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RKDF group has been actively involved with social causes since its very inception and has drawn appreciation from one and all for its works in various facets of societal paradigms. The Group started its journey in 1994 by establishing 1st private engineering college at Bhopal, Madhya Pradesh. Now the group has 162 Institutions & 6 Universities (5 in M.P. and one in Jharkhand). The six universities and social society as established by Ayushmati Education are RKDF University, Bhopal (2011), Sri Satya Sai University of Technology & Medical Science Sehore (2014), Sarvepalli Radhakrishna University, Bhopal (2015), Dr. A.P.J. Abdul Kalam University, Indore (2016), Bhabha University, Bhopal (2018), RKDF University, Ranchi (2018).

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## Table of Contents

Sl. No.	Title and Author(s)	Page No.
1.	<b>Prospect and Scope of Pilgrimage Tourism in Jharkhand – An Analysis of Deoghar</b> <span style="display: block; text-align: right;">➤ Baljit Singh Kalsi</span>	01 -08
2.	<b>Fama French Five Factors Asset Pricing Model</b> <span style="display: block; text-align: right;">➤ Vipra Laxmi</span>	09 - 12
3.	<b>Awareness of Computer Skills of Secondary School Students</b> <span style="display: block; text-align: right;">➤ Anjali</span>	13 - 19
4.	<b>Vivekananda’s Concept of Social Reform</b> <span style="display: block; text-align: right;">➤ Bhawna Jha</span>	20 - 24
5.	<b>Socio-Pedagogical Factors for Sustainability Education of English Language Among Technical Students</b> <span style="display: block; text-align: right;">➤ Dr. Anita Kumari</span>	25 - 30
6.	<b>Thermal Performance of Inclined and Transverse Wire Solar Air Heater</b> <span style="display: block; text-align: right;">➤ Dr. Rajeev Ranjan</span>	31 - 39
7.	<b>Determinants of Pangas Catfish Production in Jharkhand</b> <span style="display: block; text-align: right;">➤ Anita Kumari</span>	40 - 52

## Overview

It is our proud privilege to present the Volume 1, Issue – 1 of INTERNATIONAL JOURNAL OF HUMANITIES, ENGINEERING, SCIENCE AND MANAGEMENT (IJHESM), a journal of RKDF University, Ranchi, based on papers selected by our editorial board and advisory committee. This issue brings out the various articles from diversified areas of Commerce, Business Management, Natural Science, Social Science, Mass Communication, Mathematics, Economics, Humanities, Business and Social Ethics, Industrial Relations, Religious Studies, Language, Literature, Information Science, International Relations, Information Technology, Health, Library Science, Cultural Studies, Demography, Women Studies, Environmental Studies, Critical Evaluation and many more. This journal is purporting to provide a podium for Researchers, Academicians and Professionals to publish their discoveries, innovative ideas, reviews on different issues (National and International), critical evaluation and analysis, data interpretation etc. to explore or discover future trends. However, this journal will also endow a forum for diffusion of knowledge on both theoretical and applied research on the above mentioned areas. It is our ultimate objective to make bridge between established theory and its practical application in the related areas of society. Thus the forum speed up and sharpen the trend of research for next generations. It is important to mention here, that our target is to make journal useful and interesting for every stake holders of our society.

We are sure that the contributions by the authors (Researchers, Academicians, and Professionals) shall add value to the research community. We welcome the researchers and scholars to their research findings, facts, suggestions, recommendations and reviews to IJHESM.

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## **Prospect and Scope of Pilgrimage Tourism in Jharkhand – An Analysis of Deoghar**

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### **Abstract:**

In the present era, Tourism is emerging as an important activity and industry with its vital role in the Indian economy. Jharkhand has tremendous potential for sustainable pilgrimage tourism destinations and Govt. of Jharkhand also has been extending every possible help to develop sustainable tourism in the state. The glory of Jharkhand- Deoghar is a prominent pilgrimage destination. With this point of view the present analysis is based on Deoghar. The care has been taken to highlight and cover all aspects in this analysis. It is believed that this analysis will unfold many hidden facts about Deoghar and pave the way to attract domestic and international tourists and ensure livelihoods, employment, prosperity and income generation for the weaker section of the society turning them into stakeholder in various tourism projects which will go a long way for the prosperity of the region and pilgrimage tourism in the state as well.

**Keywords: Pilgrimage Tourism, Deoghar, Babadham, Baidyanath Dham, Jharkhand.**

### **Introduction:**

Jharkhand has a tremendous potential of Pilgrimage Tourism. Jharkhand was earlier considered to be only industrial and business state which was full of natural resources, mines and minerals but anyhow pilgrimage tourism was neglected badly. No efforts were being made properly for the upliftment of the pilgrimage destinations. However, in the name of pilgrimage people used to visit only Deoghar (Babadham) that too in the Shrawan month (July-August) mostly. Rest of the year the visit of pilgrimage tourists was very low. In Jharkhand there are also some very famous pilgrimage sites that attract people from all over the world like - Baidyanath Dham, Parasnath, Rajrappa, Maithan, Basukinath, Liloristhan, DeoriMandir, etc. But now Government and local

bodies have understood the importance of pilgrimage tourism and many steps are being taken by them to increase Pilgrimage tourism.

Babadham (Deoghar) is one of the 12 Jyotirlingas of Lord Shiva. It attracts millions of Hindu devotees in Shrawan month for worshipping Lord Shiva. Not only Babadham (Deoghar) but Parasnath too, situated near to Dhanbad attracts Jain devotees from the different corners of the world. Both destinations have a group of hillocks that attract crowd who are fond of hiking, trekking and adventure in a huge numbers. Other Pilgrimage destinations like Rajrappa and Maithan are also very important and attract many pilgrims and tourists.

Pilgrimage Tourism offers great opportunities for generating revenues, earning foreign exchange and providing employment to people. Presently our country is trying its best to develop pilgrimage tourism in a huge way. Pilgrimage tourism earns over 3.5 trillion worldwide. India's current contribution in global tourist inflow is only 0.37 percent. Pilgrimage Tourism is considered as a representative of peace and worldwide brotherhood and it also helps in protecting cultural manifestations and old monuments and surroundings.

### **Deoghar (Babadham):**

Deoghar district is located in the western portion of Santhal Parganas. It is bounded by Banka and Jamui district in north, Dumka in east, Jamtara in south and Giridih in west. The district contains several clusters of rocky hills covered with forest, but series of long ridges with intervening depressions. The holy city is famous for the Baidyanath Temple (Babadham). The importance of Babadham increases during the month of Shrawan (July – August) when lakhs of devotees, called “Kanwarias” throng the Baidyanath Temple for worship. “Kanwarias” are dressed in saffron color and cover the journey of around 109 km. on foot from Sultanganj to Babadham (Deoghar). They carry the water of holy river - The Ganges from Sultanganj and offer it on Shiva Linga at Babadham (Deoghar). This continues during the whole of Shrawan for 30 days. This is the longest religious fair in the world. People from foreign countries also visit Babadham during Shrawan month. There are 22 temples in the same campus of different God and Goddesses among which Lord Shiva is empowered as being supreme. The temple of Shiva (Baidyanath) is 72 feet tall and it is lotus shaped. Babadham has a legend that it was established by the Demon King Ravana.

Deoghar city is well connected by road and rail and easily accessible from any part of the country. However, apart from pilgrimage tourism Deoghar is a perfect place for pleasure and adventure tourism too. The city of Deoghar and its nearby area is also full of many exciting tourist destinations, where tourists may enjoy Trekking, Ropeway, Wildlife Adventures and a safe natural retreat. Apart from this many Ashrams are there which are famous in the world for its Meditation Camp. It has a huge potential to develop domestic and international tourism.

### **Positive Impacts:**

The biggest positive impact the Pilgrimage Tourism has the creation of job opportunities. Local people are employed in a mass level directly and indirectly in different jobs related to pilgrimage tourism like – Pooja Shops, Flower Shops, Sweet (Prasad) Shops, Monuments and Handicraft Shops, Toys and Gift Shops, Restaurants and Dhabas, Lodges and Paying guest houses, Travel Agencies and so on. It gives birth to many commercial activities and opens up new possibilities of ventures. It attracts the new investors in the city to invest which apart from providing job opportunities to locals also increases the revenue for the city/state. Foreign exchange is one of the factors which also immerge. Many private companies increase the job opportunities by investing in that area by building well-equipped Hotels, Restaurants, Entertainment houses etc. It is only possible when a particular Pilgrimage Spot is identified with its potential to attract more tourists. State Government, Private Companies and Local Bodies all play a very important role in identifying and developing a particular area.

Another positive impact is the development of that area since government provides funds for its development and improvement by - making roads and railway station and connecting it with other parts of the country; making proper sewerage and ensuring supply of drinking water; putting the street lights; proper disposal and waste management system; proper parking place; installing sign boards (where necessary); making parks; systematically constructed shops; making tourist help centers; making guest houses; bus stops and so on. It also helps the municipal councils to earn the revenue by vehicle entry and parking charges and other tourist taxes. This increases the revenue and foreign exchange for that particular area and state as tourist spending provides the necessary income for preserving and managing places of attraction.

**Negative Impacts:**

Pilgrimage Tourism has multiple negative impacts too. It puts the extra burden of increased expenses on the budget of municipal councils of town in terms of cleaning and safely disposal of garbage, water arrangement and its disposal, lightening, sanitization, providing market place for vendors and so on. It destroys the ecological environment of the city since, the natural resources are consumed rapidly. The movement of vehicles, smoke coming out of the chimneys of hotels, restaurants, generators etc. increases in those areas which creates huge air pollution. In the name of development trees are cut for constructing roads, parks, commercial buildings and hotels etc. and the atmosphere does not remain pleasant any further as it ought to be. This destroys the carrying capacity of the city/spot if the planning is not done properly.

