marketing, Green Retailing and others. Multinationals such as Toshiba, LG, and Sony are among the few brands that are on this mission. Toshiba Environment report defines Green Management as, Green Management is an initiative aiming at continuously improving the foundation of environmental management, such as the development of personnel responsible for environmental activities, environmental management systems, and environmental communication as well as conservation of biodiversity. The green management system is a dynamic and constant administration arrangement of exercises and procedures to screen, avoid and control pollutants of nature (Abbaspour, et al., 2006)

According to Denisi and Griffin (2009), HRM is the comprehensive set of managerial activities and tasks concerned with developing and maintaining a qualified workforce in ways that contribute to organizational effectiveness. HRM is a well-known and understood concept; therefore, the authors do not focus more on establishing the importance or basic understanding of this term. GHRM is relatively a new idea and is gaining limelight with the acknowledgment of the importance of environmental concerns and role organizations can play.

Green HRM is not a stand-alone concept. Sharma and Gupta (2015) are also of the view that Green HRM is a holistic and wider application of the notion of sustainability to an organization and its personnel. Green actions can be inculcated into various steps or processes in an organization. Green HRM involves the use of HRM to support sustainable use of resources in organizations (Rani and Mishra, 2014).

Some organizations, such as those mentioned in the introductory part of this paper, present themselves as Green, they are working on building their image as Green organizations to capitalize on this goodwill image. The GHRM framework is not complex and may not require a fundamental shift in the structure of HRM functions but at the same time have a positive impact in the long run. GHRM can be more fruitful if it is adopted by the organizations as part of the broader sustainable development.

Ahmad (2015) reiterates that Green HR efforts have resulted in increased efficiencies, cost reduction, employee retention, and improved productivity, besides other tangible benefits. Organizations need to become proactive and go for practices that can help them grow and at the same time enable organizations for paying back to society. It is imperative to mention that literature about GHRM and its implementation is mostly available in the context of developed economies and not in developing countries.

It is high time that developing countries should acknowledge the importance of a greener sustainable environment and counter the growing global warming issues. GHRM can be one small but effective strategy as a part of the broader mission. The Green HRM model can be assessed and evaluated using a method developed by Tang et al. (2017) to support the research.

C. Recent Scenario Of Human Resource Development In India:

It's no secret that employee's attitudes about their jobs, their benefits and their employers can range from exuberant to sour. What 's less well known and harder to find out is exactly what matter to specific types of employees and how effective various types of HRD policies, practices and workplace characteristic are, in spurring employee productivity and retention. Since human resource development and management is culture sensitive, therefore we shall examine the recent scenario of HRD in India context by having a brief preview of HRD scenario in the global context as discussed below:

- More and more employers are assessing the value returned from each dollar spent on employees. They are targeting specific programs and practice to the employees that value them the most and becoming more important than ever. Determining what matter most to employees and aligning expenditures with priorities is a strategic challenge for HRD function. Employee change continuously due, in part, to change changes in personal preference but also in part to the chum that occurs as employees leave and new ones enter the Organization. However, it is neither cost effective nor practical to satisfy every employee. Therefore, understanding employees and issues they face holds the key to the function to respond quickly.
- importance of all but one. Now professionals and employees differed on the relative importance of all but one. Now the question arises whether HRD professionals are out of touch with the attitudes among their own particular employees. Perhaps, in some Organization, HRD function is very much in tune with what their employees are thinking, while in some others the gap may be larger. Finding out what really matters to employees so that the Organization can maximize its investment in human resource is not an incident undertaking. There are costs involved in doing surveys and in analyzing their results and there are there are additional costs if an Organization does not show that it values the efforts.
- Thus, it is that core HRD tools, tactics and programmes remains the same however employee needs and priorities have changed and indeed changing. Employee 's values greatly professional developments, job specific training and learning, career development and empowerment more than anything else, except compensation. Employees are increasingly emphasizing opportunities for their development in order to enhance their productive contribution to the Organization and derive satisfaction. Post 1991, India started its phased economics restructuring to provide domestic Organizations the time and competencies to face greater competition. The liberalization paved the way for integration of India economy
- with the global economy. It opened many opportunities for growth through the removal of artificial barriers on pricing and output decisions, investments, mergers and acquisition, joint ventures, technology imports, import of foreign captain etc., this enabled Indian Organizations an opportunity to expand, diversify, integrate and globalize more freely.
- Indian Organizations have to develop the workforce capable of taking up challenges thrown by the new economic environment. To tackle this challenging situation, Indian academics a nod practitioner have both advocated the adoption of the concept of human resource development. The adoption of professionalized HRD practices in India is recent phenomenon, but has gained momentum in the past ten years.

Findings, Suggestions & Limitations:

To summarize the findings, some key characteristics of a sustainability perspective in HRM derived in this study and the related theoretical literature are listed as, having a long-term approach and foresight, creating organizational dynamics, emphasizing on creating equal and non-discriminatory learning opportunities, regeneration and development of HRs, the implementation of appropriate policies to create work-life balance including flexible or floating working hours and distance working.

Targeted, a diverse, flexible, and motivational reward system that is consistent with sustainability goals, Caring for the interests of different groups of stakeholders, Caring for the health and safety of HRs, Efforts to gain and maintain social legitimacy through long-term investment appreciation and responsibility towards society and other stakeholders, make use of the restrictions and turn them into opportunities through creativity and innovation, Gaining sustainable competitive advantage, Creating corporate sustainability.

