

Some Fixed Point Results on F-Type Contractions without Monotone Property in Partially Ordered Metric-Like Spaces

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Abstract- The aim of this paper is to present some fixed point theorems involving F-type contractions which satisfies a weaker conditions than the monotonicity of self mapping of a partially ordered metric like-space. Some examples are also included in order to verify the effectiveness and applicability of our main results.

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Introduction and Preliminaries:

There are a lot of generalizations of the concept of metric space. In 1994, Matthews [20] introduced the notion of partial metric space as a part of the study of denotational semantics of dataflow network. In a partial metric space, the usual distance was replaced partial metric, with an interesting property “ nonzero self distance” of points. Matthews showed that the Banach contraction principle is valid in partial metric spaces and can be applied in program verifications. Later on , several authors generalized the results of Matthews (see Nashine *et.al.*, 2012; Ahmad *et.al.*, 2012; Bari *et. al.*, 2012; Kadelburg *et.al.*, 2012; Vetro and Radenović, 2012) . On the other hand, Amini-Harandi [21] introduced a new extension of the concept of partial metric space, called a metric like space.

Ran and Reurings [1] and Nieto and Lopez [2,3] obtained the existence of fixed points of a self-mapping of a metric space equipped with a partial order. The fixed point results in spaces equipped with a partial order can be applied in proving existence and uniqueness of solutions for matrix equations as well as for boundary value problems of ordinary differential equations , integral equations, fuzzy equations of problems in L-spaces etc. (see [1-11]). The results of Ran and Reurings [1] and Nieto and Lopez [2,3] were generalized by several authors (see [4,5,8,12-17]).

In all these papers, the condition of monotonicity with respect to the partial order defined on space is required. Following is a typical result among these. In [22], Wardowski introduced a new concept of an F-contraction and proved a fixed point theorem which generalizes Banach contraction principle in a different way than in the known results from the literature in complete metric spaces. In this paper, we consider a more generalized type of F-contractions and prove some common fixed point theorems for such type of mappings in metric-like spaces. We generalize the result of Wardowski [22], Matthews [20], Ran and Reurings [1], Nieto and Lopez [2], and the recent result of Doric et al. [18] by proving the fixed point results for F-g-weak contractions in metric-like spaces equipped with a partial order.

Results of this paper are new not only in the setting of metric-like spaces but also in the setting of metric and partial metric spaces.

Theorem 1.[1,2] Let $(X, \sqsubseteq)$ be a partially ordered set which is directed (upward or downward) and let d be a metric on X such that (X, d) is a complete metric space. Let $f : X \rightarrow X$ be a mapping such that the following conditions hold :

- (i) f is monotone (nondecreasing or nonincreasing) on X with respect to " $\sqsubseteq$ ";
- (ii) there exists $x_0 \in X$ such that $x_0 \sqsubseteq fx_0$ or $fx_0 \sqsubseteq x_0$;
- (iii) there exists $k \in (0, 1)$ such that $d(fx, fy) \leq kd(x, y)$ for all $x, y \in X$ with $y \sqsubseteq x$;
- (iv) (a) f is continuous, or
(b) if a nondecreasing sequence $\{x_n\}$ converges to $x \in X$, then $x_n \sqsubseteq x$ for all n .

Then, f has a fixed point $x^* \in X$.

Recently, the fixed point results on partially ordered sets are investigated via a weaker property than the monotonicity of f (see [8, 13, 18, 19]). We state following facts from these papers.

Let $(X, \sqsubseteq)$ be a partially ordered set and $x, y \in X$. If x, y are comparable (i.e., $x \sqsubseteq y$ or $y \sqsubseteq x$ holds), then we will write $x \asymp y$

Lemma 2. [18] Consider the following properties for a self-map f on a partially ordered set $(X, \sqsubseteq)$:

- 1. f is monotone (nondecreasing or nonincreasing), i.e., $x \sqsubseteq y \Rightarrow fx \sqsubseteq fy$ for all $x, y \in X$ or $y \sqsubseteq x \Rightarrow fx \sqsubseteq fy$ for all $x, y \in X$;
- 2. $x \asymp y \Rightarrow fx \asymp fy$ for $x, y \in X$;
- 3. $x \asymp fx \Rightarrow fx \asymp ffx$ for $x \in X$;

Then $1 \Rightarrow 2 \Rightarrow 3$. The reverse implications do not hold in general.

First, we recall some definitions and facts about partial metric and metric-like spaces.

Definition 1. [20] A partial metric on a nonempty set X is a function $p : X \times X \rightarrow \mathbb{R}^+$ ($\mathbb{R}^+$ stands for nonnegative reals) such that, for all $x, y, z \in X$:

- (p1) $x = y$ if and only if $p(x, x) = p(x, y) = p(y, y)$;
- (p2) $p(x, x) \leq p(x, y)$;
- (p3) $p(x, y) = p(y, x)$;
- (p4) $p(x, y) \leq p(x, z) + p(z, y) - p(z, z)$.

A partial metric space is a pair (X, p) such that X is a nonempty set and p is a partial metric on X . A sequence $\{x_n\}$ in (X, p) converges to a point $x \in X$ if and only if
$$p(x, x) = \lim_{n \rightarrow \infty} p(x_n, x).$$
 A sequence $\{x_n\}$ in (X, p) is called p -Cauchy sequence if there exists $\lim_{n, m \rightarrow \infty} p(x_n, x_m)$ and is finite. (X, p) is said to be complete if every p -Cauchy sequence $\{x_n\}$ in X converges to a point $x \in X$ such that $p(x, x) = \lim_{n, m \rightarrow \infty} p(x_n, x_m)$.

Definition 2. A metric-like on a nonempty set X is a function $\sigma : X \times X \rightarrow \mathbb{R}^+$ such that, for all $x, y, z \in X$;

- (σ 1) $\sigma(x, y) = 0$ implies $x = y$;
- (σ 2) $\sigma(x, y) = \sigma(y, x)$;
- (σ 3) $\sigma(x, y) \leq \sigma(x, z) + \sigma(z, y)$.

A metric-like space is a pair (X, σ) such that X is a nonempty set and σ is a metric-like on X . Note that, a metric-like satisfies all the conditions of metric except that $\sigma(x, x)$ may be positive for $x \in X$. Each metric-like σ on X generates a topology τ_σ on X whose base is the family of open σ -balls

$B_\sigma(x, \varepsilon) = \{y \in X : |\sigma(x, y) - \sigma(x, x)| < \varepsilon\}$, for all $x \in X$ and $\varepsilon > 0$.

A sequence $\{x_n\}$ in X converges to a point $x \in X$ if and only if $\lim_{n \rightarrow \infty} \sigma(x_n, x) = \sigma(x, x)$. Sequence $\{x_n\}$ is said to be σ -Cauchy if $\lim_{n, m \rightarrow \infty} \sigma(x_n, x_m)$ exists

and is finite. The metric-like space (X, σ) is called σ -complete if for each σ -Cauchy sequence $\{x_n\}$, there exists $x \in X$ such that

$$\lim_{n \rightarrow \infty} \sigma(x_n, x) = \sigma(x, x) = \lim_{m, n \rightarrow \infty} \sigma(x_n, x_m)$$

Note that every partial metric space is a metric-like space, but the converse may not be true.

Example 1 : Let $X = \{0, 1\}$ and $\sigma : X \times X \rightarrow \mathbb{R}^+$ be defined by

$$\sigma(x, y) = \begin{cases} 2, & \text{if } x = y = 0 \\ 1, & \text{otherwise} \end{cases}$$

Then (X, σ) is a metric-like space, but it is not a partial metric space, as $\sigma(0, 0) \leq \sigma(0, 1) = 1$.

Definition 3. If a nonempty set X is equipped with a partial order " $\sqsubseteq$ " such that (X, σ) is a metric-like space, then the $(X, \sigma, \sqsubseteq)$ is called a partially ordered metric-like space. A subset A of X is called well ordered if all the elements of A are comparable, i.e., for all $x, y \in A$, we have $x \sqsubseteq y$. A is called g-well ordered if all the elements of A are g-comparable, i.e. for all $x, y \in A$, we have $gx \sqsubseteq gy$.

In the trivial case, i.e. for $g = I_X$ (the identity mapping of X), the g-well orderedness reduces into well orderedness. But, for nontrivial cases, i.e., when $g \neq I_X$ the concepts of g-well orderedness and well orderedness are independent.

Example 4. Let $X = \{0, 1, 2, 3, 4\}$, " $\sqsubseteq$ " a partial order relation on X defined by $\sqsubseteq = \{(0, 0), (1, 1), (2, 2), (3, 3), (4, 4), (1, 2), (2, 3), (1, 3), (1, 4)\}$. Let $A = \{0, 1, 3\}$, $B = \{1, 4\}$ and $g : X \rightarrow X$ be defined by $g0 = 1, g1 = 2, g2 = 3, g4 = 0$. Then it is clear that A is not well ordered but it is well ordered.

The proof of following lemma is similar as for the metric case, and for the sake of completeness, we give the proof.

Lemma 3. Let (X, σ) be a metric-like space and $\{x_n\}$ be a sequence in X . If the sequence $\{x_n\}$ converges to some $x \in X$ with $\sigma(x, x) = 0$, then $\lim_{n \rightarrow \infty} \sigma(x_n, y) = \sigma(x, y)$ for all $y \in X$.

Proof. Let $\lim_{n \rightarrow \infty} \sigma(x_n, x) = \sigma(x, x) = 0$ i.e., for every $\varepsilon > 0$ there exists $n_0 \in \mathbb{N}$ such that $\sigma(x_n, x) < \varepsilon$ for all $n > n_0$.

Now by (σ_3) we have $\sigma(x_n, y) \leq \sigma(x_n, x) + \sigma(x, y)$ and $\sigma(x, y) \leq \sigma(x, x_n) + \sigma(x_n, y)$, i.e., $\sigma(x_n, y) - \sigma(x, y) \leq \sigma(x_n, x)$ and $\sigma(x, y) - \sigma(x_n, y) \leq \sigma(x, x_n)$.

Therefore $|\sigma(x_n, y) - \sigma(x, y)| \leq \sigma(x_n, x)$ and so $|\sigma(x_n, y) - \sigma(x, y)| < \varepsilon$ for all $n > n_0$ and the result follows.

Analogous to [22], we have following definitions.

Definition 4. Let $F : \mathbb{R}^+ \rightarrow \mathbb{R}$ be a mapping satisfying :

- (F1) F is strictly increasing, that is, for $\alpha, \beta \in \mathbb{R}^+$ such that $\alpha < \beta$ implies $F(\alpha) < F(\beta)$;
- (F2) for each sequence $\{\alpha_n\}$ of positive numbers, $\lim_{n \rightarrow \infty} \alpha_n = 0$ if and only if $\lim_{n \rightarrow \infty} F(\alpha_n) = -\infty$;
- (F3) there exists $k \in (0, 1)$ such that $\lim_{\alpha \rightarrow 0^+} \alpha^k F(\alpha) = 0$

For examples of functions F , we refer to [22]. We denote the set of all functions satisfying properties (F1)-(F3), by $\mathcal{F}$.