The price of land and buildings increases as soon as development starts taking place and flow of tourist increases in such areas since, investors want to occupy the prime location which is suitable and perfect for their business venture. Retailers and suppliers also increase the prices of their products/services to earn more profit since, mostly tourists have the paying capacity and they pay for it, what is demanded. The price hike of products/services creates dissatisfaction and a gap between tourists and locals. The local people then generally develop the feeling of biasedness towards tourists. Hence, the pricing strategy should be made keeping in mind the locals and their paying capacity.

Another major negative impact is the fickle market. Since, in most of the cases religious/pilgrimage tourism is seasonal and people gather at spot during fixed period of time to celebrate an occasion, due to this the most of the marketers are fickle. They put/install temporary shops only during the particular occasion and do not get a proper business round the year. They try to earn maximum profit from tourists/devotees out of these occasions only.

It puts negative impacts on the transportation services too i.e. on railways and buses. People of the same shrine from different parts of the country want to take participation in such religious events and travel to a particular destination; a huge rush is found in transportation services, especially in railways and buses, which creates the problem of non-availability of berths/seats for other passengers.

**Economic Impacts:**

First and most obvious impact of pilgrimage tourism is through the visitor's/devotee's contact with the religious institutions at the destination on their visit. However, holy sites are surrounded by religiously/commercially oriented businesses and facilities such as – pooja shops, flower shops, sacrament shops, souvenir shops, hotels, restaurants, travel agencies, and even medical shops etc. providing employment to the host community. The sale from these shops brings in considerable revenue to the host community, as is the case in Babadham (Deoghar). Deoghar earns Rs. 2500 Crore in 30 days during the Shrawan Mela. The month long earnings keep the district alive and kicking throughout the year or almost. According to a survey, around 50 lakh devotees (Kanwariyas) visit Babadham per year and on an average a devotee spends around Rs. 5000. The numbers of devotees (Kanwariyas) is increasing every year and bring more money and revenue. The “Pedas”, the main sacrament (Prasad) of the festival, bring over Rs. 70 to 80 Crore alone. Around 700 temporary shops come up during the Shrawan month only. The transport business is well over Rs. 100 Crore. The food business contributes over Rs. 100 Crore. The flower business is also attractive and earns over Rs. 5 Crore during the season as all devotees purchase flowers necessarily. Apart from it thousands of shops of confectioners, toys, garment, tea, snacks, utensils, stationary items, etc. have come up around the Babadham Shrine. The district transport department collects around Rs. 1.5 Crore from toll taxes in a month. Pilgrimage Tourism has now become a big business and is one of the fastest growing segments in the tourism industry today.

**Socio - Cultural Impacts:**

Pilgrimage Tourism can be used as a technique of social and cultural conservation and revitalization. It helps to improve the living standards of people and improves the facilities and services among the community. It also improves the sense of pride among the host population or a sect of shrine about their culture when they find devotees/pilgrims coming to their city/town from different corners of the country or world. It also preserves the pilgrimage shrine, surrounding, and historic sites and develops and maintains museums, theatres and/or cultural centers and events, traditional dances, music, drama, arts and handicrafts unique to the area etc. which helps to earn the huge revenue and financial support for that area by tourist admission fee.

Density of population is also affected drastically of pilgrimage spot and increases the active participation of locals and social organizations towards the facilitation and servicing of tourists/devotees. It also gives birth to the quality education and educates local residents about tourism and its benefits.

### **Conclusion:**

- ❖ Deoghar has huge potential of pilgrimage tourism.
- ❖ 92% people admit that pilgrimage tourism motivate them to travel.
- ❖ 60% people admit that host population will be directly benefited by developing pilgrimage tourism.
- ❖ Pilgrimage tourism creates a lot of job opportunities for the host population and thereby increasing the per capita income.
- ❖ It uplifts the living standard and social status of the host population.
- ❖ It leaves a positive impact on the culture of city and helps in widening of the mentality of the resident people.
- ❖ Pilgrimage tourism attracts new investors in the city to invest which is ultimately raising the job opportunities for people and adding on the infrastructure of the city.
- ❖ It helps in revenue generation for the State Government.
- ❖ Deoghar and its nearby area is full of many exciting tourist destinations which attracts tourists throughout the year.

### **Recommendations:**

- ❖ Well managed pilgrimage destination/spot is important for attracting more tourism.
- ❖ Infrastructure, facilities and services for pilgrimage tourists need to be increased in such destinations like - Deoghar.
- ❖ Quality No. of rooms for accommodating pilgrimage tourists are not sufficient in Deoghar especially during peak season. It needs to be improved.
- ❖ Sometimes pilgrimage tourism creates dissatisfaction and gap between locals and tourists. Hence, local people should not be deprived of the basic facilities. State Government and local authorities need to work out and take proper remedial steps.
- ❖ Pilgrimage tourism is destroying the ecological environment of the Deoghar city especially during Shrawan month when there is huge rush. Main problem is garbage disposal and

excess utilization of natural resources like water. It needs to be taken care of on a serious note.

- ❖ Protection of local culture and custom is very necessary for pilgrimage tourism. Cultural activities are required to be organized to pull more tourists to Deoghar.
- ❖ 90% people realize the need of an airport in the Deoghar. Recently Government has announced the opening of a domestic airport in Deoghar in coming years, which is a commendable step.
- ❖ More special trains and buses should be operated for Deoghar, especially during Shrawan
- ❖ Government should plan, promote and execute more attractive packages to allure more tourists to Deoghar.
- ❖ There is need to construct more Government accommodations, Hotels, Yatri Niwas, etc. to cater to the huge rush of the tourists.
- ❖ Government should pay attention towards increasing Trekking, Wildlife adventure, Mountain climbing etc. activities around Deoghar city to attract more tourists. As of now only Ropeway is being operated at “Trikut Pahar” but that is not enough since, tourists always look for more attractions.
- ❖ Government should also pay attention towards proper security of the tourists as during the peak season like - Shrawan and other festivities when there is a huge crowd, a number of cases of theft and vandalism is recorded.
- ❖ More Tourist help centers are required to be opened in and around Deoghar city
- ❖ Deoghar is famous for Woodcrafts, Metal works, Stone carvings and ornaments, tribal handicrafts, bamboo items, etc. but there is no proper market for the vendors. They sell their items on the roadside. Government should construct a proper market for them.
- ❖ Government should provide more and adequate medical facilities to tourists/devotees especially during Shrawan month when millions of devotees come to Deoghar. Government should always be ready to handle any outbreak of pandemic/epidemic during peak season, which is still lacking.

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# Fama French Five Factor Asset Pricing Model

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## Abstract:

In 2015 Fama and French proposes a five-factor model by adding profitability and investment factors to their three-factor model. Fama and French Five factor model outperforms the three-factor model previously proposed by Fama and French (1993). Many researchers find that five factor model explains assets pricing anomalies better than the range of competing assets pricing models. But the main problem with five-factor model is its failure to capture the low average returns on small stocks whose returns behave like those firms who invests a lot despite low profitability. The model's performance is not sensitive to the way its factors are defined.

**Keywords:** Fama and French three-factor model; Fama and French five-factor model; Capital assets pricing model; Dividend discount model; Profitability; Investment

## Introduction:

From long time the relationship between the risk and return is topic of discussion and research. Financial Economics there is concern that how estimating assets returns. Different models and methods have been developed over the year for pricing securities and determine the return on our capital investments. In the beginning of 1964 Capital Assets pricing model, which is also known as single factor model has been developed. The single factor was beta which states how much price will move as compared to the market. Higher the Beta it means that the stocks have moved more than the market and thus higher the risk higher the return (Demuth, 2014).

In 1993 Fama and French three factor model came with its two additional factor size and value. This three-factor model was significant improvement in CAPM model over the period. It expands the capital assets pricing model by adding size risk and value risk factor in CAPM. This model considers that small- caps stock and the value outperform the markets on a regular basis.

The traditional capital assets pricing model uses only one variable to describe the returns of a portfolio or stocks with the return of the market. Fama and French uses the three variables and observed that two classes of assets (i) small caps and (ii) stock with high book-to- market ratio are performed better than market. Then they added the two factors to CAPM to reflect a portfolio's exposure.

Two alternatives are available to estimating the assets return: Single Factor model or capital assets pricing model (CAPM) by Sharpe (1964) and Linter (1965), and the second one is the Three Factor Model suggested by Fama and French (1992). CAPM model explains stock returns as a function of market return. Fama and French model is alternative of CAPM model.

### **Application of Five Factor Model:**

Nobel Laureate Eugene Fama and researcher Kenneth French, attempted to find out the measure of market returns, and research found that value stocks outperform growth stock. Similarly, large-cap stocks outperformed by small- cap stocks. The Fama and French model has three factors: size of the firm, excess return on the market and book-to- market values.

Lot of debate exists about outperformance tendency that weather that is due to market efficiency or inefficiency. In support of market efficiency, outperformance is excess risk faced by value and small- cap stocks because of higher cost of capital and greater business risk. While incorrectly pricing of these companies, which provides the excess return in the long run as the value adjusts, supports the market inefficiency.

Fama and French use the dividend discount model to get two new factors, investment, and profitability (Fama and French, 2014). The five-factor model aim to explain average returns on portfolios. Firstly, the model is applicable on portfolios formed on size, B/M, profitability, and investment. Secondly the five-factor model has been comparing with three factor model's performance to explain the average return associated with major anomalies not targeted by the model (Fama and French, 2014).

The results show that Fama and French five factor model explains between 71% and 94% of the diversified portfolios return. Five-factor model captures the size, value, profitability, and investment patterns in average stock returns performs better than the three-factor model. The new model shows that highest returns companies can attain weather the company is small,

profitable and company has no major growth prospect. However, the setback of five factor model is momentum factor was not included in the model. Foye (2018) tested the five-factor model in the UK and raises some serious concerns. five-factor model in the UK and raises some serious concerns tested by Foye (2018).