Conclusion:

Sustainable Human Resource Management is an extremely new subject for HR and empirical studies to evaluate and demonstrate best practices for more sustainable HRM-based organizations. Sustainability is a strategic issue for HRM that is necessary for a company's long-term access to resources needed for business in the future including human resources and long-term viability to maintain the social legitimacy of their commercial operations for which they need to control the risks from producing negative externalities on natural and social environments.

This ultimately leads to the long-term sustainability and capability of organizations as well as resilience and sensitivity to external environmental change within those organizations that positively influence their efficiency and effectiveness. The paper has a limitation is that no specific organizational

sustainable HRM analysis has been made. Future research could be made on some specific organizational aspects

In sum, Sustainable HRM can be viewed as facets of modern integral management model, in continual dynamic interaction that brings about a potential for improved competitive advantage and business performance and as the opportunity for HR to prove its own legitimacy and strategic position.

References:

1. Ahmed, F. & Kazmi, A. (1999), 'Historical evolution of strategic human resource management', Malaysian Management Review, Vol. 34 No. 1.
2. Dixon, F (2003), 'Total Corporate Responsibility: Achieving Sustainability and Real Prosperity, Ethical Corporation Magazine, December 2003.
3. Dyllick, T. & Hockerts, K (2002), Beyond the Business Case for Corporate Sustainability? Business Strategy and the Environment, 11(2), pp. 130-141.
4. Ehnert, I. (2009), Sustainability and Human Resource Management: Reasoning and Applications on Corporate Websites. European Journal of International Management, 3(4), pp. 419-438.
5. Jamrog, J. & Overholt, M.H. (2004), 'Building a strategic HR function: continuing the evolution', Human Resource Planning, Vol. 27, No. 1, pp. 51-63
6. Kramar, R. (2014), 'Beyond strategic human resource management: Is sustainable human resource management the next approach?', International Journal of Human Resource Management, 25, pp. 1069-1089.
7. Mandip, G (2012), Green HRM: People management commitment to environmental sustainability. Research Journal of Recent Sciences, 2012, Vol. 1, pp 244-252.
8. Ravi Kumar (2018), 'Sustainable HRM: An Evolution of a New Approach', International Journal of Management, Technology and Engineering, 8, XI, November 2018, pp. 167.
9. Schuler, R.S. & Jackson, S.E. (2005), A Quarter-Century Review of Human Resource
10. Youndt, M. A. et al. (1996), 'Human resource management, manufacturing strategy and firm performance, Academy of Management Journal, Vol. 39, No. 4, pp. 836-865.

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WATER: THE NUTRITIONAL SOURCE

Dr. Anvita Agrawal
Associate Professor , HOD Home Science
Dr (Sow) IBP Mahila Mahavidyalay,Auranagabad
Email: anvitasandeep@yahoo.com

Abstract:

Water helps to restore fluids lost through metabolism, breathing, sweating, and the removal of waste. It helps to keep you from overheating, lubricates the joints and tissues, maintains healthy skin, and is necessary for proper digestion. It's the perfect zero-calorie beverage for quenching thirst and rehydrating your body. Water is an essential nutrient at every age, so optimal hydration is a key component for good health. Water accounts for about 60% of an adult's body weight. We drink fluids when we feel thirst, the major signal alerting us when our body runs low on water. We also customarily drink beverages with meals to help with digestion. But sometimes we drink not based on these factors but on how much we think we should be drinking. Drinking water quality is one of the greatest factors affecting human health. However, drinking water quality in many countries, especially in developing countries is not desirable and poor drinking water quality has induced many waterborne diseases. This paper is based on the impacts of drinking water quality on public health so that proper actions can be taken to improve the drinking water quality conditions in many countries.

Introduction:

Water quality is **one of the most important factors in a healthy ecosystem**. Clean water supports a diversity of plants and wildlife. Drinking water quality is paramount for public health. Despite improvements in recent decades, access to good quality drinking water remains a critical issue. The World Health Organization estimates that almost 10% of the population in the world do not have access to improved drinking water sources. Among other diseases, waterborne infections cause diarrhoea, which kills nearly one million people every year. Most are children under the age of five . At the same time, chemical pollution is an ongoing concern, particularly in industrialized countries and increasingly in low and medium income countries (LMICs). Exposure to chemicals in drinking water may lead to a range of chronic diseases (e.g., cancer and cardiovascular disease), adverse reproductive outcomes and effects on children's health (e.g., neurodevelopment), among other health effects .

The Following Water Properties Are Important In Determining Water Quality:

Temperature: Water temperature is important to fish and aquatic plants. Temperature can affect the level of oxygen, as well as the ability of organisms to resist certain pollutants.

Acidity – pH: The measurement of pH is a measure of the amount of hydrogen ions (H+) present in a substance such as water. Knowing the amount of hydrogen in a substance allows us to judge whether it is acidic, neutral, or basic.

Dissolved Oxygen: A small amount of oxygen, about ten molecules of oxygen per million molecules of water, is dissolved in water. Fish and microscopic organisms need dissolved oxygen to survive.

Turbidity: Turbidity makes the water cloudy or opaque. Turbidity is the amount of particulate matter (such as clay, silt, plankton, or microscopic organisms) suspended in water.

Specific Conductance: Specific conductance measures the capacity of water to conduct an electrical current. It depends on the amount of dissolved solids, such as salt, in the water.