Wardowski in [22], defined the F -contraction as follows.

Definition 5. Let (X, ρ) be a metric space. A mapping $T : X \rightarrow X$ is said to be an F -contraction if

there exists $F \in \mathcal{F}$ and $\tau > 0$ such that, for all $x, y \in X$, $\rho(Tx, Ty) > 0$ we have

$$\tau + F(\rho(Tx, Ty)) \leq F(\rho(x, y))$$

Definition 6. Let $(X, \sigma, \sqsubseteq)$ be a partially ordered metric-like space, $f, g : X \rightarrow X$ be mappings. Suppose $\tau > 0$ and $F \in \mathcal{F}$ are such that : $\sigma(fx, fy) > 0 \Rightarrow \tau + F(\sigma(fx, fy)) \leq F(\max\{\sigma(gx, gy), \sigma(gx, fx),$

$$\sigma(gy, fy), \frac{\sigma(gx, fy) + \sigma(gy, fx)}{2}\})$$

(1)

for all $x, y \in X$ with $gx \preceq gy$. Then mapping f is called an ordered F-g-weak contraction.

For $g = Ix$ the F-g-weak contraction reduces into an ordered F-weak contraction. It is clear that the concept of an ordered F-weak contraction. It is clear that the concept of an ordered F-g-weak contraction and ordered F-weak contraction are more general than the F-contraction.

Definition 7. Let f and g be self-mappings of a nonempty set X and $C(f, g) = \{x \in X : fx = gx\}$. The pair (f, g) is called weakly compatible if $fgx = gfx$ for all $x \in C(f, g)$. If $w = fx = gx$ for some x in X , then x is called a coincidence of f and g .

The following lemma will be useful in proving our main result.

Lemma 4. Let $(X, \sigma, \sqsubseteq)$ be a partially ordered metric-like space, $f, g : X \rightarrow X$ be mappings such that f is an ordered F-g-weak contraction. If $v \in X$ be a point of coincidence of f and g , then $\sigma(v, v) = 0$.

Proof. Let $v \in X$ be a point of coincidence of f and g , then there exists $u \in X$ such that $fu = gu = v$. If $\sigma(v, v) > 0$, then from (1) it follows that

$$\tau + F(\sigma(v, v)) = \tau + F(\sigma(fu, fu))$$

$$\leq F(\max\{\sigma(gu, gu), \sigma(gu, fu), \sigma(gu, fu), \frac{\sigma(fu, gu) + \sigma(gu, fu)}{2}\})$$

$$\leq F(\max\{\sigma(v, v), \sigma(v, v), \sigma(v, v), \frac{\sigma(v, v) + \sigma(v, v)}{2}\}) = F(\sigma(v, v)).$$

This is a contradiction. Therefore, we must have $\sigma(v, v) = 0$.

Main Result :

Theorem 5: Let $(X, \sigma, \sqsubseteq)$ be a partially ordered metric like space and let $f, g : X \rightarrow X$ be mappings such that $f(X) \subset g(X)$ and $g(X)$ is σ -complete.

Suppose following conditions hold :

(i) If $x, y \in X$ such that $gx \preceq fx = gy$, then $fx \preceq fy$;

(ii) There exists $x_0 \in X$ such that $gx_0 \preceq fx_0$;

(iii) There exists $F \in \mathcal{F}$ and $\tau > 0$ such that for all $x, y \in X$ satisfying $gx \preceq gy$, we have

$$\sigma(fx, fy) > 0 \Rightarrow \tau + F(\sigma(fx, fy)) \leq F(\max\{\sigma(gx, gy), \sigma(gx, fx), \sigma(gy, fy), \frac{\sigma(fx, gy) + \sigma(gx, fy)}{2}\})$$

(2)

(iv) If $\{x_n\}$ is sequence in (X, σ) converging to $x \in X$ and $\{x_n : n \in \mathbb{N}\}$ is well ordered, then $x_n \preceq x$ for sufficiently large n .

Suppose F is continuous, then the pair (f, g) have a point of coincidence $v \in X$ and $\sigma(v, v) = 0$. Furthermore, if the set of coincidence points of the pair (f, g) is g well ordered then the pair (f, g) have a unique point of coincidence. If in addition, the pair (f, g) is weakly compatible, then there exists a unique common fixed point of the pair (f, g) .

Proof : Let $x_0 \in X$ be the point given by (ii) and by assumption $f(X) \subset g(X)$ we define a sequence $\{x_n\} = \{gx_n\}$ by $y_n = gx_n = fx_{n-1}$, for all $n \in \mathbb{N}$

As $gx_0 = fx_0 = gx_1$ and (i) holds, we have $fx_0 = fx_1$ i.e., $gx_1 = fx_1 = gx_2$ and so $fx_1 = fx_2$. Continuing this process, we obtain $gx_n = gx_{n-1}$, i.e. $y_n = y_{n-1}$ for all $n \in \mathbb{N}$.

We shall show that the pair (f, g) has a point of coincidence. If $\sigma(y_n, y_{n+1}) = 0$ for any $n \in \mathbb{N}$, then $y_n = y_{n+1}$, i.e. $gx_n = fx_{n-1} = gx_{n+1} = fx_n$ and so x_n is a coincidence point and $gx_n = fx_n$ is a point of coincidence of pair (f, g).

Suppose $\sigma(y_n, y_{n+1}) > 0$ for all $n \in \mathbb{N}$. As $gx_n = gx_{n+1}$ for all $n \in \mathbb{N}$ we obtain from (2) that

$$\begin{aligned} & \tau + F(\sigma(y_n, y_{n+1})) = \tau + F(\sigma(fx_{n-1}, fx_n)) \\ & \leq F(\max\{\sigma(gx_{n-1}, gx_n), \sigma(gx_{n-1}, fx_{n-1}), \sigma(gx_n, fx_n), \\ & \quad \frac{\sigma(gx_{n-1}, fx_n) + \sigma(gx_n, fx_{n-1})}{2}\}) \\ & = F(\max\{\sigma(y_{n-1}, y_n), \sigma(y_{n-1}, y_n), \sigma(y_n, y_{n+1}), \\ & \quad \frac{\sigma(y_{n-1}, y_{n+1}) + \sigma(y_n, y_n)}{2}\}) \\ & = F(\max\{\sigma(y_{n-1}, y_n), \sigma(y_n, y_{n+1}), \\ & \quad \frac{\sigma(y_{n-1}, y_{n+1}) + \sigma(y_n, y_n)}{2}\}) \\ & = F(\max\{\sigma(y_n, y_{n-1}), \sigma(y_n, y_{n+1}), \\ & \quad \frac{\sigma(y_{n-1}, y_n) + \sigma(y_{n+1}, y_n)}{2}\}) \end{aligned}$$

Note that for any $a, b \in \mathbb{R}^+$ we have

$$\max\left\{a, b, \frac{a+b}{2}\right\} = \max\{a, b\}, \quad \text{therefore it}$$

follows from the above inequality that

$$\tau + F(\sigma(y_n, y_{n+1})) \leq F(\max\{\sigma(y_{n-1}, y_n), \sigma(y_n, y_{n+1})\}) \quad (3)$$

If $\max\{\sigma(y_{n-1}, y_n), \sigma(y_n, y_{n+1})\} = \sigma(y_n, y_{n+1})$, then from (3) we have

$$F(\sigma(y_n, y_{n+1})) \leq F(\sigma(y_n, y_{n+1})) - \tau.$$

a contradiction. Therefore $\max\{\sigma(y_{n-1}, y_n), \sigma(y_n, y_{n+1})\} = \sigma(y_{n-1}, y_n)$ and from (3) we have

$$F(\sigma(y_n, y_{n+1})) \leq F(\sigma(y_{n-1}, y_n)) - \tau \quad (4)$$

Continuing in this way, we get

$$F(\sigma(y_n, y_{n+1})) \leq F(\sigma(y_{n-1}, y_n)) - \tau \leq F(\sigma(y_{n-2}, y_{n-1})) - 2\tau \leq \dots \leq F(\sigma(y_0, y_1)) - n\tau \quad (5)$$

By taking $n \rightarrow \infty$ in (5), we obtain

$$\lim_{n \rightarrow \infty} F(\sigma(y_n, y_{n+1})) = -\infty \quad \text{and since } F \in \mathcal{F} \text{ we have}$$

$$\lim_{n \rightarrow \infty} F(\sigma(y_n, y_{n+1})) = 0$$

$$(6)$$

Again as $F \in \mathcal{F}$, there exist $k \in (0, 1)$ such that

$$\lim_{n \rightarrow \infty} [\sigma(y_n, y_{n+1})]^k F(\sigma(y_n, y_{n+1})) = 0$$

$$(7)$$

From (5) we obtain

$$[\sigma(y_n, y_{n+1})]^k [F(\sigma(y_n, y_{n+1})) - F(\sigma(y_0, y_1))] \leq -n[(y_n, y_{n+1})]^k \tau \leq 0$$

Letting $n \rightarrow \infty$ in above inequality and using (6) and (7) we obtain

$$\lim_{n \rightarrow \infty} n[\sigma(y_n, y_{n+1})]^k = 0$$

Therefore there exists $n_0 \in \mathbb{N}$ such that

$$\sigma(y_n, y_{n+1}) \leq \frac{1}{n^{1/k}} \quad \text{for all } n > n_0. \quad (8)$$

Let $m, n \in \mathbb{N}$ with $m > n > n_1$. Then it follows from (8) that

$$\sigma(y_n, y_m) \leq (\sigma(y_n, y_{n+1}) + (\sigma(y_{n+1}, y_{n+2}) + \dots + \sigma(y_{m-1}, y_m))$$

$$\leq \frac{1}{n^{1/k}} + \frac{1}{(n+1)^{1/n}} + \dots + \frac{1}{(m-1)^{1/k}} \leq \sum_{i=n}^{\infty} \frac{1}{i^{1/k}}$$

Since $k \in (0,1)$, the series $\sum_{i=n}^{\infty} \frac{1}{i^{1/k}}$ converges, So it

follows from the above inequality that

$\lim_{n \rightarrow \infty} \sigma(y_n, y_m) = 0$, that is the sequence $\{x_n\}$ is a

σ -Cauchy sequence in $g(X)$.

As $g(X)$ is σ -complete, there exists $u, v \in X$ such that

$$v = gu \text{ and } \lim_{n \rightarrow \infty} \sigma(y_n, v) =$$

$$\lim_{n \rightarrow \infty} \sigma(gx_n, gu) =$$

$$\lim_{n, m \rightarrow \infty} \sigma(y_n, y_m) = \sigma(v, v) = 0$$

(9)

We Shall show that v is a point of coincidence of f and g .

If $\sigma(fu, v) = 0$ then $fu = v = gu$ and v is a point of coincidence of f and g .