### **Fama and French Five factor model formula:**

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + e_{it}$$

$R_{it}$  = Expected rate of return in the t

$R_{ft}$  = Risk-free rate

$R_m - R_f$  = Return spread between the capitalization weighted stock market and cash

SMB (Small Minus Big) = Historic excess returns of small-cap companies over large- cap companies

HML (High Minus Low) = Historic excess returns of value stocks (high book-to-price ratio) overgrowth stocks (low book-to-price ratio)

RMV = Return spread of the most profitable firm minus least profitable firm CMA = Return spread of the firm that invest conservatively minus aggressively.

This regression test observe whether the five-factor model captures average returns on the variables and which variables are positively or negatively correlated to each other and additionally identifying the size of the regression slopes and how all these factors are related to and affect average returns of stocks values.

Fama and French done the test (Fama and French.2014) shows that the value of HML redundant for describing the average returns when in the equation profitability and investment factor has been added, but if portfolio tilts are also of interest in addition to abnormal returns then the five-factor model is best to use.

### **Limitations:**

- ❖ There is no clarity whether HML and SMB capture risk or just persistent mistakes by investors
- ❖ Its Ignores the Momentum and Low Volatility

- ❖ It is unlikely to lead to academic consensus
- ❖ Alternative models who are competing five- factor model is already being proposed

### **Conclusion:**

The five-factor model has yet to improve compared to previous models. There is lot of room to develop further new models in the future. Most of investors still use the famous three factor model. Until this method proves itself in the empirical evidence it would be in the best interest for the investors to use the other factor models.

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# **Awareness of Computer Skills of Secondary School Students**

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## **Abstract:**

Computer Skills are the ability and knowledge needed to perform specific tasks with the help of Computer. Different skills like typing, mouse handling, Internet using, Email, working on MS-Office, Multimedia, Databases and Programming. The objectives of the study were to find awareness of computer skills of secondary school students on the basis of gender, locality, medium and types of school. The methodology used in the study was survey methods with self constructed and validated tools, 303 samples were collected with the help of purposive sampling technique from Secondary school students of Patna and Bhojpur. The data was analyzed by using t-test. The findings of study were : There is no significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of gender, locality and types of school. On the other hand there is significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of medium.

**Keywords:** Awareness, Computer Skills, Secondary School Students

## **Introduction:**

### **Education**

Education is the way by which we can enlighten ourselves. It is the medium that could bring a change in our society. Education consists of knowledge, skill, attitude, aptitude, application, understanding and transmitting about good things.

Education works as a dynamic force by which we can understand about the present situation, adjust to the situation and develop our views towards our life and other person.

Education has been defined by many scholars and scientists in the following ways :-

“By Education I mean an all round drawing out of the best in the child and men body mind and spirit.”(Mahatma Gandhi)

## **Computer Skill**

Today we can get the information of not only our region but also of different states countries and about the world within a second by using internet or Technology.

Computer skills fit into two categories hardware and software.

**Hardware skills** allow you the physically operate a computer. Hardware skill can be so simple like knowing how to turn on device and how to turn off device. They might be also involved more complex task like connecting machines to networks changing parts or fixing broken devices. For these complex tasks, many employers higher trained technician with advanced computer skills.

**Software skills** help you to efficiently used computer program and application. There are some software skill that employer may considered as prerequisite to employment

## **Significance of the study:**

Computer works as a tool for sharing, storing, retrieving and receiving of information. It is a medium which makes our work easier. Computer also works as a helper/supporter as well as facilitator of the students and teachers

Teacher can make their teaching effective by the use of computers. Computer skills are very important for any person who wants to update or upgrade himself. Computer skills have direct relation with the teaching methodology, delivering of content, student understanding and level of retention by students. It makes our subjects and topics easy.

## **Review of the Related Literature:**

**Preety, (2012)** has studies on “A study of the Impact or the use of ICT on Achievement”. The major findings were:

- ❖ ICT group scored significantly better as compared to the traditional group.
- ❖ The immediate and delayed retention of the ICT group was higher than the traditional group.
- ❖ There was approximately equal loss in achievement in both the groups when delayed scores were analyzed.

**Shahla, (2012)** conducted a research on Use of ICT and Constructivist Learning Theory. The major Findings were:

- ❖ ICT is seen to support and encourage constructive teaching and learning.
- ❖ It increases the participation in a social process of knowledge construction.
- ❖ ICT also provides the scaffolding for learning.

**Ignatius & Shushil, (2012)** studied on ICT Awareness Among Secondary School Teachers of Patna. Major findings of the study were:

- ❖ There are significant differences between male and female, graduate and post graduate, trained and untrained, married and unmarried secondary school teachers.
- ❖ The secondary school teachers of Patna are well aware of the use of ICT in their today teaching learning process.

### **Statement of the problem:**

Awareness of Computer Skills of Secondary School Students.

### **Operational Definitions:**

**Awareness:** The ability to directly know and perceive, to feel, or to be cognizant of events. The state or condition of being aware; having knowledge; consciousness.

**Computer skills:** The ability to use computers and related technology efficiently, with a range of skills covering levels from elementary use to programming and advanced problem solving.

### **Objectives of the study:**

To find awareness of computer skills of secondary school students on the basis of gender, locality, medium and types of school.

**Tools Used:**

Self constructed and validated tool on Awareness of Computer Skills

**Method Used:**

Survey Method was used for this study.

**Population of the study:**

All Secondary School Students of Patna and Bhojpur.

**Sample:**

303 secondary school students of Patna and Bhojpur.

**Statistical Techniques Used:**

Mean, SD, t-value.

**Delimitations of the study:**

- ❖ The Population is secondary schools students of Patna and Bhojpur.
- ❖ Survey method is used in the present study.
- ❖ 303 students of secondary school have been taken for data analysis.
- ❖ Study is limited to only class 9<sup>th</sup> students.

The researcher has used only one variables i.e. Awareness of Computer Skills

**Null Hypothesis:**

- ❖ There is no significant difference between the mean scores of secondary school students in their level of awareness of computer skills on the basis of gender.
- ❖ There is no significant difference between the mean scores of secondary school students in their level of awareness of computer skills on the basis of locality.
- ❖ There is no significant difference between the mean scores of secondary school students in their level of awareness of computer skills on the basis of medium.
- ❖ There is no significant difference between the mean scores of secondary school students in their level of awareness of computer skills on the basis of types of school.

## Hypothesis Testing:

**H<sub>0</sub> 1** There is no significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of gender.

**Table No 4.11**

### Gender wise awareness Computer Skill of Secondary School Students

Gender	N	Mean	Std. Deviation	t- value	p-value	Remarks
Male	155	168.89	23.305	.224	.823	NS
Female	148	168.33	20.008			

(At 5% of level of significance, the table value of 't' is 1.96)

It is inferred from the table that the calculated 't' value of the above table is 0.224 which is less than the level of significance at 5%. Hence the null hypothesis is accepted. Therefore, there is no significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of gender.

**H<sub>0</sub>2** There is no significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of locality.

**Table No 4.12**

### Locality wise awareness Computer Skill of Secondary School Students

Locality	N	Mean	Std. Deviation	t value	p value	Remarks
Urban	149	169.67	22.272	.327	.744	NS
Rural	154	167.60	21.201			

(At 5% of level of significance, the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value is .327 which is lesser than critical value of 1.96 at 5% level of significance. Hence, we accept the null hypothesis. Therefore, there is no significant difference between the mean score of secondary school students in their awareness of computer skills on the basis of locality.

**H<sub>03</sub> There is no significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of medium.**

**Table No 4.13**

**Medium wise awareness Computer Skill of Secondary School Students**

Medium	N	Mean	Std. Deviation	t value	p value	Remark
Urban	169	171.45	21.041	2.468	.014	S
Rural	140	165.32	22.112			

(At 5% of level of significance, the table value of 't' is 1.96)

It is inferred from the table that the calculated 't' value is 2.468 which is more than critical value 1.96 at 5% level of significance. Hence, we reject the null hypothesis. It means that there is significant difference in the mean score of secondary school students in their awareness of Computer Skills of on the basis of medium.

**H<sub>04</sub> There is no significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of types of school.**

**Table No 4.14**

**Types of School wise awareness Computer Skill of Secondary School Students**

Types of School	N	Mean	Std. Deviation	t value	P value	Remarks
Govt.	170	170.07	21.878	1.318	.188	NS
Private	133	166.76	21.462			

(At 5% of level of significance, the table value of 't' is 1.96)

It is inferred from the table that the calculated value 't' is 1.318 which is less than critical value 1.96 at 5% level of significance. Hence, we accept the null hypothesis. Therefore there is no significant difference in the mean score of secondary school students in their awareness of Computer Skills of on the basis of types of school.

## Conclusion:

As a conclusion we have following results:

There is no significant difference between the mean scores of secondary school students in their awareness of computer skills on the basis of gender, locality and types of school. On the other hand there is significant difference between the mean score of secondary school students in their awareness of computer skills on the basis of medium.

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## **Vivekananda's Concept of Social Reform**

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### **Abstract:**

Swami Vivekananda was a great thinker and reformer of India. He was an Indian Philosopher of the modern times. He introduced Indian Philosophy of Vedanta. He focussed on the practicality of the theory and believed in Karmayoga. Vivekananda applied Philosophy of Advaita Vedanta to build humanity and spirituality. He believed in learning from the past mistakes and going forward from the good. He was against the “Caste system” and the “Practice of untouchability”. Vivekananda believed in ‘Gender Equality’ and ‘Education of Women’ as an instrument for human betterment. According to him, strength is goodness, weakness is sin. So he emphasised on the proper care of the body and healthy development. He stressed on reorientation of the Education System and the integrated development of the human personality in the order: body, mind and heart. He wanted to abolish poverty and remove mass illiteracy. Vivekananda wanted to bring social change through Spirituality and Vedanta.