Hardness: The amount of dissolved calcium and magnesium in water determines its "hardness." Water hardness varies throughout the United States.

Suspended Sediment: Suspended sediment is the amount of soil circulating in water. The amount depends in part on the speed of the water flow. Fast-flowing water can pick up and hold, or suspend, more soil than calm water.

To Function Properly, All The Cells And Organs Of The Body Need Water.

Here are some reasons our body needs water:

1. It lubricates the joints

Cartilage, found in joints and the disks of the spine, contains around 80 percent water. Long-term dehydration can reduce the joints' shock-absorbing ability, leading to joint pain.

2. It forms saliva and mucus

Saliva helps us digest our food and keeps the mouth, nose, and eyes moist. This prevents friction and damage. Drinking water also keeps the mouth clean. Consumed instead of sweetened beverages, it can also reduce tooth decay.

3. It delivers oxygen throughout the body

Blood is more than 90 percent water, and blood carries oxygen to different parts of the body.

4. It boosts skin health and beauty

With dehydration, the skin can become more vulnerable to skin disorders and premature wrinkling.

5. It cushions the brain, spinal cord, and other sensitive tissues

Dehydration can affect brain structure and function. It is also involved in the production of hormones and neurotransmitters. Prolonged dehydration can lead to problems with thinking and reasoning.

6. It regulates body temperature

Water that is stored in the middle layers of the skin comes to the skin's surface as sweat when the body heats up. As it evaporates, it cools the body. In sport Some scientists have suggested that Trusted Source when there is too little water in the body, heat storage increases and the individual is less able to tolerate heat strain.

Having a lot of water in the body may reduce physical strain if heat stress occurs during exercise. However, more research is needed into these effects.

7. The digestive system depends on it

The bowel needs water to work properly. Dehydration can lead to digestive problems, constipation, and an overly acidic stomach. This increases the risk of heartburn and stomach ulcers.

8. It flushes body waste

Water is needed in the processes of sweating and removal of urine and feces.

9. It helps maintain blood pressure

A lack of water can cause blood to become thicker, increasing blood pressure.

10. The airways need it

When dehydrated, airways are restricted by the body in an effort to minimize water loss. This can make asthma and allergies worse.

11. It makes minerals and nutrients accessible

These dissolve in water, which makes it possible for them to reach different parts of the body.

12. It prevents kidney damage

The kidneys regulate fluid in the body. Insufficient water can lead to kidney stones and other problems.

13. It boosts performance during exercise

Some scientists have proposed that consuming more water might enhance performance during strenuous activity.

14. Weight loss

Water may also help with weight loss, if it is consumed instead of sweetened juices and sodas. "Preloading" with water before meals can help prevent overeating by creating a sense of fullness.

Summary:

Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes. Improved water supply and sanitation, and better management of water resources, can boost countries' economic growth and can contribute greatly to poverty reduction. Contaminated water and poor sanitation are linked to transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid and polio. Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks. This is particularly the case in health care facilities where both patients and staff are placed at additional risk of infection and disease when water, sanitation and hygiene services are lacking. Globally, 15% of patients develop an infection during a hospital stay, with the proportion much greater in low-income countries.

Inadequate management of urban, industrial and agricultural wastewater means the drinking-water of hundreds of millions of people is dangerously contaminated or chemically polluted. Natural presence of chemicals, particularly in groundwater, can also be of health significance, including arsenic and fluoride, while other chemicals, such as lead, may be elevated in drinking-water as a result of leaching from water supply components in contact with drinking-water.

Some 829 000 people are estimated to die each year from diarrhoea as a result of unsafe drinking-water, sanitation and hand hygiene. Yet diarrhoea is largely preventable, and the deaths of 297 000

children aged under 5 years could be avoided each year if these risk factors were addressed. Where water is not readily available, people may decide handwashing is not a priority, thereby adding to the likelihood of diarrhoea and other diseases.

Diarrhoea is the most widely known disease linked to contaminated food and water but there are other hazards. In 2017, over 220 million people required preventative treatment for schistosomiasis – an acute and chronic disease caused by parasitic worms contracted through exposure to infested water.

In many parts of the world, insects that live or breed in water carry and transmit diseases such as dengue fever. Some of these insects, known as vectors, breed in clean, rather than dirty water, and household drinking water containers can serve as breeding grounds. The simple intervention of covering water storage containers can reduce vector breeding and may also reduce faecal contamination of water at the household level.

References:

1. D. Vidyasagar, Global minute: water and health - walking for water and water wars, J. Perinatol., 27 (2007) 56–58.
2. https://www.who.int/news-room/fact-sheets/detail/drinking-water
3. https://iwaponline.com/jwh/article/2/1/1/1854/A-systematic-review-of-the-health-outcomes-related
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6315424/
5. https://www.sciencedirect.com/science/article/abs/pii/S0167629611001172

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MANAGEMENT OF NATURAL RESOURCES: A NEED TO SAVE PLANET AND HUMANITY

Dr. Vanmala R. Tadvi
Assistant Professor, Dept. of Geography, Milind college of arts, Aurangabad
Email: vanmalartadvi1978@gmail.com

Abstract:

Earth planet is the only known planet bearing life on it. But the capacity to hold the pressure of increasing population of planet is decreasing day by day. The growing population is proving threat to the ecological balance of the planet and ultimately it will prove disaster to the planet and the humanity. Hence its learning time to manage natural resources for sustainable development of mankind as Gandhiji's quoted in this regarded that the earth can fulfill the needs of all human but can't fulfill the desire of a single man. This paper intends to focus on various ways of maintaining natural resources.