Suppose $\sigma(fu, v) > 0$ then we can assume that there exists $n_1 \in \mathbb{N}$ such that $\sigma(fx_n, fu) > 0$ then we can assume that there exists $n_1 \in \mathbb{N}$ such that $\sigma(fx_n, fu) > 0$ for all $n > n_1$. From the assumption (iv), there exists $n_2 \in \mathbb{N}$ such that $y_n \approx v$, i.e. ;

$gx_n \approx gu$, for all $n > n_2$, therefore using (2), we obtain

$$\tau + F(\sigma(y_{n+1}, fu)) = \tau + F(\sigma(fx_n, fu))$$

$$\leq F(\max\{\sigma(gx_n, gu), \sigma(gx_n, fx_n), \sigma(gu, fu),$$

$$\frac{\sigma(gx_n, fu) + \sigma(gu, fx_n)}{2}\})$$

$$= F(\max\{\sigma(y_n, gu), \sigma(y_n, y_{n+1}), \sigma(v, fu),$$

$$\frac{\sigma(y_n, fu) + \sigma(v, y_n)}{2}\})$$

$$= F(\max\{\sigma(y_n, gu), \sigma(y_n, y_{n+1}), \sigma(v, fu)$$

$$\frac{\sigma(y_n, fu) + \sigma(v, y_n)}{2}\})$$

for all $n > n_2$. As, $\sigma(fu, v) > 0$, (9) shows that there exists $n_3 \in \mathbb{N}$ such that

$$\max\{\sigma(y_n, gu), \sigma(y_n, y_{n+1}), \sigma(v, fu),$$

$$\frac{\sigma(y_n, fu) + \sigma(v, y_{n+1})}{2}\} = \sigma(v, fu) \text{ for all } n > n_3.$$

Therefore for all $n > \max\{n_1, n_2, n_3\}$ we have

$$\tau + F(\sigma(y_{n+1}, fu)) \leq F(\sigma(v, fu))$$

Using continuity of F , (9) and Lemma 3, we obtain from above inequality that

$$\tau + F(\sigma(v, fu)) \leq F(\sigma(v, fu)), \text{ a contradiction.}$$

Therefore we must have $\sigma(fu, v) = 0$, i.e., $fu = gu = v$. Hence v is a point of coincidence of f and g .

Suppose, the set of coincidence point of f and g , i.e. $C(f, g)$ is g -well ordered and v' is another point of coincidence of f and g , then there exists $u' \in X$ such that $fu' = gu' = v'$. By lemma 4 we have $\sigma(v', v') = 0$, also as $C(f, g)$ is g -well ordered we have $gu \approx gu'$.

So, if $\sigma(v, v') > 0$, it follows from

(2) that

$$\tau + F(\sigma(v, v')) = \tau + F(\sigma(fu, fu'))$$

$$\leq F(\max\{\sigma(gu, gu'), \sigma(gu, fu), \sigma(gu', fu'),$$

$$\frac{\sigma(gu, fu') + \sigma(gu', fu)}{2}\})$$

$$\leq F(\max\{\sigma(v', v'), \sigma(v, v), \sigma(v', v'),$$

$$\frac{\sigma(v, v') + \sigma(v', v)}{2}\})$$

$$\leq F(\max\{\sigma(v', v'), \sigma(v, v), \sigma(v', v')\}) = F(\sigma(v, v'))$$

This is a contradiction. Therefore we must have $\sigma(v', v') = 0$, i.e. ; $v = v'$. This point of coincidence is unique.

In addition, if the pair (f, g) is weakly compatible, then there exists $w \in X$ such that $fu = fgw = \dots = w$. So, w is another point of coincidence of pair (f, g) and by uniqueness $w = v$, i.e. ; $fv = gv = v$.

Example 5. Let $X = [0, 1]$ and define $\sigma : X \times X \rightarrow \mathbb{R}^+$ by

$$\sigma(x, y) = \begin{cases} 0, & \text{if } x = y = 2; \\ 2x, & \text{if } x = y; \\ \max\{x, y\}, & \text{otherwise} \end{cases}$$

Then (X, σ) is a σ -complete metric-like space. Define a partial order relation " $\sqsubseteq$ " on X and $f, g : X \rightarrow X$ by

$$\sqsubseteq = \{(x, y) : x, y \in [0, \frac{1}{2}] \text{ with } x \geq y\} \cup \{(x, y) : x, y \in (\frac{1}{2}, 1] \text{ with } x \leq y\},$$

$$fx = \begin{cases} \frac{1}{2} - x, & \text{if } x \in [0, \frac{1}{2}); \\ 0, & \text{if } x = \frac{1}{2}; \\ 1, & \text{if } x \in [1/2, 1] \end{cases} \quad \text{and} \quad gx = \begin{cases} \frac{2x}{3}, & \text{if } x \in [0, \frac{1}{2}); \\ 1, & \text{if } x \in (\frac{1}{2}, 1] \end{cases}$$

Then we can see that all the postulates of the above theorem are satisfied for taking $F(\alpha) = \log \alpha$ and $\tau \in (0, \log 1]$. Here F is continuous and the pair (f, g) have a point of coincidence $1 \in X$ and $\sigma(1, 1) = 0$. Also the set of coincidence points of the pair (f, g) is g -well ordered and the pair (f, g) have a unique point of coincidence. Also, the pair (f, g) is weakly compatible and there is a unique common fixed point 1 of the pair (f, g) .

Taking $g = I_x$ in inequality (2), we obtain the following fixed point result for F -weak contraction in ordered metric-like spaces.

Corollary 6. Let $(X, \sigma, \sqsubseteq)$ be a partially ordered σ -complete metric-like space and let $f : X \rightarrow X$ be a mapping such that the following hold :

- (i) if $x, y \in X$ such that $x \preceq fx$, then $fx \preceq ffx$;
- (ii) there exists $x_0 \in X$ such that $x_0 \preceq fx_0$;

Thus, the pair (f, g) have a unique common fixed point v and $\sigma(v, v) = 0$.

We are giving an example to illustrate main theorem.

- (iii) there exists $F \in F$ and $\tau > 0$ such that for all $x, y \in X$ satisfying $x \preceq y$, we have

$$\begin{aligned} & \sigma(fx, fy) > 0 \Rightarrow \tau + F(\sigma(fx, fy)) \\ & \leq F(\max\{\sigma(x, y), \sigma(x, fx), \sigma(y, fy), \\ & \frac{\sigma(x, fy) + \sigma(y, fx)}{2}\}); \end{aligned} \quad (10)$$

- (iv) if $\{x_n\}$ is sequence in (X, σ) converging to $x \in X$ and $\{x_n : n \in \mathbb{N}\}$ is well ordered, then $x_n \preceq x$ for sufficiently large n .

Then f has a fixed point $v \in X$ and $\sigma(v, v) = 0$. Furthermore, the set of fixed points of f is well ordered if and only if f has a unique fixed point.

Corollary 7. Let $(X, \sigma, \sqsubseteq)$ be a partially ordered metric-like space and let $f, g : X \rightarrow X$ be a mapping such that $f(X) \subset g(X)$ and $g(X)$ is σ -complete. Suppose that the following hold :

- (i) if $x, y \in X$ such that $gx \preceq fx = gy$, then $fx \preceq fy$;
- (ii) there exists $x_0 \in X$ such that $gx_0 \preceq fx_0$;

(iii) there exists $F \in \mathcal{F}$ and $\tau > 0$ such that for all $x, y \in X$ satisfying $gx \approx gy$, we have

$$\sigma(fx, fy) > 0 \Rightarrow \tau + F(\sigma(fx, fy)) \leq F(\sigma(gx, gy)); \quad (11)$$

(iv) if $\{x_n\}$ is sequence in (X, σ) converging to $x \in X$ and $\{x_n : n \in \mathbb{N}\}$ is well ordered, then $x_n \approx x$ for sufficiently large n .

Suppose F is continuous, then the pair (f, g) have a point of coincidence $v \in X$ and $\sigma(v, v) = 0$.

Furthermore, if the set of coincidence points of the pair (f, g) is g -well ordered then the pair (f, g) have a unique point of coincidence. If in addition, the pair (f, g) is weakly compatible, then there exists a unique common fixed point of the pair (f, g) .

Following example illustrates the case when usual metric version of Corollary 7 as well as the main result of [18] is not applicable, while our Corollary 7 is applicable.

Example 6. Let $X = [0, 2]$ and define $\sigma : X \times X \rightarrow \mathbb{R}^+$ by

$$\sigma(x, y) = \begin{cases} 0, & \text{if } x = y = 2; \\ 2x, & \text{if } x = y; \\ \max\{x, y\}, & \text{otherwise} \end{cases}$$

Then (X, σ) is a σ -complete metric-like space. Define a partial order relation " $\sqsubseteq$ " on X and $f, g : X \rightarrow X$ by $\sqsubseteq = \{(x, y) : x, y \in [0, 1] \text{ with } x \geq y\} \cup \{(x, y) : x, y \in (1, 2] \text{ with } x \leq y\}$,

$$fx = \begin{cases} x - \frac{1}{2}, & \text{if } x \in [0, 1/2) \\ 0, & \text{if } x = 1/2 \\ x + \frac{1}{2}, & \text{if } x \in (1/2, 1] \\ 2, & \text{if } x \in (1, 2] \end{cases} \quad \text{and} \quad gx = \begin{cases} x - \frac{1}{2}, & \text{if } x \in [0, 1) \\ 2, & \text{if } x \in [1, 2] \end{cases}$$

Then, the set $C(f, g)$ is not g -well ordered and all other conditions of Corollary 7 are satisfied with $\tau \in (0, \log 2]$ and $F(\alpha) = \log \alpha$, and 0 and 2 are the points of coincidence as well as common fixed points of pair (f, g) . Note that $C(f, g) = \{0\} \cup (1, 2]$ and $(g_0, gx), (gx, g_0) \notin \sqsubseteq$ for all $x \in (1, 2]$, therefore $C(f, g)$ is not g -well ordered and the point of coincidence is not unique.

Note that, if d is the usual metric on X then at point $(x, y) = (1, 3/5)$ we have, $d(fx, fy) = d(f1, f3/5) = d(3/2, 11/10) = 2/5$ and $d(gx, gy) = d(g1, g3/5) = d(3/2, 3/2) = 0$. Therefore, there is no $\tau > 0$ and $F \in \mathcal{F}$ such that $\tau + F(d(fx, fy)) \leq F(d(gx, gy))$ for all $x,$

$y \in X$ with $x \approx y$. Thus, the metric version of Corollary 7 is not applicable. Also, with same point we conclude that there is no $k \in [0, 1)$ such that $d(fx, fy) \leq kd(gx, gy)$ for all $x, y \in X$ with $x \approx y$, so the results of [18] are not applicable.

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Promotion as the Predictor of Purchase Intention: A Study on Cosmetic Product in Central Chhattisgarh

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Abstract- The Cosmetic product is categorized as skin care, hair care, color cosmetics, fragrances and oral care segments which is on the path of becoming a million dollar industry in Chhattisgarh and is expected to grow at rapid pace. Since 1991 with the liberalization along with the crowning of many Indian women at international beauty pageants, the cosmetic industry has come into the limelight in a bigger way. Subsequently there has been a change in the cosmetic consumption and this trend is fueling growth in the cosmetic sector. Chhattisgarh cosmetic Industry had rapid growth in the last couple of years.