**Keywords:** Advaitin- A follower or proponent of the Advaita Vedānta tradition, Jnana Yoga- yoga of the mind or intellect, Puranic- Derived from Purana, Karmayoga- The path to reach moksha (spiritual liberation) through work ,Daridra-Narayana- service to the poor is equivalent in importance and piety to service to God, Bhakta- A devotee of God Bhakti- Devotion, Vedantists-Follower of Vedanta, Rishis- Saints

### **Introduction:**

Swami Vivekananda was a great thinker and reformer of India. He did not teach religion as a water-tight compartment. He treated religion as co-extensive with life and wanted it to influence the social and economic ideals of the people and their daily conduct and activity. According to Vivekananda, theory must be practical and if it is not, it has no value. The Vedanta, therefore, as

a religion must be intensely practical. The ideals of religion must cover the whole aspect of life, and it must enter into our thoughts and be put more and more into practice. Vivekananda called his religion Practical Vedanta. For Vivekananda, both Socialism and Practical Vedanta have some common elements like Democratic Socialism and Gandhian Socialism. Intellectually, Vivekananda was an Advaitin and a votary of Jnana yoga but emotionally he was a Bhakta deeply influenced by the dualistic interpretation of the Vedanta. His heart was moved by what he saw and responded to the overwhelming need of his people for economic and social betterment. He got very angry at the social system when he came into contact with the Indian masses, their poverty, illiteracy, superstitions and social degradation. His distress at what he saw was heightened by his Puranic concept of Bhakti which identified love for God with love for all human beings. His belief in Karmayoga gave him the strength to look up to incessant work in the service of the poor as the motivation for all work. He was convinced that God was not someone to be sought for from outside this world. In fact, God was manifested in all human beings. He was sure that serving was the best way of finding him.

### **Subject Matter:**

Vivekananda spent his life on this earth seeing missionaries who would fight as soldiers for the abolition of poverty and for the service of the Daridra-Narayana as their way of worship of God. Vivekananda's concept of social reform showed itself in his formulation of the ideal of the patriotism. He was immensely proud of the country's Philosophical and Cultural heritage but on the other side he was also fully aware of the disastrous results it had produced on the condition of the Indian masses. His patriotism was the great love for his people. According to him, Patriotism needs three things for its practical implementation. One is the passionate love for masses, second is the finding of practical solution for their problem instead of reforms on paper, and the third is the strength of will to overcome the obstructions to the implementation of these solutions. He however, did not believe in big change but he recognised that the past was a mixture of both good and evil and one should learn from the past mistakes and go forward from the good. Vivekananda's concept of social reform covered the Social system and the need for its reconstruction to enable the masses to play their rightful role in society. He believed in retaining the nation's pride in its past and the self respect it engendered. He was most concerned with the institution of caste which he disliked intensely but continued to exist because of the mistaken

notion of reforms that caste was a religious institution. Vivekananda stoutly denied the thesis of religious sanction for the Caste system. The Caste system is opposed to the religion of the Vedanta. Caste is a social custom and all great preachers have tried to break it down. The fact is that Vivekananda was denouncing caste even if it was based on merit and shows how his Vedanta was moving him in the direction of what have called Vedantic socialism. Vivekananda was staunch opponent of privilege in any form and took caste as the supreme illustration of the doctrine of privilege. There were bound to be variations in the physical, mental and spiritual abilities of different human beings, but this gave no right for special privilege for those who had more of any such ability. None can be Vedantists and at the same time admit of privilege to anyone, either mental, physical or spiritual. The same power is in every man, in one manifesting itself more and in the other less, the potential is in everyone. The work of the Vedanta is to break down all these privileges. The practical Vedanta preached more radical in its implications for human relations and its relevance for India today is even greater than when he preached it so many years ago. Vivekananda was also a strong advocate of giving women their rightful place in the society by removing their backwardness. He started a math for women disciples. He indicated the scriptures that stated that women were not competent for knowledge and devotion. On the contrary, during Vedic times, women like Maitreyi, Gargi and others had taken the place of Rishis through their skills in discussing about the Brahman. According to him “Daughters should be supported and educated with as much care as the sons”. Unless the conditions of women are bettered in India, the country will remain backward. He wanted to provide equal educational opportunities to women as well. It should be for them to choose their role in life and not for men to decide their role. Thus, Vivekananda used his Vedantic Philosophy to drive home his advocacy of equality and independence for women, giving them education, removing their backwardness and giving them the opportunity to play their rightful role in society.

Vivekananda believed that Education was an instrument for human betterment. He pleaded for Universalisation of literacy, development and of mass education. He wanted a thorough reorientation of the educational system, in order to make it an integrated man making and character building system, with emphasis on pride in national heritage, love for the masses, self confidence, strength and will power. He also laid stress on the proper care of the body and

healthy development of one's physique. He was not satisfied with an education that merely looked to the development of the body and mind of the student. He attached the greatest importance to the development of compassion and fellow feeling for the common man. Vivekananda also laid stress on the development of fearlessness in the young, because for him fear is the greatest enemy of development. For him, strength is goodness, weakness is sin. Education should free the individual from the fear of the powers that be or of the unknown.

Vivekananda also emphasised the importance of the teacher winning his pupil through personal interest and affection and building up his self confidence. His own life was a wonderful example of what an ideal teacher can do to a difficult disciple. He knew that self confidence was more than half the secret of success in life and it required careful and sympathetic nurturing at an early age. The prime goal of education should be to educate the masses particularly, the rural masses. Use of the intellect rather than accumulation of information, concentration rather than memorising, integrated development of the human personality in the ascending scale of the body, mind and heart, cultivation of fearlessness in pursuit of truth and compassion, science instead of superstition and absorption of spirited message of the Vedanta that all man are divine and it only needs will, strength and effort to realize their divinity is the message to those who seek education. Vivekananda was not a blind patriot nor was he an upholder of the status-quo in social institutions. He wanted the individuals to awaken themselves and be assertive. He knew that social change could not come without the stimulus of individual thought, so he advocated an Educational system that would develop the thinking power. He was also aware that intellectual development may stimulate change. He knew that change would not get implemented without organisation and character. It was his love for the country and the desire to see the change in the right direction that led him to undertake a fearless analysis of its national weaknesses of character and organisation.

Vivekananda gave a number of wise and practical suggestions for promoting the efficient working of the organizations which he wanted his countrymen to build. He writes "Skilful management lies in giving every man work after his own heart". The thought that Vivekananda presented on organizational efficiency, hold as good today as when it was formulated. According to him first make the people of the country stand on their legs by rousing their inner power, let

them learn to have good food and clothes and plenty of enjoyment then tell them how to be free from this bondage of enjoyment. If their material wants are not removed by the rousing of intense activity, none will listen to words of spirituality. He wanted material betterment first and was content to bring religion later. That is why he called his religion practical Vedanta or Vedantic socialism. He was a believer in human development, material development and the goal of development was the perfection of man. His stress was on the individual rather than on society. But he was not thinking of individual in isolation but always talking of the individual in society and in relation to society. According to Vivekananda development should include both materiality and spirituality. He believed in growth and evolution.

### **Conclusion:**

Vivekananda's merit was that he campaigned for the abolition of poverty and the same is being practiced today. He pleaded for the removal of mass illiteracy and today it has become a part of the Government's programme. He spoke up for the up-liftment of backward classes and today the same has become the general slogan for all political parties.

Vivekananda was ahead of his time in his concern for social change. His concept of social reform was based on the conduct and character of the Indian masses and rousing of spirituality through the new interpretation of the Hindu concept of Vedanta. Vivekananda wanted special changes but the engine of social change must have its proper fuel. This will only come from Spirituality and the Vedanta which proclaimed the innate divinity in man and the sameness it gave all men as the basis for the social ethic of non-exploitation and universal human welfare.

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## **Socio-Pedagogical Factors for Sustainability Education of English Language Among Technical Students**

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### **Abstract:**

In the present scenario, professional engineers certainly need effective and impressive communication skills. There is a great need to frame course materials to enhance LSRW (listening, speaking, reading, and writing) skills of engineering graduates. The integration of LSRW skills within subject modules will provide ample opportunities to professional engineers. It should be incorporated throughout the engineering program. Therefore communication skills programs in engineering colleges should be revamped to suit the requirements of the curriculum.

**Keywords: Effective and impressive, LSRW, Ample opportunity, Revamped, Curriculum**

### **Introduction:**

It has been observed that the growth of engineering and technical education in India has been fragmented by a regional imbalance with a greater number of colleges in the eastern region, including the state of Jharkhand. Indeed the state of Jharkhand has always been at the forefront of education, technology, agriculture, and industrial development at the national level. The majority of the students enrolled in engineering and technology courses in the state came from non-English speaking backgrounds and they need to improve their communication skills. Over the last four decades, India has embarked on a massive expansion in the sector of engineering and technical education and the nation presently faces many challenges due to rapid growth in unemployment. This is primarily due to exponential growth in the number of engineering institutions in the country, as well as lack of proper linkages between industries & universities. The exponential growth of technical education in India in general, and in the state of Jharkhand

in particular has raised many quality concerns. It has been observed that students after finishing their diploma face several problems at the time of recruitment, such as lack of knowledge of interview techniques, insufficient written and oral communication skills, expression of knowledge gained, among other aspects.

Despite gaining higher scores during their studies, students often encounter problems during industrial selection procedures; a lack of communication skills is one of the reasons for this.

### **Objective:**

- ❖ To find the relationship between language skills, language aptitude and verbal
- ❖ The intelligence of the selected engineering college students.
- ❖ To find the influence of socio-economic factors of family, the influence of the college environment, and the influence of personality traits in language skills of engineering college students.

To study the influence of pedagogical factors such as study habits locus control, learning approaches, living style, and learners' effectiveness on the language of the students.

### **Methodology:**

The study was designed to address the following two main questions:

- ❖ What are the main speaking difficulties encountered by Engineering and Polytechnic Students of Jharkhand?
- ❖ What are the factors that contribute to the existence of these speaking difficulties?