Keywords: Natural resources, Planet, Humanity, Sustainable Management, Water Harvesting, biodiversity.

Objectives: To know various ways managements of natural resources.

Introduction:

Some natural resources like soil, air and water, forests, and how various components are cycled over and over again in nature.This is high time to think how we ought to use our resources so as to sustain the resources and preserve our environment. We must look at our natural resources viz water, air, forests, soil, wild-life, coal and petroleum. We must look take care of our natura resources. These resources must be managed for sustainable development.

There are a lot many environmental problems. These problems are global as well as local and most of the time and we feel helpless to make any changes. There are international laws and regulations. There are our own state and national laws and acts for protecting our environment. There are also national and international organizations working towards protecting our environment. But exploiting our resources unthinkingly has been a fairly recent phenomenon in our society. There should be political as well as social will to make sustainable development.

Natural Resources:

These are the resources that are found in the environment and are developed without the intervention of humans which include air, Sunlight, Water, Soil, Stone, Plants, Animals and Fossil fuels etc.

Natural resources are naturally occurring materials that are useful to man. It can be useful under conceivable technological, Economic or Social Circumstances. It also supplies raw materials, food, building and Clothing materials, fertilizers, metals, water and geothermal power etc. Air, Water, Soil, Iron, Forests are most important natural resources.

Discussion:

Manage Our Resources: We need to manage our resources carefully because these are not unlimited resources . Population explosion due to improvement in health- care and excessive demand for all resources is increasing at an exponential rate. The management should also ensure equitable distribution of resources so that all, and not just a handful of rich and powerful industrialists get benefit from these resources.

One more factor to be well-thought-out while we exploit these natural resources is the harm we have done to the environment. These resources are either extracted or used. For example, mining causes pollution because of the large amount of slag which is discarded for every tone of metal extracted. Hence, sustainable natural resource management demands a well-planned and systematic plan for the safe disposal of these kinds of wastes too.

Forests are 'biodiversity hot spots. One measure of the biodiversity of an area is the number of species originate there. However, the range of different life forms viz bacteria, fungi, ferns, flowering plants, nematodes, insects, birds, reptiles etc. are of immense importance. One of the main intentions of conservation is to try and preserve the biodiversity we have inherited will help to save the planet. Experiments and field studies suggest that a loss of diversity may lead to a loss of ecological stability which will destroy the planet.

Management of natural resources is not possible without assimilating the local people in movement in the protected areas. We can't bring ecological balance by keeping the local people out, by using force cannot possibly be successful in the long run cause they have ways of maintaining ecological balance for ages. In any case, the damage caused to forests cannot be attributed to only the local people- one cannot turn a blind eye to the deforestation caused by industrial needs or development projects like building cities, roads, dams etc. The damage caused in these reserves or the arrangements made for their convenience is also to be measured.

We must analyze human interventions which has caused damage to the much a part of the forest landscape. This will give a roadmap what has to be managed in the nature and how to decrease human interventions. Forest resources must be used in manner that is both environmentally and developmentally sound – in other words, while the environment is preserved, the benefits of the controlled exploitation go to the local people, a process in which decentralized economic growth and ecological conservation go hand in hand. The kind of economic and social development we want will ultimately determine whether the environment will be conserved or further destroyed. The environment must not be regarded as a pristine collection of plants and animals. It is a vast and complex entity that offers a range of natural resources for our use. We need to use these resources with due caution for our economic and social growth. And to meet our material aspirations which is impossible to achieve.

Sustainable Management: We must consider the goals of all the stakeholders with regard to the management of the forests. Forest resources are often made available for industrial use at rates far below the market value while these are denied to the local people. The Chipko Andolan (Hug the tree Movement) was the result of a grassroot level effort to end the alienation of people from their forests. The movement originated from an incident in a remote village called Reni in Garhwal, high –up in the Himalayas during the early 1970s . There was a dispute between the local villagers and a logging contractor who had been allowed to fell trees in a forest close to the village. On a particular day, the contractor's workers appeared in the forest to cut the trees while the men folk were absent. Undeterred, the women of the village reached the forest quickly and clasped the tree trunks thus preventing the workers from felling the trees. Thus thwarted, the contractor had to withdraw. This kind of movements can help to bring the ecological balance but are fewer in numbers. Awareness for sustainable development can bring it into reality.

Water Harvesting: Watershed management underlines science soil and water conservation in order to increase the biomass production. The aim is to grow primary resources of land and water, to produce secondary resources of plants and animals for use in a manner which will not cause ecological imbalance. Watershed management not only upsurges the production and income of the watershed community, but also mitigates droughts and floods and rises the life of the downstream dam and reservoirs. Various organizations have been working on rejuvenation ancient systems of water harvesting as an alternative to the 'mega- projects' like dams. These communities have used hundreds of indigenous water saving methods to capture every trickle of water that had fallen on their land; dug small pits and lakes, put in place simple watershed systems, built small earthen dams, constructed dykes, sand and limestone reservoirs, set up rooftop water- collecting units. This has recharged groundwater levels and even brought rivers back to life.