The whole research is aimed at how much impact promotion has on Purchase Intention. I conducted various surveys among the Gen Next customers and collate the data. After many round of data analysis it has been found that Promotion strongly influence purchase intention of people and they tend to go with brand image created by promotional activities. In the Chhattisgarh Cosmetic Industry, both electronic as well as print media are playing an important role in spreading awareness about the cosmetic products and developing fashion consciousness among the Chhattisgarh consumers. During this research we found another important fact that along with enhanced purchasing intention, purchasing power has also been improved in Chhattisgarh hence with more purchasing power and increasing fashion consciousness, the industry is expected to maintain the growth momentum during the period 2016-2017.

Index Terms- Purchase Intention, Promotion, Cosmetic product

INTRODUCTION

The main agenda of this research is to find out the impact of promotion in increasing the purchase intention of cosmetic product in Chhattisgarh. The following section explains what is the business

meaning of promotion, promotional strategies and purchase intention?

Promotion

It is something made to publicize or advertise a product, cause, institution, etc., as a brochure, free sample, poster, and television or radio commercial or personal appearance.

Promotional Strategy

It has to do with finding the best market for a product or service and utilising all aspects of the promotion such as advertising and discounts used to promote the product or service to a particular market.

Most Commonly used Promotional Strategies

Promotion is one of the essential ways for getting your brand in view of the public and attracting customers. There are many ways to promote a product or service. Some companies use more than one method, while others may use different methods for different marketing purposes. Regardless of your company's product or service, a strong set of promotional strategies can help position your company in a favorable light with not only existing customers but new ones as well.

Contests: Contests are a frequently used promotional strategy. Many contests don't even require a purchase. The idea is to promote your brand and put your logo and name in front of the public rather than make money through a hard-sell campaign. People like to win prizes. Sponsoring contests can bring attention to your product without company coventness.

Social Media: Social media websites such as Facebook and Google+ offer companies a way to promote products and services in a more relaxed environment. This is direct marketing at its best. Social networks connect with a world of potential customers that can view your company from a different perspective. Rather than seeing your company as "trying to sell" something, the social network can see a company that is in touch with people on a more personal level. This can help lessen the divide between the company and the buyer, which in turn presents a more appealing and familiar image of the company.

Mail Order Marketing: Customers who come into your business are not to be overlooked. These customers have already decided to purchase your product. What can be helpful is getting personal information from these customers. Offer a free product or service in exchange for the information. These are customers who are already familiar with your company and represent the target audience you want to market your new products to.

Product Giveaways: Product giveaways and allowing potential customers to sample a product are methods used often by companies to introduce new food and household products. Many of these companies sponsor in-store promotions, giving away product samples to entice the buying public into trying new products.

Point-of-Sale Promotion and End-Cap Marketing: Point-of-sale and end-cap marketing are ways of selling product and promoting items in stores. The idea behind this promotional strategy is convenience and impulse. The end cap, which sits at the end of aisles in grocery stores, features products a store wants to promote or move quickly. This product is positioned so it is easily accessible to the customer. Point-of-sale is a way to promote new products or products a store needs to move. These items are placed near the checkout in the store and are often purchased by consumers on impulse as they wait to be checked out.

Customer Referral Incentive Program: The customer referral incentive program is a way to encourage current customers to refer new customers to your store. Free products, big discounts and cash rewards are some of the incentives you can use. This is a promotional strategy that leverages your customer base as a sales force.

Causes and Charity: Promoting your products while supporting a cause can be an effective promotional strategy. Giving customers a sense of being a part of something larger simply by using products they might use anyway creates a win/win situation. You get the customers and the socially conscious image; customers get a product they can use and the sense of helping a cause. One way to do this is to give a percentage of product profit to the cause your company has committed to helping. The best example of this would be Nihar Shanti Amla. The commercial for Nihar Shanti Amla seems right out of the unwritten textbook on hair care advertising.

Vidya Balan is the mandatory celebrity/pretty face with long hair, surrounded by a bunch of precocious tots. Except it's soon revealed that the apparently random yelling of the alphabet is not just to push the film into cutesy family friendly territory as is usually the case. It's to highlight Nihar Shanti Amla's move into purpose based branding territory, with 2% of the proceeds from the sale of each bottle being devoted to the education of children.

Branded Promotional Gifts: Giving away functional branded gifts can be a more effective promotional move than handing out simple business cards. Put your business card on a magnet, ink pen or key chain. These are gifts you can give your customers that they may use, which keep your business in plain sight rather than in the trash or in a drawer with other business cards the customer may not look at. For e.g Emami scheme include emami pure skin worth Rs, 22 free with boroplus moisturising lotion worth Rs. 98. ITC offering Vivel di wils shampoo(200ml) with its 75gm bathing soap for Rs.89

Customer Appreciation Events: An in-store customer appreciation event with free refreshments and door prizes will draw customers into the store. Emphasis on the appreciation part of the event, with no purchase of anything necessary, is an effective way to draw not only current customers but also potential customers through the door. Pizza, hot dogs and soda are inexpensive food items that can be used to make the event more attractive. Setting up convenient product displays before the launch of the event will ensure the products you want to promote are highly visible when the customers arrive.

After-Sale Customer Surveys: Contacting customers by telephone or through the mail after a sale is a promotional strategy that puts the importance of customer satisfaction first while leaving the door open for a promotional opportunity. Skilled salespeople make survey calls to customers to gather information that can later be used for marketing by asking questions relating to the way the customers feel about the products and services purchased. This serves the dual purpose of promoting your company as one that cares what the customer thinks and one that is always striving to provide the best service and product.

Purchase Intention

As per Philip Kotler theory “Purchase intention is defined as an “individual’s readiness and willingness to purchase a certain product or service”. Similarly, purchase behaviour is defined as “decision processes and consumer involvement in purchasing and using product” or simply as purchasing goods and services for personal consumption.

Factors which drive the correlation between promotion and purchase intention of cosmetic product industry:-

- The psychology of how consumers make decision between different alternatives (e.g., brands, products, and retailers)
 - The psychology of how the consumer is influenced by his or her environment (e.g., culture, family, signs, media)
 - Lack in consumer knowledge or information processing abilities influence marketing decisions and outcome
 - How the behavior of consumers affect marketing decision while shopping or making other decisions
 - The effect of consumer motivation and decision strategies while deciding between two different products
 - How marketers make and improve the existing strategies in order to reach the consumers effectively
- Today, the beauty and health market is growing rapidly in Chhattisgarh. Sales of beauty products were sustained by a rise in the number of working women, an increased urbanization, and a growing number of women entering the Chhattisgarh labour force. This paper examines the effects of brand image, product knowledge, promotion, and product quality on consumers’ purchase intentions in the cosmetics industry. Companies could use the findings to enhance their brand management. Consumers usually prefer well-known brands, because they presume that they are associated with higher quality. Thus, promotion highly affects consumer’s purchase intention.

Research Objective

- 1) To find out the various factors that impacts consumer buying behaviour and purchase decision.
- 2) To find out different modes of promotional strategies and their importance in motivating consumer buying behavior and purchase intention of consumers in cosmetic industry.

LITERATURE REVIEW

What is Cosmetic?

The Federal Food, Drug and Cosmetic Act (FDA) defined cosmetic is "product that is intended to be

rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body or any part in order to clean, beautify, promote attractiveness, or alter the appearance". Cosmetic is not only on makeup and perfume. It also contains lotions, skincare, Shampoo, etc. In this study, cosmetic products mainly focus on makeup and skincare product.

How Fashion and Cosmetic correlates?

Rudd and Lennon (2000) define dress as “the act of choosing how and with what items or processes to construct personal appearance”. In order to achieve this goal, customer can use different kinds of dress which is not limited to the apparel product. Cosmetic product also can achieve the goal of constructing personal appearance.

Evans (1989) thinks that fashion can be an ideal product for reflecting the changes of grooming. Cosmetic item is similar with the apparel product which helps for enhancing the appearance attractiveness and reflecting the changes.

De Mooij (1998) stated that standardization in advertising strategy could apply on the beauty-related products, liked cosmetics, clothing and footwear. As the result, marketer always emphasize on enhancing attractiveness of appearance in cosmetic and clothing product advertising. As the result, cosmetic brand marketing strategy could be adapted into apparel brand.

How Celebrity endorsement comes to foray?

Many of the cosmetic and apparel brand used celebrity endorsement in marketing strategy. Since it could be easier for promoting its brand to the public, there is higher chance for potential customers recognize the brand compared with competitor.

Purchase Intention and Promotional Strategy is linked to the real purchase of the cosmetic product/brand, actual purchase behaviour is evident when a consumer goes through all the relevant steps of a purchase. Actual purchase behavior of cosmetic product/brand is defined as consumers from different background having different abilities in terms of actual purchase to select from different cosmetic products brands.

Trust and Actual Purchase

Various researches have revealed trust as the highly contributing variable for purchase behavior when it

comes to cosmetic product. Trust is a factor that cannot be created overnight and entirely depends on the relation between the two parties. According to Rousseau, consumer trust relies on the willingness of the consumer to be emotionally tied and belief is the variable found to have a role in increasing the level of trust.

Promotion and Advertisement

As mentioned above to positively influence the purchase intention a cosmetic product brand has to have build the trust. Here comes the need of two essential tools to build trust and enhance brand image i.e. promotion and advertisement. According to Kotler and Armstrong, advertising can directly influence the purchase behavior decision. It does this by creating awareness, providing product information and helping consumer determine the worth and quality of the product, thus helping them to decide on the best purchase option. In addition, findings of previous studies regarding purchase intention as antecedent of actual purchase reveal significant positive relationships. Hence, hypotheses of this study are as follows:

H1 purchase intention has a significant and positive influence to actual purchase,

H2 Trust has a significant and positive influence to purchase intention,

H3 Promotion and Advertisement is related significantly and positively to purchase intention

H4 Trust has a significant and positive influence to actual purchase

H5 Promotion and Advertisement is related significantly and positively to actual purchase.

Underpinning Theory:

Theory Of Planned Behaviour (TPB) The Theory of Planned Behavior confirms that actual behavior is a direct function of behavior intention and perceived behavior control and that behavior intention is a function of attitude toward behavior, where attitude is defined as the individual's negative or positive feelings towards performing a behavior. Subjective norm is considered as the perception of an individual on whether people who matter to him should expect the behavior to be done or not. The contribution of the opinion of important people in his life is weighed against the motivation of his complying to do according to the opinion. Therefore, subjective norm can be wholly expressed as the total sum of the individual's perception of his motivation assessments of all the important people.

RESEARCH METHODOLOGY

The study employs quantitative research design by administering primary data collection via a

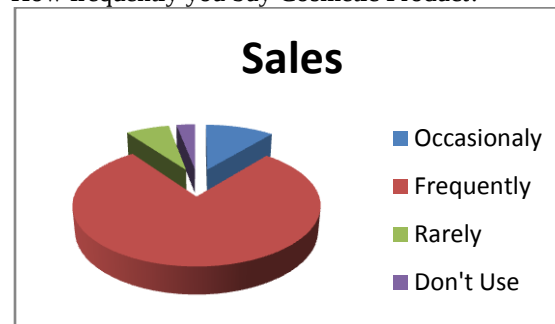
questionnaire. This study is conducted in Chhattisgarh. Chhattisgarh is a state located in the central India.