### **Population & Sample:**

The present study is a case study of two Engineering colleges and two polytechnic colleges of Jharkhand. The population consisted of 1st-year students of two Engineering & Polytechnic College and Four English teachers.

### **Research Instruments:**

Three instruments were used in the present study and they are lesson observations, interviews, and curriculum analysis. Class observations were conducted and field notes were taken to find more about the speaking difficulties that are encountered by Polytechnic students in an actual classroom situation.

Four interviews were conducted, two of which with polytechnic students and 2 of which with 1st year Engineering students. The interview is aimed to find more about students' beliefs regarding the factors that cause difficulties for students when trying to speak in English.

Curriculum analysis of 1st year Engineering and Polytechnic education, Analysis of syllabus, and textbook are done to find out the role that curriculum may contribute to the problem of speaking difficulties.

### **Factors that cause speaking difficulties to EFL learners:**

The environment and family background play a vital role in the success of the learning process. For example, a state like Jharkhand, where the majority of the families are not adequate. Hence, the parents are not interested in giving a good educational background to their children. In contrast, they are willing to engage the children in some jobs to earn money. This is the very basic reason and the affecting factor is teaching. Attitude is yet another affective factor in teaching. Attitude is yet another affective factor in learning a second language. Attitude is the way that you think and feel about something. The successful acquisition of a second language seems to be some extent, contingent upon learners, views of the language, learning environment, the learning situation, and how they view the target language and its speaker.

Speaking remains the most difficult skill to master for the majority of English learners, and they are still incompetent in communicating orally in English. These are many factors that cause difficulty in speaking and they are as follows:-

- ❖ Inhibition: - students are worried about making mistakes, fearful of criticism, or simply shy.
- ❖ Nothing to say: - students have no motive to express themselves.
- ❖ Low or uneven participation: - Only one participant can talk at a time because of the large classes and the tendency of some learners to dominate, while others speak very little or not at all.
- ❖ Mother-tongue use: - Learners who share the same mother tongue tend to use it because it is easier and because learners feel less exposed if they are speaking their mother tongue.
- ❖ Lack of Motivation:- Learners who lack the motivation to speak English, they do not see the real need to learn or to speak English. They do not see the real need to learn or speak English. Actually “motivation is the crucial force which determines whether a learner embarks in a task at all, how much energy he devotes to it, and how long he preserves.”

Besides, pointed out there are many factors that cause difficulties in speaking English among EFL learners. Some of these factors are related to the learner, the teaching strategies, the curriculum, and the environment. For example, many learners lack the necessary vocabulary to get their meaning across, and consequently, they cannot keep the interaction going.

### **Reasons:**

The foremost reason for the above-mentioned factors that cause difficulties to EFL learners in Jharkhand state is the lack of proper exposure. Many students are from rural and tribal areas of the state where they hardly get proper exposure for developing their language skills. Even in urban areas, the exposure is limited. In school education, English is taught rather as a subject than a language. The syllabus up to SSC is designed to develop four basic skills of English but students hardly develop these skills even if they pass the examination with good marks in English.

Another reason is many students who secure admission in polytechnics are from Hindi schools, so they are not accustomed to English medium schools are fluent in English. They have developed their speech but many grammatical errors can be observed in their speech as well as in writing. Their pronunciation is not proper either.

It is also true that they do not get motivation from their school teachers whose primary task is to finish the syllabus in stipulated time. In our school, the emphasis is laid on the teaching process, not on the learning process.

The role of the Government of Jharkhand also needs to be taken into consideration. In Jharkhand English was neglected for a long time. One could complete graduation without studying English as one of the subjects. As a result of this, there was a lack of a suitable atmosphere of English in the state. The students learn more from the atmosphere rather than studying the rules of grammar. English speaking people are rare in the state. Now the state government has realized the necessity of developing English communication skills and English subject has been made compulsory in SSC and HSC examination.

### **Solutions:**

To overcome the above-stated difficulties, grass-root level changes are required. The level of English in Jharkhand state will improve not only by changing the syllabus. It is highly necessary to create awareness among school children about the need and importance of learning the

English language for their future. The frequent teacher's training program should be arranged to develop the competency of the teachers and to make them aware of the latest trend of teaching. The present syllabus needs to be changed as it is outdated. In place of technical passages, interesting stories and novels should be introduced so that English sentence structures can be taught through literature and it is an easy task for the teachers to maintain interest in the classroom.

Competitions like elocution, essay writing, quiz, group discussion, seminar, report writing should be arranged frequently in polytechnics to apply the basic skills of the language. Students should be encouraged to participate in such competitions.

Separate classes of general English should be arranged after regular classes for the students who are from the tribal belt and also from rural areas of the state or who have poor communication skills.

The teachers who speak English in polytechnics must explain to the students the importance of the subject for their future and how communication skill is helpful in the industrial as well as other organizations. A language lab should be established in all polytechnics and communication practice should be given to the students by using the software in the language laboratory.

In short, the management also should take interest and an atmosphere of English must be created in all polytechnics of state. All teaching faculties should be compelled to use English for teaching and must be given instructions to motivate the students, to use the English language for conversation. If the management succeeds in creating a suitable atmosphere for English, the students will undoubtedly develop good communication skills.

### **Conclusion:**

English communication skills are recognized as an important element in the academic life and career of the engineering students. It requires making use of integrated methods to facilitate advanced communication skills, which is the demand of industry as well as society.

The rural area engineering students should effectively make use of the faculty, education system, and the amenities provided to them in combination with the self-efforts, to emerge as a competent user of English communication to become successful in life and career.

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# Thermal Performance of Inclined and Transverse Wire Solar Air Heater

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## Abstract:

This paper presents an analytical investigation on the been carried out to study the heat transfer and friction characteristics by using a combination of inclined as well as transverse wire on the absorber plate of a solar air heater. The Analytical investigation encompassed the Reynolds number (Re) ranges from 3000 to 14000, relative roughness pitch (p/e) 10–30 and relative roughness height (e/D) 0.0135-0.0225. The effect of these parameters on the heat transfer coefficient and friction factor has been discussed in the present paper and correlations for Nusselt number and friction factor has been developed within the reasonable limits. A procedure to compute the thermal efficiency based on heat transfer processes in the system is also given and the effect of these parameters on thermal efficiency has been discussed .transverse wire has been used to enhance heat transfer coefficient. By providing artificial roughness it has been concluded that there is an improvement of heat transfer coefficients which results increase in pumping power, pressure drop and high value of thermal performance.

## Introduction:

Solar collector is a basic device which captures the solar radiation and converts into useful heat energy. Solar air heat collector due to its simple design, construction and low cost, it is widely used to collect solar energy. It has applications from seasoning of timber to drying of seeds tor preservation. Solar collector consists of an absorber plate, wooden box, back plate, glass cover and insulator. Major drawback of solar air heater is low efficiency due to low heat transfer coefficient which leads to poor performance. Convective heat transfer is low between air and absorber plate due to formation of laminar sub-layer. Heat transfer coefficient can be enhanced by breaking the sub-layer by creating turbulence in air flow. Turbulence can be created by

introducing artificial roughness on collector surface however it increases the friction losses and therefore required more power for pumping air through collector. To keep frictional losses as low as possible it is required to create turbulence only near the surface without disturbing already existing turbulent flow.

The concept of surface roughness in solar air heater was first introduced by Prasad and Mullick. Saini (1988) they studied the effect of transverse rib roughness in solar collector on heat transfer it was based on the approach considered by Han 1984, the maximum nusselt number was reported to be 2.38 times over the conventional duct.

The correlation used to predict the average nusselt number is given as:

$$\overline{Nu} = \frac{\bar{f}/2}{1 + \sqrt{\left(\frac{\bar{f}}{2}\right) \left[4.5(e^+)^{0.28} Pr^{0.57} - 0.95\left(\frac{p}{e}\right)^{0.53}\right]}} RePr \quad (1)$$

Top side artificially roughened solar heater was studied by Prasad and Saini 1991 for optimizing Thermo-Hydraulic performance, they uses various values of relative roughness pitch ( $p/e$ ), relative roughness height ( $e/D$ ) and Reynolds number (Re) they arrived at the conclusion that the value of roughness Reynolds number,  $e^+ \approx 24$  gives the optimal value of Thermo-Hydraulic performance (i.e. minimum pumping power and maximum heat transfer).

Gupta et al 1993 investigated the performance of solar air heater using transverse wire rib on the top surface .they kept relative roughness pitch value constant ( $p/e = 10$ ) and studied it for different aspect ratio and relative roughness height, flow Reynolds number used was 3000 - 18000. Based on their study they concluded following correlations:

For  $e^+ < 35$

$$Nu_r = 0.000824 \left(\frac{e}{D}\right)^{-0.178} \left(\frac{W}{H}\right)^{0.288} (Re)^{1.62} \quad (2)$$

For  $e^+ \geq 35$

$$Nu_r = 0.00307 \left(\frac{e}{D}\right)^{0.469} \left(\frac{W}{H}\right)^{0.245} (Re)^{0.812} \quad (3)$$

Karwa et al. developed correlations for friction factor and heat transfer coefficient in transition flow for top roughened solar collector duct. Verma and Prasad 2000 developed correlations for heat transfer coefficient for top side artificially roughened solar heater duct in fully developed turbulent flow which is given as :

For  $e^+ \leq 24$

$$Nu_r = 0.08596 \left(\frac{e}{D}\right)^{0.072} \left(\frac{p}{e}\right)^{-0.054} (Re)^{0.728} \quad (4)$$

For  $e^+ > 24$

$$Nu_r = 0.02954 \left(\frac{e}{D}\right)^{0.021} \left(\frac{p}{e}\right)^{-0.016} (Re)^{0.802} \quad (5)$$

Various investigators with their roughness geometry and dimensional parameters are tabulated below:

Investigator	Roughness geometry	parameter
Prasad and Mallick	Transverse wire rib	$e/D = 0.0190$ ; $P/e = 12.7$
Gupta	Inclined wire rib	$e/D = 0.0230$ ; $P/e = 10$
Momin	v- shaped rin	$e/D = 0.0230$ ; $P/e = 10$
Karwa	Chamfered rib	$e/D = 0.0441$ ; $P/e = 4.85$
Jaurker	Rib – grooved	$e/D = 0.0363$ ; $P/e = 6$
Bhagoria	Transverse wedge	$e/D = 0.0330$ ; $P/e = 7.57$
Saini and Saini	Arc shaped rib	$e/D = 0.0422$ ; $P/e = 10$
Karmare and Tikekar	Metal grit rib	$e/D = 0.0440$ ; $P/e = 17.5$
Pawar	Wedged shaped rib groove	$e/D = 0.0330$ ; $P/e = 8$
Aharwal	60° inclined square rib with gap	$e/D = 0.0370$ ; $P/e = 8$

Sharp edge roughness element increases heat transfer coefficient more than smooth or roundness shaped roughness but it increases friction losses even more than the roundness shaped roughness. The net effect of sharpness of roughening element is investigated by Sparrow and Hossfeld,

1984 and it was reported that round shaped roughness geometry is more suitable than sharp edge roughness.