The management of these energy sources includes slightly different perspectives from those resources discussed earlier. Coal and petroleum were made from the degradation of bio-mass millions of years ago and hence these are resources that will be exhausted in the future no matter how carefully we use them. So we would need to look for alternative sources of energy. Various estimates as to how long these resources will last us exist and one is that at present rates of usage, our known petroleum resources will last us for about forty years and the coal resources will last for another two hundred years hence its high time to search for new energy resources for sustainable development.

Conclusion: Sustainable management of natural resources is a difficult task. While talking this issue, we need to keep an open mind with regard to the interests of various stakeholders. We must understand that people will act with their own best interests as the priority. But the understanding that such selfish goals will lead to destruction of the planet and mankind itself. Beyond the rules, laws, and regulations, we must curtail our necessities, individually and social. This could make it possible to give livable mother planet to our future generations.

References:

1. AICRP-CS Reports. (1984-2000). Project Directorate for Cropping Systems Research Modipuram, Meerut, India.
2. Anonymous, (2000): Natural Resource management for agricultural production in India

3. (J.S.P. Yadav and G.B. Singh Eds)
4. Bannon, Ian, and Paul Collier. 2003. Eds. Natural Resources and Violent Conflict: Options and Actions. Washington, D.C, World Bank, 2003.
5. Carmen Zaharia*Daniela Suteu, The natural resources and sustainable development Cercetări Agronomice în Moldova Vol. XLIV , No. 1 (145) / 2011
6. Dr. Subramanian, K.R. The crisis of consumption of natural resources ,Volume-2, Issue-4, August 2018, Page No: 8-19 ISSN : 2635-3040
7. Earth Security Group (ESG). (2016). Indian insurance and sustainable development. Report by ESG, FICCI and British High Commission New Delhi
8. Huron River Watershed Council (HRWC). (2016). Climate change impacts on natural resources.
9. Khagram Sanjeev, and Saleem Ali. 2006. Environment and Security. Annual Review of Environment and Resources 31(1): 395–411.
10. Loorbach, D. (2010). Transition management for sustainable development: A prescriptive, complexity-based governance framework. Governance, 23(1), 161–183. doi: 10.1111/j.1468-0491.2009.01471.x
11. Salvati, L. and Marco, Z. 2008. Natural resource depletion and economic performance of local districts: suggestions from a within-country analysis Journal of Sustainable Development and World Ecology., 15(6): 518–523
12. Schilling, M. and Chiang, L. 2011. The effect of natural resources on sustainable development policy: The approach of non-sustainable externalities. Energy Policy 39: 990–998.
13. Sustaining natural resources in a changing environment: evidence, policy and impact Ruth Kattumuri

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Impact of Human Resource Management on Economic Development in India: An analysis

Dr. M. Madhumathi [1] Dr. Surappa Naik[2]

[1]Director, School of Humanities & Liberal Arts, Department of Economics, Maharani Cluster University, Palace Road, Bangalore, Karnataka-560001

[2]Assistant Professor of Economics, LBS Government First Grade College, R.T. Nagar, Bangalore, Karnataka-560032,

Email- surappanaik@yahoo.in, Mobile: 9449343839

Email- madhumathieco@gmail.com

Introduction:

India is being extensively recognized as one of the most exciting emerging economics in the world. Besides becoming a global hub of outsourcing, Indian firms are spreading their parts universally through mergers and acquisitions. This article touches remarkable evidence of Human Resource Management, Economic organizations, Managerial ideas and Economic development from ancient Indian sources with persistent ethnicities and reflects them in the context of contemporary challenges. Human Resources Management or Development or Human Capital refers to labor or workers' knowledge, skill sets, and experience in an economy. Human Resources Development and Economic Growth are strongly linked. Human capital influences Economic Growth and can aid in the development of an economy by broadening its people's knowledge and skills.

Indian economy has been taken a new track after 1991 by the overview of new industrial policy, as a part of New Economic Policy. This policy brings changes in the form and structure of Indian corporate consequence and very popularly known as Liberalization, Privatization and Globalization (LPG). Finally, this policy exposed the Indian economy as a massive hope before the world business magnates. It is of no doubt that huge foreign investment has been coming to Indian economy with a strident growth of Gross Domestic Product (GDP). This step is milestone to the implementation of Human Resource Management policies in India.

The former President of India and Scientist, Dr. A P J Abdul Kalam recognizes the India's Human Resource base as one of its extreme fundamental competencies in a book titled - *'India 2020: A Vision for the New Millennium'*. Mentioned, Sir Winston Churchill at the H.T Leadership Summit - *'India: The Next Global Superpower',* the former Prime Minister of India, Dr. Manmohan Singh in his speech said - *'empires of the future will be the empires of the mind'*. This statement not only identifies the importance of knowledge possessed by individuals in determining the destinies of the nations, it also evidently hints that the intellectual, cultural, social, economic and political empowerment of these individuals is the basis on which the modern world will be constructed.

Research Methodology:

The information for this article has been gathered from various secondary sources, to analyze the impact of Human Resource Management on Economic Development in India. Especially, referred some of related articles, books, reports, periodicals and journals.

The Objectives of the Study:

The present study has following objectives:

1. To review the status of Human Resource Management in India.
2. To analysis the opportunities and challenges of Human Resource Management.
3. To provide suitable suggestions to effective Human Resource Management of India.

Review of Literature:

Human Resource is one of the energetic strength for a society, country and an economy. Out of the 4 M, this M (Man) has only brain and cannot be measured as per the will of the employer. Their productivity be contingent upon many factors both internal and external. Only external factors like money, perks and other material benefits could not satisfy them enough to be an inspired workforce. Several research has shown

the relationship between employee arrangement practices with other constraints productivity, leadership etc.