Chhattisgarh with an estimated population of more than 25.5 million people. A total of 500 questionnaires were distributed to young and middle age group of people whereby 380 responses were returned representing 76 percent response rate.

Data Analysis

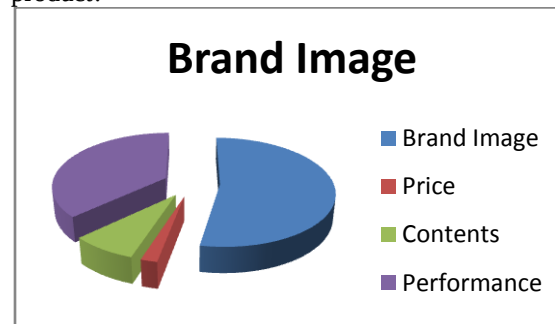
Pie Chart 1(Sale of Cosmetic Products)

How frequently you buy Cosmetic Product?



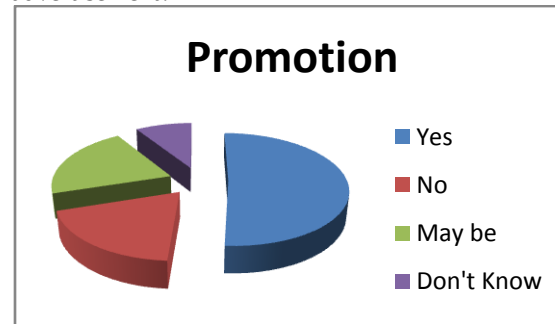
Pie Chart 2 (Brand Image)

What influence you the most while buying cosmetic product?



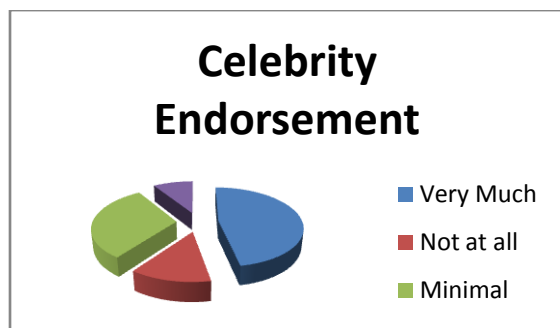
Pie Chart 3 (Promotion)

Do you buy a cosmetic product after watching the advertisement?



Pie Chart 4(Celebrity Endorsement)

How much impact a celebrity has in your buying decision of a cosmetic product?



The present study reveals that the influence of four predictors of actual purchase of cosmetic brand on Chhattisgarh consumers Promotion, advertisement, and purchase intention are the significant positive antecedents of actual purchase towards cosmetic brands. This replicates and supports the finding by the past studies. The significant impact of promotion, brand image on cosmetic product reveals that Chhattisgarhi consumers prefer cosmetic brand because of trust and emotional quotient among the consumers Chhattisgarhi consumers are more emotional oriented rather than functional value for shopping cosmetic products. The best example is the whooping rise in sales of Patanjali cosmetic products. In last few quarters riding on the band wagon of yoga guru Baba Ramdev Patanjali cosmetic products has acquired a substantial market share in cosmetic industry and out class the some biggest names such as Emami, Loreal, Lakme etc. This is in complete inclination of our current research result. The way patanjali product promoted the advantages and Aayurveda and capitalised on the celebrity image of Baba Ramdev has made this possible.

CONCLUSION

The research concludes that the factors namely trust, promotion, advertisement and purchase intention directly influence actual purchase of cosmetic product brand in Chhattisgarh. And also trust, promotion, advertisement important predictors of the actual purchase. The study provides valuable implication for the existing cosmetics brand. The companies are advised to focus on trust, advertisement and promotional strategy in order to make a great appeal on their product. The advertising campaigns could impact emotionally appealing messages stressing the trust of cosmetic brands. While projecting the products features they are advised to focus on improving the positive concept of the product. Chhattisgarhi companies are advised to go for aggressive strategies to improve the

customer's perception on Cosmetic brands in terms of quality and trust value like "Herbal", "Without Chemical harms", "Natural".

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Television

The Supernatural elements in Ruskin Bond “The Overcoat”

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Abstract - Ruskin Owen Bond as a short story writer occupies a prominent place in the realm of contemporary Indian English writers. The unique touch of the author as a super naturalist lies as he treats mystery and imagination occurring at a deep level and connecting all human consciousness and experience which society has long suppressed. The super naturalists were determined to explore the inner psyche, the realm of fantasy and unconsciousness. The supernatural element evokes unnatural worlds of fear and horror and even allows readers to develop a degree of pleasant insensitivity to the subtleties of the real world. These unusual experiences that lack a scientific explanation or phenomena alleged to be outside of science's current ability to explain or measure. The writer's creative imagination, hallucination, dream gives charm and special effect to his narration and fills it surrounding/ situation terrifying and he develops a safe fear factor to threaten the reader. Bond artistic merit imparts a touch of authenticity in native color and tones as much as they come across in the popular folklore about the mysterious features of the supernatural.

Key words: Terror, Fear, Ghost, Overcoat, Mystery

INTRODUCTION

The supernatural is considered to be those powers which are not believed to be human or not subject to the laws of nature or logic. The super naturalists were determined to explore the inner psyche, the realm of fantasy and unconsciousness. They viewed dreams and imagination as occurring at a deep level and connecting all human consciousness and experience which society has long suppressed. “C.S. Lewis argued in his

book, Miracles, that it is inaccurate to define a miracle as breaking the laws of nature. Instead,

The great complex event called Nature,
and the new particular event introduced
into it by the miracle, are related by their
common origin in God, and doubtless, if
we knew enough, most intricately related
in his purpose and design, so that a Nature
which had had a different history, and
therefore been a different Nature, would
have been invaded by different miracles
or by none at all.(Lewis, Wikipedia)

It's just that there are some things we don't yet understand well enough. We cannot explain why this or that happens or do exists. These things, whatever happens, in concise form, can be said as supernatural only. These unusual happenings and experiences that lack a

scientific explanation or phenomena alleged to be outside of science's current ability to explain or measure. No doubt some stories of mysterious agents can be found in every literature. Bond too, has scribbled fantastic tales of ghosts and spirit. Bond's believes that supernatural elements spring from the natural atmosphere stirred into the everyday life, which are sometimes remains unobserved. They are meant to thrill, shrill with exquisite terror at the thought of a spirit gliding through the dark or meeting on the road at dark chill night to perform its nameless deed. The writer's creative imagination, hallucination, dream gives charm and special effect to his narration and fills it surrounding/ situation terrifying and he develops in the readers a safe fear factor to threaten the reader. Bond artistic merit imparts a touch of authenticity in native color and tones as much as they come across in the popular folklore about the mysterious features of the supernatural. "These supernatural stories range covers from the vintage 'Raj' piece of Kipling and "The Strange Ride of Morrowbie Jukes" and "The Mark of the Beast" and "The Brown Hand" by Conan Doyle, to the post -independence offerings of Satyajit Ray " They Were tiger" and "Around the temple" by R.K. Narayan and "Little Ones" by O.V. Vijayan's and Ravi Shankar's "Mixed Blood" and "A Shade Too Soon" by Jug Suraiya's other Indian writers". (Guha, 28). No doubt these stories have passed from generation to generation and are influenced by the creativity and psyche of each writer. In this way writers saw an object and created art out of it because of the feelings that object inspired and what that object lent itself to be transformed into and bring forth a new manner or way of seeing and feeling the world as it was understood. This paper will make a deep study of the supernatural elements used by Bond in his famous short story The Potpourri

Bond's all ghost stories are set in a beloved hill near Dehradun. His ghosts and spirits are benevolent and pleasant. Like Raja Rao's phrase the **Sthala Purana** of the Grahwal hills these stories are found to be inseparable part of human consciousness expressing themselves. They do not create a terrible atmosphere of terror or horror. Some of the short stories of Bond end in make -believe characters. Here, "Manish Bhatt raise a rhetorical question "Isn't in an age of science one finds it difficult to digest his fictional encounters with **ghosts and jinns**, none can deny that they do exist in the psychology of each society either in the East or in the modern West". (Bhatt, 99) What the psychologist illustrates the memory image (mistaken for perception) an individual's hold on reality is weakening by his absorption in his fears and anxieties, desire and whims. Further the reason is individual own false sensation , unworthiness, unfilled desire, wishes, painful experience, due to these individual see, smell, feel, odors or hears voice in line with his desires and fears. Bond's language is very well describes the mental set up or characters frame of mind due to which he see or hear and feels the events or the situation. Here, Ruskin Bond justifies the reason for creation of supernatural world thus:

The truth is, what we commonly call life is not really living at all. The regular and settled ways which we accept as the course of life are really the curse of life. They tie us down to the trivial and monotonous, and we will do almost anything to get away, ideally, for more exalted and fulfilling existence, but if is not possible, for a few hours of forgetfulness in alcohol, drugs , forbidden sex or even golf. So it would give me great

joy to go underground with the fairies.

These little people who have sought refuge
in Mother Erath from mankind's killing ways
are as vulnerable as butterflies and flowers....

Come fairies, carry me away, to experience again
the perfection I did that summer's day!

(A Season of Ghost 29-30)

Bond tells a story which is inextricably linked with artistic merit endeavor to interlock the attention of readers as he describes the story "**The Over Coat**" Bond met a sixteen -year old girl named Julie in a "long hair, hanging to her waist, and a flummoxed sequined dress, pink and lavender" (28) on his way to Kapadia's house. Julie old -fashioned wearing reminds Bond of his grandmother. When he (Bond) came closer to her, she has a lovely eyes and a winning smile. Bond's invited her to attend the party with him. She immediately accepted his invitation. At the party everyone thought that she was a girl friend of Bond. Bonds also did not feel to deny accepting her as a friend. And, he now and then happens to fall in love with any girl who was nice to him is weakness of Bond. The need of love and care in relationship is experienced by all at various times in his stories. In the party, Julie was feeling lonely and wanted to be friendly with the people. Though she was not much interested in eating, drinking, but she flitted about from one group to another, talking, listening, and laughing; and when the music began, she was dancing almost continuously, alone or with partners, it appears that she is completely wrapped up in the music. No doubt she is enjoying the party. At the midnight, when the party is over Bond had drunk a fair amount of punch, he was not

able to walk anymore and therefore, he bid-good -bye to everyone, at this moment she expresses her willingness to go with him (Bond). The humanistic bend always glance through Bond's writing. Innocently Bond asked her where she lived, here she replied, "At Wolfs burn," "At the top of the hill" But Bond said "There's a cold wind," I said, "And although your dress is beautiful, it doesn't look very warm. Here, you'd better wear my over coat I've plenty of protection." (28) Julie does not protest and calmly accepted his overcoat. Due to heavy drink, Bond did not express the desire to escort her all the way. So, they departed from each other. Julie's followed her way to the hillside .In the dark chill night, Bond's lend his overcoat to Julies with assurance to collect it the next day, but when he reaches "The next day I walked up to Wolfs burn I crossed a little brook, from which the house had probably got its name, and entered an open iron gate. But of the house itself little remained. Just a roofless ruin, a pile of stone, a shattered chimney, a few Doric pillars where a veranda had once stood" Bond investigate about the Julie from mission house where the Mrs. Taylors lived. On hearing, he was struck and lost his balance when the Mrs. Taylor says,

Nobody had lived at Wolfs burn for over
forty years. The MacKinnon's lived there.