Studies of Sharma and Varun, 2010, while comparing the performance of different types of geometry of roughness element in solar air heater duct, shows that small diameter protrusion wire are better for flow Reynolds number up to 10000.

The value of collector efficiency factor,  $F'$  given by equation (Bliss, 1959), is given as:

$$F' = \frac{h}{h+U_L} \quad (6)$$

$F'$  can be enhanced by increasing the value of heat transfer coefficient,  $h$ , between the absorber plate and flowing air over it. The increase in the value of  $h$  further decrease the value of heat loss coefficient which also increases the value of  $F'$ .

It is general practice to provide roughness only on one surface (top surface) of solar air heater duct so, only the top surface forms the absorber plate and the side plates are insulated which are not the part of absorber. Glass cover is also provided on the top side to receive solar radiation. The side wall of the solar air heater duct may form the part of absorber plate having artificial roughness and side glass to receive solar radiation. Considering that the rectangular solar air heater duct has two sides absorber plate and two sides (bottom plate and one side wall) insulated, the present work has been focused at to analyze for fluid flow and heat transfer for fully developed turbulent flow in solar duct roughened artificially using small diameter wires on two sides (top side and one side wall). The analytical values of the roughness and the heat transfer parameter has been found out with the reference to the results of Prasad and Saini 1998; Prasad, 2013; B.N. Prasad et al. 2014 available for one side and three side roughened solar air heater, to see the effect of roughness on heat transfer enhancement in the present solar air heater.

### **Analysis:**

The following analysis is purely based on the approach used by (Prasad et. Al, 1984) who analysed for the fluid flow in rectangular duct having three side artificial roughness and (Prasad and saini 1988) who analysed for one side roughened rectangular solar air heater duct. Both of these ducts have identical dimensions and cross sectional area of  $W \times B$  with the assumption of

$W \gg B$ .

Friction factor for fully developed turbulent flow in a four side smooth duct, is given by the relation,  $f_s = \frac{\tau_s}{\frac{1}{2}\rho v_s^2}$  (7)

Similarly, the friction factor for fully developed turbulent flow in a four side rough duct, is given by the relation,  $f_r = \frac{\tau_r}{\frac{1}{2}\rho v_r^2}$  (8)

Average friction factor for fully developed turbulent flow for a duct having two side smooth and two side rough wall is given by the relation,  $\bar{f}_r = \frac{\bar{\tau}_r}{\frac{1}{2}\rho \bar{v}_r^2}$  (9)

If  $\tau_{2r}$  is the shear stress on the rough surfaces of four sided duct having two roughened walls and two smooth wall , and  $\tau_{2s}$  is shear stress on two smooth wall surfaces . $\tau_s$  is the shear stress in the duct having all four wall rough and  $\tau_r$  is the shear stress in the duct having all four wall smooth.

The following equivalence between the total shear forces of the duct system can be established

$$[(W+B)\tau_{2r} + (W+B)\tau_{2s}]L \cong [(W+B)\tau_r + (W+B)\tau_s] L$$

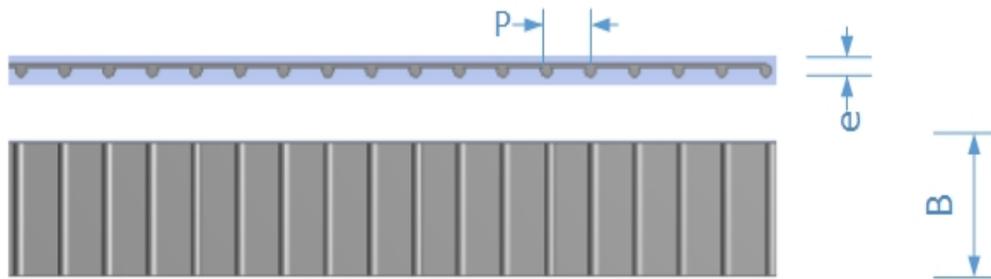


Fig.1. side absorber plate

## Results and discussion:

Fig. 2 represents the effect of roughness pitch on the average friction factor for constant relative roughness value of  $e/D = 0.0135$  at varying values of Reynolds number, while the fig. 3 shows the effect of relative roughness height on friction at for constant value of roughness pitch  $p/e$

=10 , for varying values of Reynolds number. Both figure also shows the investigation made by Prasad et.al. 2014 for three side artificially roughened solar air heater duct.

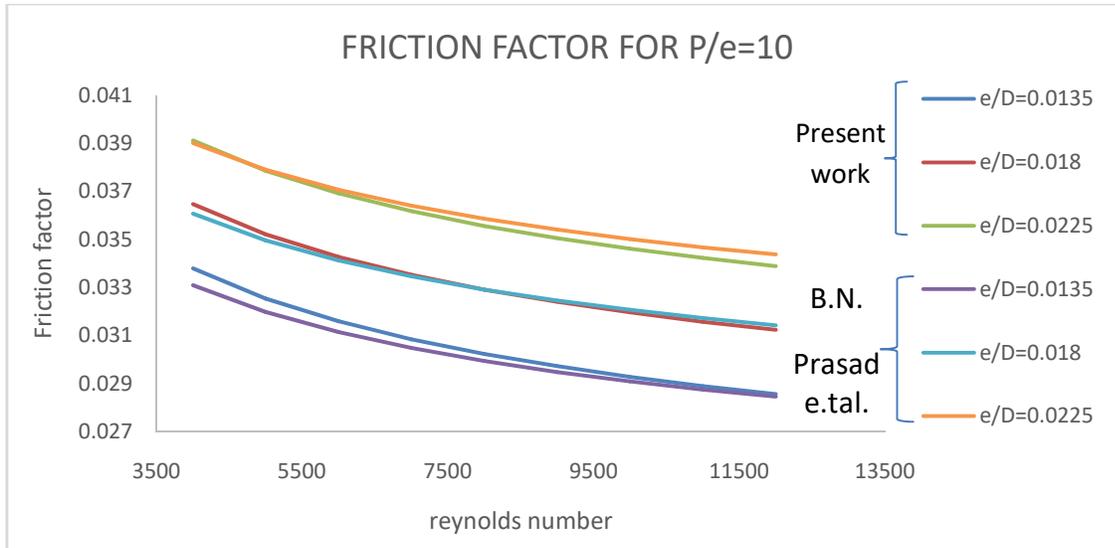


Fig. 2. Effect of roughness pitch on the average friction factor

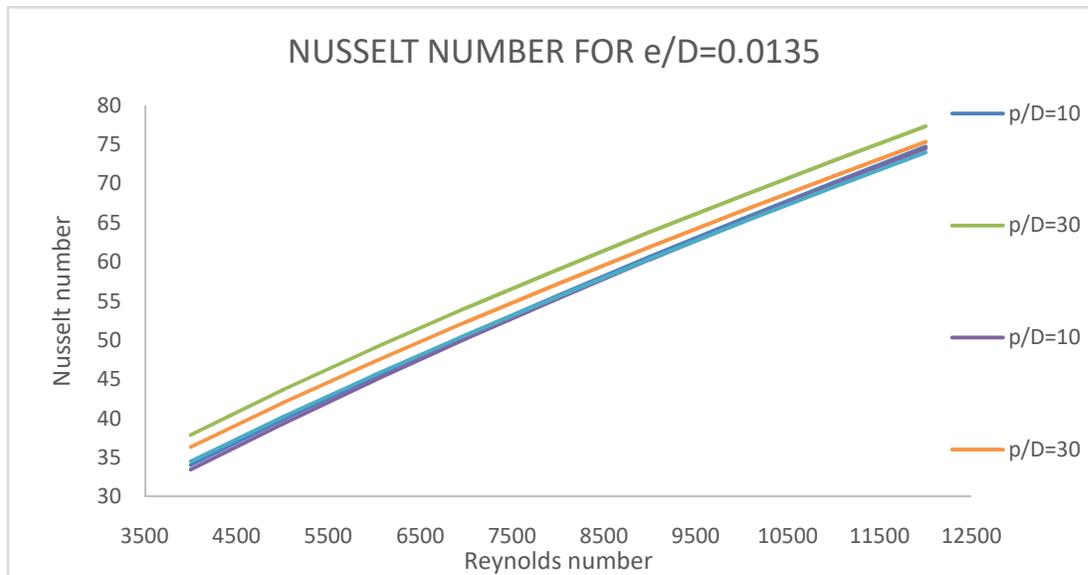


Fig.3 Effect of relative roughness pitch on average nusselt

Fig.3 shows the effect of relative roughness pitch on average nusselt  $\overline{Nu}_r$  number for constant values of relative roughness height of  $e/D=0.0135$  at varying values of Reynolds number while the variation of average nusselt number with relative roughness height for constant relative

roughness pitch of  $p/e=10$  at various Reynolds number. Nusselt number increases with increase in relative roughness pitch for constant values relative roughness height whereas for constant values value of relative roughness pitch enhancement in nusselt number is not recognizable at lower Reynolds number. In both of the cases nusselt number increases with increase in Reynolds number. nusselt number for two side roughened duct is slightly higher than three side roughened duct for higher values of relative roughness pitch whereas nusselt number is higher for three side roughened duct for higher values of relative roughness height.