Budhwar, 2000), considered the Indian managers define Human Resource Management as a holistic concept, which is more focused and proactive than Personal Management; it integrates and incorporates both Personal Management and Human Resource Management, and deals with satisfying and developing employees. Human Resource Development indicates a long term perception for developing the potential and capabilities of Human Resource for future organizational needs.

Anand & Banu (2011) deliberate various factors of Employee Engagement practices like work, rewards and recognition, opportunities, team work, immediate supervisor, communication and observed their impact on intension to stay at the organization. The study found a strong positive relationship between engagement variables and discretionary effort and a weak negative relationship between engagement variables and intension to stay.

Sarkar's (2013) found on the factors contributing to the employee engagement and the various strategies implemented by Human Resource professionals to enhance employee engagement in manufacturing organizations shown that Intrinsic Motivation and Training & Development are affecting in a higher degree to the employee engagement.

Handa & Gulati (2014) considered the relationship between personality traits and employee appointment amongst frontline personnel in the organized Indian retail industry. The study also found that personality is a significant predictor of employee engagement. A thriving employee engagement assists to generate a community at the place of work not just an employee. Engaged employees experience a strong emotional connection to the organization.

Human Resource Management in India:

In the Wealth of Nations (1776), *Adam Smith's* ideas of concentration of labor controlled the ideas about human capital. But, *Alfred Marshall* (1898), discussed that man should be equally significant as money, services are as important as goods, and that there must be a weight on human welfare, instead of just wealth. On the other hand, *Karl Marx*, a revolutionary economist lectures that eventually human resource is vibrant for economic development of a country, hence we have to instruct and train them in an appropriate way.

India is being broadly documented as one of the most exciting emerging economics in the world. Besides becoming a global hub of outsourcing, Indian firms are spreading their wings globally through mergers and acquisitions. During the first four months of 1997, Indian companies have bought 34 overseas companies for about U.S. $11 billion dollars. This remarkable development has been due to a growth in inputs (Capital and Labor) as well as factor productivity. By the year 2020, India is expected to add about 250 million to its labor pool at the rate of about 18 million a year, which is more than the entire labor force of Germany. This so called *'demographic dividend'* has drawn a new interest in the Human Resource concepts and practices in India. This article touches noticeable mark of economic establishments and administrative views from ancient Indian sources with enduring traditions and considers them in the context of contemporary challenges. In the 21st century, enterprises, which progressively alter the market environment, are faced with globalization, shifts in society, technological innovations and high customer expectations. To succeed efficiently, businesses need approaches to sustain a certain degree of effectiveness within a complex and dynamic knowledge-based economy.

Status of Human Resource in India:

India has 62.5 percent of its population in the age group of 15-59 years which is ever increasing and will be at the peak around 2036 when it will reach approximately 65 percent. These population parameters indicate an availability of demographic dividend in India, which started in 2005-06 and will last till 2055-56.

The Economic Survey of India (2020-21) documented, India's Demographic Dividend will peak around 2041, when the share of working-age, i.e. 20-59 years, population is expected to hit 59 percent. India has one of the youngest populations in an aging world. By 2022, the median age in India will be just 28 percent, compared to 37 percent in China and the US, 45 percent in Western Europe, and 49 percent in Japan. Since 2018, India's working-age population (people between 15 and 64 years of age) has grown larger than the dependent population-children aged 14 or below as well as people above 65 years of age. This bulge in the working-age population is going to last till 2055, or 37 years from its beginning. This transition happens largely because of a decrease in the Total Fertility Rate (TFR) after the increase in life expectancy gets stabilized.

A study on demographic dividend in India by United Nations Population Fund (UNFPA) throws up two thought-provoking facts. The window of demographic dividend opportunity in India is available for five decades from 2005-06 to 2055-56, longer than any other country in the world. This demographic dividend window is available at diverse periods in different states because of differential performance of the population parameters.

In a recent study on CSR and Employee Engagement (2015) it has been taken that the role of top management is highly substantial to support in connecting CSR with employee approaches. This attitude can be attained through proper drafting and implementation of HRM practices in the organization.

Human Resource Management & Economic Development:

India with a huge population has the human resource to manage and contribute towards Indian economy which differentiates it from the developed countries and it has also the challenges of huge population. According to the National Planning Commission of India (NITI AYOG), 'Human resource is the knowledge, skill, efficiency and physical and mental capacity to do work inherent in the people of the country'. Capital, natural resources, as well as other productive resources remain inactive in the nature but, human resources are necessary to mobilize them. HRD is a key driver and component of economic development and it leads to a number of social and economic benefits including jobs, reduction in poverty, increase in standard of living and better quality of life, better civil society etc.

The part of human resources in economic development can be explicated with the help of following substantial evidences:

1. Skill Development: Slow growth in several developing countries like India is mostly resulted from lack of investment in human capital (skills, knowledge, and experience possessed by an individual or population, viewed in terms of their value or cost to an organization or country). These countries are suffering from lack of critical skills required for its industrial sector and also face the problem of surplus labor force in its farm sector.

2. Appropriate Utilization of Resources: Human resource has considered important type of resource for attaining economic development of a country. Among various types of resources, human resources are the most active type of resources. Qualitative and quantitative development of human resource is very much required for the proper utilization of natural resources of the country.