One of the old families who settled here.

But when their girl died.... ' She stopped
and gave me a queer look. 'I think her name
Julie.... Anyway, when she died, they sold
the house and went away. No one ever lived

in it again; and it fell into decay .But it
couldn't be the same Julie you're looking for
. She died of consumption -there wasn't

much you could do about it in those days.

Her grave is in the cemetery, just down the road. (29)

Without saying a words Bond walked slowly down the road to the cemetery under the deodars. Here, he found Julie's grave with a simple head stone with her name clearly outlined on it:

Julie mackinnon 1923-39

‘With us one moment,

Taken the next,

Gone to her maker,

Gone to her rest.

Here, he recovered his neatly folded overcoat from the cemetery. After the close study of Bond short stories, one can see Bond's has lost his nearest and dearest may be either parents or beloved one which let him a thirst and space for relationship for ever. This intense emotion can be understood in terms of the inner mental states of the characters concerned. Therefore, Bond creative technique creates the environment of (spine chilling) event that seems to push the imaginary boundaries of what it contains. In the psychological term ghost story, is one which dissolve the boundary between the mind and the exterior world. It makes us feel naturally long to see the unseen and hear the unheard which have been remained mysteriously hidden so far and later on put into the light of understanding. He makes the story the strong, credible by working out “**willing suspension of disbelief**” as Coleridge said about the method of making the supernatural look natural. The exquisite and exhilarating description of physiognomy of characters helps the readers to form a close relationship with them. His style which is used fantasy

imagery from his subconscious mind and his style never foreshadows the fascination of his faithful description.

In the similar vein the story “**The Overcoat**” is written by [Ukrainian](#)-born [Russian](#) author [Nikolai Gogol](#), where Gogol uses "corpse" to describe the ghost of Akaky. The story revolves around the life and death of Akaky Akakievich Bashmachkin. Akaky is a very hard -working clerk, lives in the St. Petersburg (the Russian capital). He is an expert in the hand –copying of the documents. The young clerk always tries to distract and tease him now and then. Often his (Akaky) threadbare overcoat has been the matter of their jokes. So Akaky decides to get repaired his coat, but the tailor declares the coat irreparable. In deed the tailor advice him to buy a new coat. But the cost of overcoat neither affordable nor within his salary. Hereafter, both (Akaky and tailor) frequently use to meet and discuss the style of the new coat. One day at the surprising end he got a large holiday as a salary bonus. This amount was sufficient to buy a new overcoat. Now Akaky and the tailor go the shop and select finest cat fur available in the market of St. Petersburg. No doubt the new coat is quite impressive and exclusive in its appearance. Soon it became the talk of the office and even a part is organized in the honour of the new coat. After the party, as Akaky's is returning home the two ruffians attack him , take his coat, kick him, and leave him in the snow.

For help Akaky approached the authorities, but no one helps him to recover the coat. On the suggestion of a colleague, he appeals to “VIP” a high-ranking general. After keeping him (Akaky's) waiting for a long time. The general declare this matter as a trivial, and demands to present the case in separate departments (the VIP from the lesser clerks). At this

discrimination Akaky passes a remark to the department secretaries, at this moment he was thrown out of the general office. In this whole incidence, Akaky fall deathly ill due to fever. In the last hours, he lost his mental balance and imagining sitting himself before VIP, who is scolding him, and he is begging for forgiveness, but as his date nears, he curses the general for his deed. Soon Akaky Ghost is reported in nearby areas of the St. Petersburg, who is haunting and taking overcoat from the people, the police are helpless in this regard. At the last, Akaky's ghost meet with the VIP — who has ill-treated him and the reason for his death — and he (Akaky) takes his overcoat, frightening him terribly; his soul was now satisfied, the hereby Akaky ghost is not seen. The reason behind Akaky ghost is lost his dear overcoat and no help is rendered by higher authority to resolve the problem of poor Akaky's, and indifference attitude of higher authority on the part of Akaky's and let his soul unsatisfied and his dying thirsty to get overcoat create as hallucination atmosphere.

Bond's did not delve into the reality of the existence of the ghosts. Whether, it may be of Julie ghost or Akaky ghost do exist, due to environmental obstructions when their desires or wishes are left unsatisfied they are repressed in unconscious mind. These wishes appear in disguised form. Bond's past experience of bitter or harsh relationship and these unconscious wishes make appear into the consciousness in a disguised form. All the writings are beautifully crafted by those people whom he came across and inspire him and left a lasting impression on him.

Conclusion: Without any bad intention Bond believes in pure entertainment, Indeed, Bond's aim is the only enjoyment and bring humour to the reader of a particular book belonging in a particular setting and situation and at the same time raise curiosity to see the unseen and hear unheard which have

mysteriously hidden so far and put them to the light understanding (by writer), so to bring the distinctions truth and the falsehood. "When life is full of satisfaction and happiness, why to get it disturb with rational analysis, "It is good to be left with some small mystery, a mystery sweet and satisfying and entirely my own". (Rain in the Mountains 111) Therefore, Bond stories eerie story are not tormentor or annoyance, but remain contented with human beings a little to make them realize the importance of fantasy in Human existence. In an interview with Pandit, Bond says,

Don't be afraid of the dark, little one,
the earth must rest when the day is done,
the sun may be harsh, but moonlight--never!
and those stars will be shining forever and ever,
be friends with the night the night, there is nothing to
fear, just let your thoughts travel to friends far and near.
by day, it does seem that our troubles won't cease,
but at night, late at night, the world is at peace.

(Pandit, dna)

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Isolation and Identification of Soil Mycoflora of Tea Plant at Jashpur (Chhattisgarh)

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Abstract - Tea is a very interesting beverage with potential for variety of medicinal uses and health promoting benefit. The aim was to study the soil mycoflora of tea plant. A total 103 colonies of 18 species belonging to 9 genera of fungi were isolated from Tea plant field at Jashpur during March 2013 to November 2013 in three intervals. The mycoflora were isolated by using soil dilution technique and soil plate technique on Potato Dextrose Agar medium supplemented by suitable antibiotics such as penicillin and streptomycin. Identification and characterization of the mycoflora were made with the help of authentic manuals of fungi. The most common among them viz; *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus niger*, *Aspergillus nidulans*, *Aspergillus terreus*, *Penicillium chrysogenum*, *Penicillium frequentans*, *Fusarium oxysporum*, *Fusarium palidosperme*, *Curvularia lunata*, *Trichoderma viride*, and *Rhizopus stolonifer* were isolated and characterized. The seasonal variation and percentage contribution of the mycoflora were statistically analyzed.

Key Words: Jashpur, Tea plant, Mycoflora, Diversity, Zygomycotina

INTRODUCTION

Tea is one of the most widely consumed beverages in the world, second only to water, and its medicinal properties have been widely explored. The tea plant, *Camellia sinensis*, is a

member of the Theaceae family, and black, oolong, and green tea are produced from its leaves. It is an evergreen shrub or tree and can grow to heights of 30 feet, but is usually pruned to 2-5 feet for cultivation. Soil microflora plays a vital role in evaluation of soil conditions and in stimulating plant growth (Singh et al. 1999). Many biological processes take place in soil and determine functions that provide various services within ecosystems: turn-over of organic matter, symbiotic and non-symbiotic atmospheric nitrogen fixation, denitrification, aggregation, etc. (Chenu and Stotzky, 2002). Microorganisms are beneficial in increasing the soil fertility and plant growth as they are involved in several biochemical transformation and mineralization activities in soils. Fungi are fundamental for soil ecosystem functioning. The members and kinds of micro organisms present in soil depend on many environmental factors such as the amount and type of nutrients, moisture, degree of aeration, pH and temperature etc. In general micro-organisms demonstrate considerable capacity for the metabolism of many pesticides (Gaddeyya G et al., 2012). Although they are capable of catalyzing similar metabolic reactions as animals and plants, they possess the unique ability to completely mineralize many aliphatic, aromatic, and heterocyclic compounds. The aim of the present investigation is to isolate soil mycoflora

from Tea plant, and to observe the percentage contribution of different fungal species.

METHOD

Study site:

For this study Tea plantation area, Sogda ashram dist.-Jashpur (Chhattisgarh) was selected (Photoplate 1).

Collection of soil samples:

The soil samples were collected from Tea crop fields in various locations of Jashpur. Soil samples of Tea crop field at Jashpur were collected during March 2014 to November 2014. The soil samples were collected from fields (up to 15cm depth) into a small sterilized polythene bags and brought to laboratory for further studies.

Isolation of fungi from the soil samples:

The soil micro fungi were enumerated by two methods, namely Soil Dilution and soil plate method on Potato Dextrose Agar.

Soil dilution plate method:

1gr of soil sample was suspended in 10ml of double distilled water to make microbial suspensions (10^{-1} to 10^{-5}). Dilution of 10^{-3} , 10^{-4} and 10^{-5} were used to isolate fungi. 1 ml of microbial suspension of each concentration were added to sterile Petri dishes (triplicate of each dilution) containing 15 ml of sterile Potato Dextrose Agar. One percent streptomycin solution was added to the medium before pouring into petriplates for preventing bacterial growth. The Petri dishes were then incubated at $28 \pm 2^{\circ}$ C in dark. The plates were observed everyday up to three days (Waksman, 1922).

Soil plate method:

About 0.005g of soil was scattered on the bottom of a sterile petri dish and molten cooled ($40-45^{\circ}$ C) agar medium (PDA) was added, which was then rotated gently to disperse the soil

particles in the medium. The Petri dishes were then incubated at $28 \pm 20^{\circ}$ C in dark for three days (Warcup, 1950).

Identification of the soil fungi :

Fungal morphology were studied macroscopically by observing colony features (Colour and Texture) and microscopically by staining with lacto phenol cotton blue and observe under compound microscope for the conidia, conidiophores and arrangement of spores (Aneja 2001). The fungi were identified with the help of literature (Gilmen 2001).

Statistical analysis:

The number of colonies per plate in 1g of soil was calculated. The percent contribution of each isolate was calculated by using the following formula:

$$\% \text{ contribution} = \frac{\text{Total no. of CFU of an individual species}}{\text{Total no. of CFU of all species}} \times 100$$

*CFU-Colony Forming Unit

RESULTS AND DISCUSSION

During the investigation period 103 fungal colonies of 18 fungal species of 9 genera were observed (Table: 1).