### Conclusions:

On the basis of the results obtained and discussion the following conclusion can be drawn:-

- ❖ Heat transfer and fluid flow analysis of rectangular solar air heater duct having two side (one top and one side wall) artificially roughened surface with two side glass cover.
- ❖ Correlations for Average friction factor and heat transfer co-efficient have been developed in terms of geometrical parameters.
- ❖ Average nusselt number and Average friction factor for different values of relative roughness height, relative roughness pitch and Reynolds number are calculated.
- ❖ Maximum 7.4 % decrease in friction factor is recorded as compared to three side roughened duct.
- ❖ In this study it is found out that substantial increase in thermal efficiency in solar air heater having roughness elements as a combination of inclined and transverse wire on the two side absorber plate. The efficiency increases with increasing air flow rate though for higher air flow rate. In this solar air heater it is found out that solar irradiation is also a factor to effect the solar efficiency. The maximum nusselt number found 77.32 for a relative pitch  $p/e=10$ , roughness pitch of  $e/D= 0.0225$  at Reynolds number  $Re = 12000$

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# Determinants of Pangas Catfish Production in Jharkhand

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## Abstract:

Fisheries occupy a prominent place in the economy of the world as the fish is one of foods of vast majority of people. Fish not only provides long chain omega -3 fatty acids, fat soluble vitamins, proteins, but also contains fat, inorganic substances and vitamins. Fish protein is easily digestible and it contains considerable proportion of soluble proteins. It is more valuable for human especially for a population whose staple food is rice. Besides, fisheries help in generating employment and revenue and raising nutritional level.

The article models the structure of Pangas catfish (*Pangasius pangasius*) (Hamilton, 1822) production to present the determinants of production and estimate costs and return in *Pangasius* farming in Jharkhand Farm business analysis was performed for computing costs and return and for determining factors of production The major determinants of *Pangasius* production were feed, seed, area, experience in *Pangasius* culture and days of culture. Coefficients indicate increase in production can be attained by increasing the inputs. The overall estimate of return to scale was larger than unity implies *Pangasius* production can be increased from scale economies.

**Keywords: *Pangasius*, farm-business analysis, scientific production function, production by cage culture.**

## Introduction:

Jharkhand came into existence in November 2000. The state has advantage of having a sizeable number of medium and large reservoirs as well as substantial number of ponds and tanks of different sizes. But the resources are largely untapped and thus, the state depends on the supply line of Andhra Pradesh and West Bengal, which usually met nearly half of its annual fish

demand. However, the state also exports fishes to West Bengal particularly from the districts/regions nearer to Kolkata market. The annual consumption of fish within the state is nearly 83 thousand MT, against the present annual production of around 62 thousand MT, having a shortfall of nearly 21 thousand MT annually. The aquaculture resources in the state are mainly reservoirs and tanks. The cumulative area of nearly 252 big and small reservoirs is 1,15,000 ha. The number of check dams is 1184 having an area of nearly 4570 ha. Main rivers are Swarnrekha, Damodar, Koyal, Sankh, Ajay, Kanchi and Brahmi . Most of the rivers are seasonal in nature. Jharkhand is a landlocked state of India endowed with resources such as Ponds, reservoirs, lakes and rivers. The fisheries of all these resources are waiting for concerted efforts aimed at well-planned development. As far as ponds are concerned, rigorous efforts have been initiated to develop them wherever possible for the purpose of development of fish culture and providing sustainable livelihood to the stakeholders.

Aquaculture is one of the fastest growing sector in India which has grown at 6-7% per annum in recent past due to the species diversification (introduction of new species) and new culture system e.g. cage

Determinants of Pangas catfish Production in Freshwater aquaculture in Jharkhand contributes more than 60-75% of total aquaculture production; marine aquaculture is limited to few species and contributes lesser.

Recently, catfish has started playing a very significant role in world aquaculture. Pangasius, a catfish with its qualities like fast growth, air breathing, tolerance to low dissolved oxygen and compatibility to polyculture has gained popularity in many Asian countries.

It has been promoted in Bangladesh over the years to ensure food security and income generation for rural communities (Ahmed & Hasan, 2007). Keeping in view its attributes, Pangasius was introduced in India during 1995-96 from Thailand through Bangladesh (Ahmed, 2007; Rao, 2010).

**Purpose of the study:**

- ❖ Culture of Pangasius spread very fast in India and the country emerged as one of the largest producers of pondcultured Pangasius .
- ❖ This is a type of catfish which is native to Vietnam, Cambodia, and Thailand. Its speciality is that in six months' time, its weight increases to 1 kg. The cost of production for 1 kg of Pangasius is Rs 35-40 and the selling price is Rs 70-80.
- ❖ For Indian conditions, this variety of fish is good for cultivation in open aquaculture ponds or in dam reservoirs. The fish is cheap, high in demand, easy to cultivate and can yield high profits in a short span of time.
- ❖ The production of fish in one cage varies from four to five tons every six months.

The Government of Jharkhand, through Department of Agriculture, Animal Husbandry & Co – operative (Directorate of fisheries), Ranchi is promoting cage-culture of Pangasius for quality production and has sanctioned a few projects for its promotion. On the other hand, local newspapers reported the price crash and declining profits in Pangasius culture, a cause of concern for policy makers (Anon, 2011). The price crash led to loss in Pangasius culture and many farmers thus, withdrew from its culture, which reduced a grave situation. However, due to lack of systematic studies on economics of Pangasius production, appropriate advisories are lacking on the part of decision makers to overcome these situations. Although there are a number of studies related to economics of carp culture and shrimp aquaculture (Jayaraman, 1997; Sharma & Leung, 2000a;b; Dey et al., 2005; Singh et al., 2009; Debnath et al., 2013). There is hardly any study available on economics and factors affecting production of Pangasius in Jharkhand.

**Under this background, the study was conducted with following specific objectives in the state of Jharkhand:**

- ❖ To estimate costs and return in Pangasius culture;
- ❖ To determine the factors affecting Pangasius production and
- ❖ To estimate the returns to scale and resource use efficiency in Pangasius production. The results of the study will help in taking policy decisions to improve Pangasius culture.

**Hypothesis of the study:**

- ❖ There is no significance difference between in both male and female at the period of training.
- ❖ There is a difference between large farmers and small farmers in the culture of fish.
- ❖ Production varies in between town and village

**Descriptive study:**

Fish lovers in Jharkhand will soon be getting one more variety to feast on. The Thai fish; pangasius will be produced in the state. The state fishery department has started preparations for its production after they found that there was a growing demand for it in other fish producing states like Chhatishgarh and Andhra Pradesh.

**Gomia block, a moist-hit- area in the Bokaro district;** has become a production centre for pangasius with government spending several crores of rupees for cultivating its seeds in reservoirs and waterbodies here. This has also bought a reason to rejoice for the residents as it has generated earning opportunities for them. Besides, the district fishery department is also facilitating pangasius production in private and government ponds in the area. The officials in the fishery department plans to take pangasius culture to every pond, reservoirs and check dams in this Red zone.

Pangasius belongs to a family of catfish, which is native of Vietman, Cambodia and Thailand. The fish is bred in floating cages or in open aquaculture ponds. The fish is farmed for six months so that it weight 900 gm to 1 kg.

Shambhu Prasad Yadav, district fishery officer, said they got the idea of pangasius breeding from Chhatishgarh which at present has grown to be one of its largest producers in the country. "We have observed a growing demand for pangasius for which we have started its cultivation here," he said.

Yadav said they have primarily cultivated pangasius seed in Tenughat dam, Konar dam and more than 10 private ponds in the area. There are 28 government ponds and 120 private ponds in Gomia. Besides; they have sought details from district administration about ponds and check dams constructed under MGNREGA so that these can also be used for pangasius cultivation

He said these will be 72 cages installed in the Tenughat dam of which 56 cages have been placed while rest will be set up soon. One cage contains a production capacity of five tones pangasius fish. They have also brought motor boat indeed for farming. “These cages contain a net tied to it inside water. Seeds cultivated will grow in the net to pangasius weighing 1 kg. It will take six months.” said Yadav.

Similarly, two cages have been installed in Konar dam too. Besides government has also sanctioned funds to the fish farmers in Gomia for production of pangasius under National Mission For Protein Mission (NMPM). “In six months time, the fish will be ready to be sold in market. Pangasius production would improve financial condition of the fish farmers in the area it is considered as Any Time Money (ATM) for them” said Yadav.

The development has bought the fish for pangasius from chhatishgarh. This feed contains 32% protein which is suitable for its growth. It is costly as one kilogram of feed cost rs 38. “However we believe that, pangasius farming would boost pisciculture in Jharkhand and Gomia will definitely play an important role in its production.” Said another fishery officer.

**The Chandil dam** reservoir is located 30 km from Jamshedpur on the Subernarekha River in Jharkhand. While this dam is a 'tourist hotspot', its construction has resulted in the displacement of more than 20,000 families from 116 surrounding villages. “We lost our farmlands because of the project and now to support our families, we have to take any job available,” says Narayan Gope.

In 2007, the Jharkhand government initiated a project to help address the problem of displacement—the 'cage fish farming project'. This pilot project was funded by the National Mission for Protein Supplement Scheme. The goal of this initiative was two-fold: to fulfil the protein requirements of the people at a low cost and to create livelihood opportunities for the displaced farmers. In 2011, the government provided a 100 percent subsidy to Chandil Bandh Visthapit Matsyajibi Swabalambi Sahakari Samiti (CBVMSSS), the fishing cooperative of the displaced farmers, to buy 70 cages for cage fish farming. They further provided 126 modular cages to CBVMSSS with a 90 percent subsidy in 2013. The state Fisheries Department provided the technical support and training to the CBVMSSS so that the farmers would get the required knowledge to manage and run these fish farms.