3. Improvement of Productivity: Schultz, Kendrick and Harbison have made some important studies recently so as to point out that a major part of the growth of national output in USA can be attributed to increased productivity which has been mostly realized out of capital formation

4. Better Volume of Production: As a result of human resource development, the production increases as the knowledgeable and skilled workers can make a rational use of all resources at their disposal. With the imparted knowledge, workers try to increase his output and income.

5. Accumulation to Productive Capacity: By advancement the technological set-up along with improved knowledge and skill can modernize the production technologies and thereby can add to the productive capacity of the country in general.

6. Improved Growth Rate: Human resource development can raise the growth of the country through increased formation of human capital. Imparting knowledge can improve the productivity of workers and therefore, can raise the per capita income.

7. Instrument for Economic change: Human resource development can make the people knowledgeable, skilled and physically fit. This can also change the attitudes of the people and improve the personal qualities of people.

8. Part of Government: The role of Government is to boost the human resource development is a function of total public sector expenditure allocation for human development sector, and how these expenditures are allocated and disbursed.

9. Quality of Life: Human resource development can pave the way for improving quality of life for the people in general. This can be made possible through improvements in the three components of Human Development Index (HDI), i.e., rise in per capita income (PCI), higher educational achievement and increase in life expectancy.

10. Utilization of Natural Resources: Human resource is necessary for the utilization of natural resources like mineral, water, forest, finance etc. Utilization of these resources is necessary for economic development. Thus, only human resource mobilizes and utilize them appropriately.

11. Deficiency of Natural Resources: The utilization of human resource compensates the deficiency of natural resources. Various countries are poor in natural resources like Japan, Hong Kong, Singapore etc. but they are able to achieve high economic growth by proper utilizing human resource.

12. Deployment of Physical Capital: Only the existence of physical capital can't do anything for economic development. They should be properly utilized. To operate machinery and equipment and to run factories and industries is impossible without the involvement of human resource.

HRM & HRD as Economic Factor to Economic Development:

Since a knowledgeable workforce can lead to augmented productivity, the skills have economic value. Human capital is the recognition that not everyone possesses the same skill sets or knowledge. Investing in people's education can also improve work quality. The fallowing factors are contributing to economic growth of the country.

1. A good quality of population is critical in responsible the level of economic development of the nation.
2. As a result, investment in human capital in the form of educational, medical, and other social schemes is highly required.
3. Human resource development improves commons awareness, skills, and abilities, which drives innovation, productivity gains, and economic growth.
4. Since labors can move from place to place, regions must improve their live ability, or quality of life, in order to retain existing talent and attract new talent.
5. Quality-of-life factors are gradually influencing economic development as the mix of skills and occupations becomes more important to the economic well-being of regions.
6. Since investment tends to boost productivity, human capital is positively correlated with economic growth.
7. The amount of skilled labor required is determined by the level of economic growth driven by consumer spending and business investment.
8. Investing in labors has a proven track record of improving employment circumstances in economies around the world.

India can collaborate with other nations to generate the business environment while providing its domain knowledge and scientific expertise for successful outsourcing. For example- TCS company has a Latin American arm based in Mumbai, India which serves an insurance client in Chile with a center in Uruguay as a near-shore locality.

India is the world's favorite subcontracting destination. India's share of the global offshore outsourcing market for software and back-office services is 44 percent. Conferring to the National Association of Software Companies (NASSCOM), India's premier trade body of the IT software and services industry, technology and IT services exports in India were worth $ 17.2 billion in the year ended March 2020, a rise of 34.5 percent over the previous year. A further expansion of 30 percent in exports is predicted in the next twelve months, to reach $ 22.5 billion. The United States accounts for 68 percent of Indian exports.

The Challenges for India:

The progress of Human Resource Management in India has been very slow, as of the following challenges:

1. As of prevalence of traditional and family-related management, more importance was given to private profit than to labor welfare activities. Labor welfare activities were performed simply for the sake of legal formalities. On account of traditional management and authoritarian approach, development of Human Resource Management faced many challenges.
2. Even laborers approach toward Human Resource Management in India is not favorable. Labor class considers management as a class of exploiters. This approach has also hampered the growth of Human Resource Management.
3. Managers paid no heed to labor welfare activities due to lack of strong trade unions. If the trade unions are strong, they can compel the management to take necessary steps in this direction.
4. Migratory character of workers also hampers the growth of Human Resource Management. They're not sticking to one place turns management indifferent towards their well-being.
5. Self-interest of the labor leaders also account for the slow growth of Human Resource Management. Consequently, capitalists did not take any interest in the development of Human Resource Management.

6. Some establishments are ignorant about the role of Human Resource Management. They still regard it as an agency to recruit and retrench the members of the staff. This approach has also stood in the way of growth of Human Resource Management.
7. Too much dependence on judicial machinery by both labor leaders and the employers for the solution of labor problems has also hindered the growth of Human Resource Management.
8. There is lack of necessary ability, creative capacity and essential qualities among Human Resource Managers. It is because of this fact that line managers treat them inferior. Moreover, Human Resource Management is not treated as a profession. This attitude has also stinted its growth.