Species Composition

Among the 9 genera recorded, the genus *Aspergillus* was considered by more number of (7 species) followed by *Penicillium*, *Fusarium* and *Rhizopus* (2 species each). All other genera were represented one species each.

Ecological study:

The maximum fungal species belongs to Anamorphic group (87 colonies) followed by Zygomycotina (11 colonies) and minimum to Mycelia sterile (5) were observed. Among the isolates the genera *Aspergillus* and *Penicillium* were dominant. Among the isolates the genera *Aspergillus*, *Penicillium* and *Fusarium* were dominant. *Aspergillus niger* (13.59%) *Cladosporium cladosporioides* (4.85%) *Aspergillus*

fumigatus (8.73%) *Aspergillus flavus* (6.79%) *Penicillium chrysogenum* (9.70%) *Fusarium pallidoroseum* (7.76%) *Fusarium oxysporum* (4.85%) *Rhizopus stolanifer* (7.76%) *Trichoderma viride* (5.82%) *A. luchensis* (5.82%) *Curvularia lunata* (5.82%) were isolated and characterized.

Soil fungi have significant impact on the several activities of soil ecosystem. Some studies on soil fungi of agricultural fields of Tamilnadu (Mahalingam *et al* 2012), Andhra Pradesh (Shiny *et al* 2013) and other remaining states of India enlightened the importance of soil mycoflora in agricultural fields.

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Photoplate 1: Tea plan area of Jashpur



Table 1: Showing isolated fungi

S.No.	Name of Fungi	% Contribution
1.	<i>Rhizopus oryzae</i>	2.91
2.	<i>Rhizopus stolonifer</i>	7.76
3.	<i>Alternaria alternata</i>	2.91
4.	<i>Aspergillus flavus</i>	6.79
5.	<i>Aspergillus fumigatus</i>	8.73
6.	<i>Aspergillus nidulens</i>	7.76
7.	<i>Aspergillus luchensis</i>	5.82
8.	<i>Aspergillus sp.</i>	2.91
9.	<i>Aspergillus niger</i>	13.59
10.	<i>Aspergillus terreus</i>	2.91
11.	<i>Cladosporium cladosporioides</i>	4.85
12.	<i>Curvularia lunata</i>	5.82
13.	<i>Fusarium oxisporum</i>	4.85
14.	<i>Fusarium pallidoroseum</i>	7.76
15.	<i>Penicillium chrysogenum</i>	9.70
16.	<i>Penicillium frequentans</i>	4.85
17.	<i>Trichoderma viride</i>	5.82
18.	<i>Mycelia sterilia</i> (Black)	4.85

Study of Seasonal Variations of Phytoplankton and Their Correlation with Physicochemical Parameters of Mahamaya, Pond Tifra, Bilaspur (C.G.)

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Abstracts - Phytoplankton are good indicators of water quality as they have rapid turn-over time and are sensitive indicators of environmental stresses. Seasonal variation of Phytoplankton population was studied of Mahamaya pond of Tifra Bilaspur from July 2012 to June 2013. During the study period it was found that the population of phytoplankton was maximum in summer, while it was minimum in winter.

Maximum species richness of phytoplankton was recorded in summer, while minimum species richness was recorded in rain along with physico-chemical characteristics of water.

Key-Word: Phytoplankton, Seasonal variation, Tifra pond

INTRODUCTION

Phytoplankton are good indicators of water quality as they have rapid turn-over time and are sensitive indicators of environmental stresses. Phytoplankton survey thus helps to find out the trophic status and the organic pollution in the ecosystem (Ramchandra and Solanki 2007). Phytoplankton constitutes the basis of nutrient cycle of an ecosystem. Being primary producers they play an important role in maintaining the equilibrium between living organisms and abiotic factors. They are affected by physical chemical and biological factors, making them valuable tool in monitoring programmes. Several studies on phytoplankton diversity of ponds, lakes and reservoirs have also been conducted in India (Shridhar et al, 2006; Tiwari and Chauhan 2006; Tas and Gonulol, 2007; Senthilkumar and Shivkumar, 2008; Ekhande, 2010; Patil, J.V.,2011), and abroad (Round, 1985; Cleber and Giani, 2001; Sandra et al., 2007) revealing the importance of this type of study. Study site – Mahamaya pond of Tifra is situated at South, distance of 5 km from Bilaspur District. It lies at 21°

47' & 23° North latitude & 81° 14' & 83° 15' East latitude. It is medium size pond. The water is utilized for domestic purpose.

METHODOLOGY

The phytoplankton population samples are collected monthly from different site of the pond surface. The phytoplankton samples will be collected by plankton net of No.20 silk bolting cloth (Mesh size 0.076 mm). After collecting the plankton materials were transferred into the glass bottle & preserve in 1% formaline solution. The identification of phytoplankton on the bases of their morphological feature, upto the level of species according to literature in the laboratory was done.

Pond water sampling –

Water samples are collected monthly from the pond for physico-chemical analysis in the 2 litre plastic bottle before 9 am. Some of the physico-chemical parameter studies were done on the spot, while others were done in laboratory according to American Public Health Association (APHA), American Water Works Association (AWWA) & Water Pollution Control Federation (WPCF).

RESULTS AND DISCUSSION**Table-1 : Phytoplanktons species**

No	Algal spe.	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
	Cyanophyta												
1	Anabaena sp.	95	60	80	85	78	72	70	66	105	120	110	100
2	Chroococcus sp.	70	45	60	70	62	68	62	48	110	125	108	100
3	Cylindrocapsa stagnale.	60	38	45	69	65	60	68	65	90	98	95	91
4	Gloeotrichia echinulata	76	48	63	75	60	65	50	45	98	115	101	92
5	Microcystis flosaquae	62	40	44	70	60	65	68	62	91	95	90	92
6	Microcystis biformis	60	43	49	65	71	68	63	60	81	110	98	91
7	Nodularia sp.	70	50	55	60	68	65	63	50	65	70	75	78
8	Nostoc carneum	130	75	98	125	102	95	92	89	150	170	160	155
9	Oscillatoria formosa	65	42	45	50	56	52	48	45	70	63	60	58
10	Oscillatoria limosa	60	40	43	48	51	49	47	40	62	55	50	45
11	Plectonema sp.	75	42	48	45	46	44	40	36	69	75	71	67
12	Rivularia haematites	72	69	71	80	72	70	65	63	80	90	85	90
13	Spirulina subsalsa	69	45	49	55	52	50	48	43	72	65	50	59
	Total	964	637	750	897	843	823	784	712	1143	1251	1153	1118
	Chlorophyta												

1	Chlamydomonas globosa	180	95	210	205	202	170	165	162	166	199	210	225
2	Chlorococcum infasion	175	95	165	160	158	155	148	160	182	193	198	185
3	Closterium sp	80	70	65	78	74	70	68	73	79	82	78	79
4	Gleococcus sp.	84	73	79	84	73	65	63	71	80	88	83	80
5	Hydrodictyon reticulatum	65	60	66	70	65	60	63	68	69	78	62	70
6	Oedogonium sp.	90	35	65	72	60	55	53	59	72	79	63	69
7	Pediastrum oedogonia	86	32	70	75	71	70	68	76	79	89	72	78
8	Spirogyra communis	61	30	34	38	41	37	32	37	40	45	40	43
9	Scendesmus sp.	75	45	48	53	45	42	39	50	58	65	60	63
10	Ulothrix tenerrima	71	45	51	54	52	51	45	55	64	72	57	62
11	Ulothrix zonota.	70	44	47	49	43	41	39	48	55	70	53	65
12	Volvox aureus	40	20	25	28	21	19	15	25	29	42	35	38
13	Zygnema pectinatum	50	30	35	40	42	39	30	34	45	51	49	52
	Total :-	1127	674	960	1006	947	874	828	918	1018	1153	1060	1109
	Euglenophyta												
1	Euglena gibbosa	60	50	63	60	51	48	44	46	47	49	53	55
2	Euglena viridis	55	43	44	39	37	32	30	33	39	45	49	53

3	Euglena fusca	50	35	38	36	33	30	28	25	29	35	39	45
		165	128	145	135	121	110	102	104	115	129	141	153
	Bacillariophyta												
1	Anphera sp.	47	42	45	48	51	55	58	60	63	68	65	68
2	Asterionella formosa	35	37	39	42	46	49	52	54	59	65	62	70
3	Cocconeis placentula	42	30	32	34	36	38	41	46	47	49	45	56
4	Diatoma vulgare	45	20	23	26	29	34	38	41	46	52	49	56
5	Denticula pelagic	30	15	20	22	26	28	31	34	37	39	38	40
6	Gonphonema parvulum	40	18	22	26	28	30	35	40	45	50	52	54
7	Navicula capitata	60	28	31	35	38	40	43	47	50	56	48	63
8	Pinnularia major	65	30	35	38	41	45	47	51	53	55	49	60
9	Pinularia Viridis	52	28	31	35	37	39	41	43	45	48	45	50
10	Synedra capitata	70	42	40	43	45	49	52	54	57	65	66	65
11	Tabelaria sp.	45	25	28	32	35	38	40	45	48	53	58	60
		531	315	346	381	412	445	478	515	550	600	577	642

**Table -2 : Physico- chemical Characteristics of water
(July 2012-June 2013)**

No	Parameters	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	Temp.(°C)	28.3	29.1	31	30.3	25.1	20.2	19.3	23.1	35.2	36.0	38.2	31.2
2	Turbidity (NTU)	75	95	107	114	92	85	75	65	41	47	53	67

3	Conductivity	70	67	64	68	71	74	75	76	78.1	78.0	73	70
4	pH	9.3	8.2	8.3	8.4	8.6	8.7	8.7	8.9	10.0	10.3	10.9	9.8
5	Free CO ₂	50.4	53.9	51.9	50.7	49.0	48.1	47.1	48.2	48.2	49	46.8	45.2
6	BOD (mg/l)	3.0	3.1	3.2	3.4	3.6	3.7	3.7	3.9	3.9	3.8	3.4	3.1
7	DO (mg/l)	6.8	6.7	6.9	7.0	7.2	7.3	7.2	7.1	6.9	7.0	7.1	7.2
8	Chloride	119	118	116	118	120	123	124	125	127	130	137	129
9	Alkalinity	720	710	699	702	705	708	710	715	725	740	760	730
10	Total Hardness	150	145	130	127	125	132	134	138	145	147	151	149
11	Ca; Hardness	110	109	107	105	104	104	103	104	105	108	112	108
12	Mg. Hardness	85	84	85	86	87	88	89	90	92	94	99	90
13	Nitrate	2.4	2.3	2.0	1.90	1.80	1.75	1.70	1.60	2.50	3.5	3.6	3.3
14	Phosphate	1.15	1.13	1.11	1.20	1.15	1.15	1.17	1.28	1.30	1.40	1.50	1.25

Total Phytoplankton

In the investigation of Mahamaya pond during the study period of one year (July 2012 to June 2013) total 34 genera and 40 species of phytoplankton were identified belonging to Cyanophyceae (Blue green algae), Chlorophyceae (Green algae), Bacillariophyceae (Diatoms), and Euglenophyta.