### **What is cage fish farming?**

It is a method of nurturing small fish in modular iron cages that are 6 x 4 x 4 metres in dimension. These water-resistant cages float in the water bodies surrounded by nylon nets to hold the fish within.

Needing very little maintenance, these cages cost around Rs 2.5 to 3 lakh.

### **What type of fish can be reared?**

The fish cultured in the Chandil reservoir belongs to a variety called Pangasius. This is a type of catfish which is native to Vietnam, Cambodia, and Thailand. Its speciality is that in six months' time, its weight increases to 1 kg. The cost of production for 1 kg of Pangasius is Rs 35-40 and the selling price is Rs 70- 80.

For Indian conditions, this variety of fish is good for cultivation in open aquaculture ponds or in dam reservoirs. The fish is cheap, high in demand, easy to cultivate and can yield high profits in a short span of time. The production of fish in one cage varies from four to five tons every six months. The average fish produced from 2011 to 2013 was 134.33 tons and the net income of CBVMSSS in 2012-13 was around Rs 25 lakh.

### **Problems with this plan:**

Only 2,000 of the 20,000 displaced families took to this type of fishing as their primary occupation. The remaining 18,000 families could not cope with it and hence migrated to nearby places as labourers. But Shyamal Mardi, another displaced farmer, says, "The initiative of cage fish farming has solved the livelihood problems of the displaced to some extent. The workers working with the fishing cooperative are quite happy about their progress. They don't want to shift to any other job". It's hard to tell whether he truly believes his words or if he is saying it out of a lack of option. The other problem with this initiative is the lack of a regulatory body to keep the fish production in check. "In 2011, the haphazard growth of Pangasius fish culture in Andhra Pradesh, led to a price crash resulting in losses for growers of this fish", says V. Vasudevappa, a senior executive of the National Fisheries Development Board (NFBD). In the last two decades, there has been a sharp decline of local varieties of fish like sol, bata, bada tengra and others due to pollution in the Subarnarekha river. So, the larger concern is the sustainability of the

production of *Pangasius*. Also, if the demand is not constant throughout the year, the risk has to be borne by the fish producers. Without regulating fish production, it is difficult to attain economic stability in the long run.

### **Has cage fish culture worked at Chandil?**

It's not a very clear answer just yet. The temporary improvement in the income of 2,000 displaced families is a matter of relief for the government but generating employment for the 18,000 that are still displaced is a big challenge. If a person's livelihood is taken away, efforts must be made to replace it in the same, if not a similar form.

### **Materials and Methods:**

Jharkhand has largest area under *Pangasius* culture in the country and hence it was selected for the study. Multistage stratified random sampling was used to select sample for the study. Two districts namely Ranchi and Bokaro from Jharkhand were selected on the basis of highest area under *Pangasius* culture. From a prepared list of all the *Pangasius* farmers of selected villages, a sample of 30 farmers was selected randomly from each of the selected villages. Thus a total of 120 fish farmers were selected for the study from four villages of the two districts in the state. The sample farmers were classified into two categories i.e. small farmers (having ponds area < 4 ha) and large farmers (having ponds area > 4 ha) on the basis of their pond area. It was found that 63 farmers were small and 57 large. It should not be cultured from 5 ha big pond areas.

All these farmers are trained by training center Doranda and Shalimar Dhruva Ranchi.

### **Table - 1**

Sampling Plan at Farm level:

SL. NO.	DISTRICTS	VILLAGES/TOWN	SAMPLE FARMERS		
			SMALL	LARGE	TOTAL
1.	Ranchi	Khunti	18	12	30
		Ormanghi	16	14	30
2.	Bokaro	Gomia	15	15	30
		Balidih	14	16	30
			120		

## Management of Quality of Water:

The management of quality of water keeps most important role for good survival and growth of pangasius. These are the following properties should be in ponds water in the culture of pangasius:-

**Table - 2**

PARAMETER	RANGE
PH	6.5 -7.5
DISSOLVED OXYGEN	> 4 p.p.m
TEMPERATURE	25 – 30 degree centigrade

## Physical Condition of Pond:

DEPTH	1.5 – 2.5 M
SOIL	ACIDIC /BASIC / ARID
COLOUR OF WATER	GREEN /BROWN
TEMPERATURE	22 – 32 degree centigrade

**Table - 3**

## Production of Pangasius Fish from Scientific Method:

1.	Area	4000 square m ( 1 acre )
2	Depth	1.5 m / 5-7 feet
3	No of days of culture	180 days / six months
4	Wt of given fishes gm /piece	10
5	No of fishes	12000 piece / acre
6	Density	3 piece /square m
7	Goal /fish (gm )	800 – 1000 gm
8	Survival rate ( % )	60 – 75 %
9	Percentage growth rate / fish /days	5.5 gm
10	Fish feed ( at the weight of fishes )	3.5 gm
11	Feed / days kg	26 kg
12	Total fish feed in 180 days	4725 kg
13	Estimated production 9 in kg )	7000 kg
14	F.C.R	1.5

## Results and Discussion:

Socio-economic status of an individual plays vital role in overall production activities of the same. Socioeconomic details of sample farmers are presented in **table** .Both male and female come in training centre. Almost male are literate but some women are illiterate. Agboola et al. (2011) emphasized on logical relation between the level of education and its effect on various facets of characteristics associated with human behavior i.e. the knowledge level, skill development, exposure to production technology, marketing and adoption of improved technology. Onumah & Acquah (2010) found that high level of formal education lead to better technical efficiency. It indicates better learning and decision making ability in sample farmers. Fish farmers had experience of about 12 years in aquaculture and 5 years in Pangasius culture, which indicate their expertise in aquaculture practices. The years of experience in aquaculture and expertise makes Andhra Pradesh fish farmers more accomplished in taking challenges in aquaculture sector of India. Aquaculture experience for fish farmers in Jharkhand was in the range of 5 to 12 years.

## Economics of Pangasius Production (Per Acre):

**Table - 4**

1. Fish seed / price of fingerlings (@ 3 ru per seed )	36,000 Rs
2. Supplement fish food 4725 kg (floating feed @ 23 Rs /kg )	1,08,675 Rs
3. Management and transporting expense	8000 Rs
4. Lime /Cow dung /medicine	10,000 Rs
5. Rent of pond	5,000 Rs
6. Labour payment (six month )	25,000 Rs
7. Expense of net	15,000 Rs
8. Other accidental expense	5,000 Rs
9. Total estimated cost	2,12,675 Rs
10. Estimated production 6 – 7 ton (sales rate @ 55 Rs/kg)	3.5 lac to 3,85 lac
11. Pure profit In six months )	1.52 lac to 1.72 lac

The farmers were using two kinds of feed; farm based (rice bran) and commercially available feed (pelleted feed). Small farmers had spent more on rice bran in comparison to pelleted feed

whereas; large farmers had spent more on pelleted feed as compared to rice bran. Commercial feed was costly in comparison to rice bran. Larger pond area was taken on lease by the large farmers as compared to small farmers. This may be due to the better financial capacity of the large farmers, as they can afford to lease in more pond area. On an average size of operational fish farm was 5.05 ha, where as that of large farmers was 8.17 ha and of small farmers, 2.23 ha. Pangasius farmers in Jharkhand, pre-dominantly use rice bran and pelleted feed. The high price of pelleted feed in comparison to rice bran had raised the overall feed cost. Therefore, considerable reduction in the use of pelleted feed, with replacement of rice bran may reduce the feed cost. Hence, in order to increase profitability and efficient use of resources, use of pelleted feed must be reduced, more area should be brought under Pangasius culture and stocking density should be increased.

Pangasius culture was found profitable on both the category of farms. ‘Large farms’ can cut down their cost through reduced use of pelleted feed. Major factors contributing to the yield were feed, seed, fish farm area, days of culture and experience in Pangasius culture. To obtain better production figures, these inputs need to be efficiently used. Except the feed in case of small farms, both the categories of farms can increase the yield/production through increased use of feed and seed. Increased farm area, days of culture and experience in Pangasius culture will increase the yield and profitability.

Unavailability of local Pangasius seed creates the opportunity for local fish breeders to learn the breeding of Pangasius and establish hatcheries to cater the need. Pangasius culture in the region exhibited increasing returns to scale. The overall estimate of the returns to scale was larger than unity implies Pangasius production can be increased from scale economies. There is a need to find alternative feed to reduce cost in production. Pangasius being an omnivore gives opportunity to find alternative feed. Enhancement of technical capacity in Pangasius breeding is of prime concern to harness its full potential. Government through department of fisheries should guide and encourage the farmers to culture Pangasius on the line of ‘Pangasius Aquaculture Dialogue’. Intensifying the production with the efforts mentioned above will keep ‘Pangasius’ profitable.

Generally most farmers of Jharkhand and its near states use the feed of “ABIS FEED Company” as a supplement food.

**Table - 5****Ways of Feeding:**

<b>BOBY WEIGHT OF FISH</b>	<b>SIZE OF FLOATING FEEDS SEED</b>	<b>% FEED ( OF BODY WEIGHT )</b>	<b>AMOUNT OF PROTEIN (IN FEED)</b>
5 – 10 gm	1.5 mm	7 %	32 %
10 – 20 gm	2 mm	6 %	32 %
20 – 30 gm	2 mm	5 %	32 %
30 - 40 gm	3 mm	4 %	28 %
50 -100 gm	3 mm	3.5 %	28 %
100 – 200 gm	4 mm	2.5 %	28 %
200 - 300 gm	4 mm	2 %	28 %
300 -400 gm	4 mm	1.5%	28 %
600 – 700 gm	4 mm	1.5 %	28 %
800 - 900 gm	4 mm	1 %	28 %
900 – 1000 gm	4 mm	1 %	28 %

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