Suggestions for the Implementation of HRD Policy in India:

1. **Structure of Human Capital:** Investing in people through healthcare, quality education, jobs and skills helps build human capital, which is key to supporting economic growth, ending extreme poverty, and creating a more inclusive society.
2. **Skill Development:** Skill development also increase employability of young population. India's labor force needs to be empowered with the right skills for the modern economy. Government has recognized the National Skill Development Corporation (NSDC) with the overall target of skilling/ up skilling 500 million people in India by 2022.
3. **Appropriate Education System:** Enhancing educational levels by properly investing in primary, secondary and higher education. India, which has almost 41 percent of population below the age of 20 years, can reap the demographic dividend only if with a improved education system. The education policy should shift its focus from enrolment to improvement in the functioning of schools as well as towards raising the quality of education outcomes.
4. **Health & Nutritional Services:** Development in healthcare arrangement would ensure higher number of productive days for young labor force, thus increasing the productivity of the economy. Success of schemes like Ayushman Bharat Scheme & National Health Protection Scheme (NHPS) is necessary. Also nutrition level in women and children needs special care and improve with effective implementation of Integrated Child Development Scheme (ICDS).
5. **Employment Generation:** The nation needs to create ten million jobs per year to fascinate the addition of young people into the workforce. Promoting businesses' interests and entrepreneurship would help in job creation to provide employment to the large labor force. India's improved ranking in the World Bank's Ease of Doing Business Index is a good sign. Schemes like Start-up India and Make in India, if implemented properly, would bring the desired result in the near future.
6. **Systematic Urbanization:** The huge young and working population in the years to come will migrate to urban areas within their own and other states, leading to rapid and large-scale increase in urban population. How these migrating people can have access to basic facilities, health and social services in urban areas need to be the focus of urban policy planning. These schemes such as Smart City Mission and AMRUT needs to be efficiently and carefully executed.
7. **Socio-Economic Growth:** Socio-Economic Growth and National Security have a direct link with Human Resource Development. The effective Human Resource Development is the cause for the Socio-Economic Development and National Security and vice-versa.
8. **Active Participation of People:** Effective participation of the people should be ensured for facilitating responsibility in social transfers. There is a need to tackle issues of economic and social equity, gender bias, and illiteracy at the popular level for this purpose. There is a need to recognize the crucial role of women as agents of sustained socio-economic growth and change of the society.
9. **Public Health Policies:** Effective policies in the public health sector call for a convergence of initiatives in different sectors. The focus should be on certain wider determinants of healthcare like food and livelihood security, drinking water, women's literacy, better nutrition and sanitation, and above all, confidence in convergent community action.

Conclusion:

This article conveyed a comprehensive summary of the set-up of Human Resource Management (HRM) in India. The advanced economies of the world are able to endure their powerful place in the world economy due to their strong human resource base. The developing countries should try to reinforce their human resources. India specially being a labor rich country will be able to develop such a durable base without much struggle. The developed countries are already having extremely skilled and refined human resources. But the people of developing countries are not developed and are trying very hard to increase their knowledge and working abilities. The Government of developed countries are not so much burdened with the task of providing good quality education and health care to people. The Multinational

Corporations (MNCs) have various opportunities and the country needs notable investment in capacity-building to attract them. They will also subsidize towards a closer dawn of the era of soft Human Resource Management as a way of structural life that will help accelerate the recognition of the goals of efficiency, productivity, trickle-down effect, and economic prosperity. I conclude this article with these words, when we design for a year, plant corn, when we schedule for a decade plant trees, when planning for life, train and educate people.

References:

1. Anand, Vijay V. & Banu Vijaya C (2011), Employee Engagement: A Research Study with Special Reference to Rane Engine Valve Ltd. (Plant-I), Chennai, India, Journal of Marketing and Management, Vol-2(2), PP. 117-135.
2. Auh S. Menguc, Fisher M. & Haddad A. (2011), The Contingency Effect of Service Employee Personalities on Service Climate: Getting Employee Perceptions Aligned Can Reduce Personality Effects, Journal of Service Research, Vol-14(4), PP. 426.
3. Avery D. R McKay P. F & Wilson D. C (2007), Engaging the aging workforce: The Relationship between perceived age similarity, satisfaction with co-workers, and employee engagement, Journal of Applied Psychology, Vol-92, PP. 1542-1556.
4. B.K. Pradhan & V. P. Ojha (2002), Human Capital Formation and Economic Growth in India: A CGE Analysis, National Council of Applied Economic Research (NCAER), New Delhi.
5. Bakker A. B (2010), Engagement and Job Crafting: Engaged Employees Create their Own Great Place to Work, in Albrecht, S. L. (Ed), Handbook of Employee Engagement: Perspectives, Issues, Research and Practice, PP. 229-244.
6. Bogdány E. Balogh A & Csizmadia T. (2014), Leadership succession and the origin of successor in Hungarian SMEs, Management & Marketing. Challenges for the Knowledge Society, Vol-9, No-3, PP. 283-300.
7. Budhwar P. & Khatri N. (2001), Comparative Human Resource Management in Britain and India: An Empirical Study, International Journal of Human Resource Management, Vol-13(5), PP. 800-826.
8. Debrah Y. McGovern I. & Budhwar P (2000), Complementarity or Competition: The Development of Human Resources in a Growth Triangle, The International Journal of Human Resource Management, Vol-11(2), PP. 314-335.
9. Jyotsnali Chetia (2012), Human Resource Development and the context of India, Karimganj College, Karimganj, Assam, India, PP.202-224.
10. Legge K (1995), Human Resource Management: Rhetoric's and Realities, London, Macmillan Press, PP.105-128.