The four major group of phytoplankton were recorded in Mahamaya pond. The population of Bacillariophyceae was high in summer & low in rainy season. Euglenophyta was low in winter and high in rainy season whereas the cyanophyceae were minimum in winter and maximum in summer the population of chlorophyta was low in winter and high in summer.

Maximum population of Phytoplankton noted at Mahamaya pond in summer may be attributed to maximum sunlight & higher temperature is reported to stimulate growth of aquatic autotrophs (Vyas & Kumar 1968; Murugaval & Pandian 2000; Hujara 2005, Patil 2011) in addition that the water level decrease in summer in India, the Phytoplankton aggregates resulting in their increased population.

pH is also a factor that influences plankton population The higher pH (alkaline pH) is favorable for the growth of phytoplankton (Unni 1984, Hujare 2005). George (1961) found the high pH values increase the growth of algae. Agarwal & Rajwar (2010) also observed same condition.

Temperature is one of the important determining factors for phytoplankton population & shows positive

correlation Unni & Pawar (2000). During monsoon when the water level is high phytoplankton get more distributed & recorded lowest in rainy season because of heavy rainfall high turbidity, decreased temperature & pH.

The Values of Chloride, BOD, hardness phosphate were high in summer when water level minimum and low in rainy season when water level in maximum, due to rainfall. These condition were also reported by Islam et al (1998); & Naz (1999).

Same condition was reported for Nitrate which value is higher in summer in early monsoon period. This condition may be due to decaying of plants, evaporation of water and higher phytoplanktonic production. (Epstein 1972 : Agarwal & Rajwar 2010)

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A Study on the Impact of Celebrity Image on Consumer Buying Behavior in Chhattisgarh

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Abstract-The agenda of this paper is to analyze the factor that influence of using celebrity brand image on consumer buying behavior and product choice, and to provide pointers for business users regarding effectiveness of celebrity endorsement on affecting consumers buying decision process. This study was based on empirical approach. A convenience sample of 700 locals from diverse background in Durg-Bhilai-Raipur region. The objective of the study is (1) to study that effect of celebrity brand image on consumer buying intention. (2) to understand the influence of celebrity endorsement vs. normal endorsement. (3) Impact of multiple celebrity endorsements and consumer celebrity attachment on mindset and attitude of customer. Exploratory and Descriptive analysis used to analyze the data. The result of the study is found that the survey takers were influenced by celebrity brand image in terms of buying behavior process or choice of product. The current research encouraged further studies to be carried on to examine the reasons behind the inability of using celebrities to influence consumers' purchasing decision and product choice.

Keywords: Celebrity brand image, Consumer buying behaviour, Impact factor, Chhattisgarh

INTRODUCTION

The promotion plays a significant role in fulfilling the business goals and strategies specifically in the marketing and sales field. Promotion is any communication used to educate, convince and/or remind people about an organization's products and services. Promotion comprises of awareness among customers, publicity/public relations, personal selling, advertising and sales promotion. Every single day consumers come across hundreds of audio/video messages and photographs in

magazines, newspapers, and on billboards, websites, radio and television. It is argued that endorsers who could be defined as "any individual who enjoys

public recognition and who uses this recognition on behalf of consumer goods by appearing with it in an advertisement. Various companies are signing deals with celebrities in the hope that by using celebrities they can accomplish a unique and relevant position in the minds of the consumers. Choice of the celebrity, hence, is of utmost importance and is usually done based on many different parameters - appeal, looks, popularity or even just a fantasy figure to endorse a brand. Advertisers often select endorsers as a promotional strategy to communicate the attributes of their product or brand. Today, this advertising approach appeared to be on the increase across all media types. The study from Friedman and Friedman, (1979), defined that celebrity endorser is an individual who is known to the public (actor, sports figure, entertainer, etc) for his or her achievements in areas other than that of the product class endorsed. However, the advertising practitioner should also recognize that the use of a well-known personality, who can create initial interest and attention for an advertisement, does not necessarily result in attitude changes towards the product. As well, the study from Till and Shimp, (1998), presents evidence that positive feelings towards advertising and products do not necessarily translate into actual behavior or purchase intentions. Research statistics in America have shown that the use of celebrity advertisement has doubled in the past ten years that is statistics related to the consumer goods industry. One in four advertisements features celebrities as opposed to one in eight in 1995. An increase in the use of celebrities in brand message communication among both non-luxury brands and luxury brands has taken place. Many celebrities see the multibillion dollar fragrance market as a lucrative way to expand their already famed brand, their name. Celebrities that were formerly associated with the music industry or/and film industry are exposing their presence in the consumer market, particularly the fragrance market." Billions of dollars spent per year on celebrity endorsement. The study from (Friedman and Friedman, 1979), defined that celebrity endorser is an individual who is known to the public (actor,

sports figure, entertainer, etc) for his or her achievements in areas other than that of the product class endorsed. The study of Perception of Advertising and Celebrity Endorsement (Zabid and Jainthy, 2002) shows that using a well-known celebrity as an endorser could help to improve the subjects rating of the commercial. The use of celebrities as means of communication has been commonly utilized in advertising and branding. This is done because it is assumed that celebrities have a powerful effect on the affluence of the brands they endorse. Advertisers believe that using celebrity endorser will foster, in the mind of the consumer that affect positively on the buying decision of consumers. Marketers use celebrity endorsement in order to help better storage of information in consumers' minds which they can easily remember in purchasing situations.

RESEARCH OBJECTIVES

The research objective of this study is to study the impact of celebrity endorsement on consumer buying behaviour in retail industry. The study examining the factor influence of consumer's gender, age and family income on their buying behaviour on celebrity endorsed advertisement. It attempts to understand the effectiveness of celebrity endorsement vs. non celebrity endorsement. Finally it tries to analysis the Effects of multiple celebrity endorsements and consumer celebrity attachment on attitude and purchase intention.

LITERATURE REVIEW

Celebrity endorsement helps in making a product visible or any new brand a visible brand by affecting consumer's pre purchase attitude using of celebrities like sports, athletes or actors can raise the profile of a company. It can help with consumer's awareness with a brand, endorse the effects of particular product or ingredient or drive sales of a long-standing product that needs a boost. Dean (1999). The credibility, attractiveness and match up are the main criteria's for selecting the celebrities (Mohammad and Al Zoubi, 2011). Consumers expect congruence between the perceived image and the type of the product which they endorse. Celebrities must possess expertise in product categories consistent with their public profile and their perceived life styles. Their image portrayed in personal and the public affects the way consumers perceive celebrities. Consumers have a tendency to form an attachment to any object that reinforces one's self identity or desired image, renders feelings of connectedness to a group or to any object that elicit nostalgia, and perhaps the most vivid example of this form of attachment maybe found in the

consumers preoccupation with the celebrities. O'Mahony and Irish (1997). The celebrity endorsement can have an impact on the consumers recall evaluations, attention and purchase intentions. At the same time it needs to be taken into consideration that although consumers might have a favorable disposition towards celebrities, this does not necessarily always translates into purchase intentions (O'Mahony and Meenaghan, 1998). The strong attachment of consumers and the view that celebrity endorses multiple brand it negatively impacts the purchase intention. When they have weak attachment then the purchase intention increased. If the practioner is only interested in consumer attitude towards their ad and brand then multiple celebrities has no impact. But when comes to purchase intention they must be careful in utilizing celebrities and their attachment (Jasmina, and Webster, 2011; Clark and Hotsman 2003), suggests that in certain situations, celebrity endorsements can enhance recall and consume assessment of the products. The research paper has undergone a detailed study on factors that influences effective advertisement. Advertising lets in emotional appeals that imply a huge impact on decision making process. Celebrity endorsement has its own effective apporportion in advertising that increases the customer consciousness towards the product. The crux of celebrity advertising lies in the effectiveness with which they are endorsing the product. Many respondents feel that just the presence of a celebrity in an advertisement alone will not impact the sale of a product by a big way whereas few have responded that they bought products just because a celebrity endorsed the product. Consumers are on the lookout for an experience which is more cognitive than physical (Pughazhendi et al., 2012). The selection of an endorser who is viewed positively by consumers and who is known to possess attributes which match up with the attributes of the product. Mismatched endorsers or endorsers who are not viewed positively will have a much smaller impact on consumers. an endorser who may not match up perfectly with the product, but who is viewed positively may still have an effect on the consumer (Zafer et al., 2001). Celebrity endorsement decisively gives more visibility to the product endorsed. The Brands, taking into consideration all the related factors, can make best use of either the 'Bollywood stars' or 'Sports star' to endorse their product. Male celebrities are more effective as an endorser than the female celebrities (Bhavana, 2011). The consumers are induced significantly by the celebrity endorser when the target is on quality and price. The purchase attitude is influenced by the celebrity endorsement

factors, product evaluation and brand recognition. Marketers make use of celebrity endorsements as they lead to better information storage in the minds of the consumers which can be readily retrieved when the purchasing situation does arise. Repetition of advertisement positively influences consumers to purchase that brand. Consumers believe that repetitive advertising company has a good brand name and it creates positive impact on consumers. Not all the celebrity endorsed advertisements impact the purchase decision of the consumers; it depends on the product the brand advertises. Schlecht and Christina (2003). The purchase attitude is influenced by the celebrity endorsement factors, product evaluation and brand recognition (Pughazhendi et al., 2011). The consumer gives more importance to the quality they perceived from the brand (Sohail and Sana, 2011). In a survey, titled "Impact of Celebrity Endorsement on Buying Behavior of Customers" the focus was laid on the risks and returns involved in using celebrity endorsements to influence the purchase behavior of the consumers. The outcome of the research was that, it substantiated the fact that celebrity endorsements do have an impact in the Indian scenario. The critical analysis of the research convinced that the consumers seek variety of aspects like credibility, likeability, fit between the brand and the celebrity. The research also concluded that from the viewpoint of the celebrity, it is not only the financial gains that matters but also the impact that the endorsement might do to their image. The research findings also laid stress on the fact that the association of the celebrity with any type of controversy or ill-behavior did have a negative impact on the endorsement. (Byrne et al., 2003), his study analyzed that the celebrity endorser influence on attitude toward advertisements and brands. Information was obtained from randomly selected respondents through survey questionnaires. All questionnaires were self-administered by the participants without interference from researchers. This paper provides a model connecting attitude toward celebrity endorser, attitude toward advertisement and attitude toward brand that has been examined and validated using respondents. The findings show that attitude toward celebrity endorser can influence on attitude toward brand directly or indirectly. In indirectly approach, attitude toward advertisement is as a mediator between attitude toward celebrity endorser and attitude toward brand. The celebrity inclusion on conditions that those factors were absent did not further encourage the purchase of the product. Consumers feel that there is no difference between the celebrity endorser and the

non-celebrity endorser in terms of experience. It is shown by research and experience that consumers are highly ready to spend and more comfortable, when products that relate to their desired image is endorsed by celebrities. A stream of studies identifies the attributes such as trustworthiness, similarity, likableness, expertise that cause a celebrity to stand as a persuasive source which in turn creates a sense of certainty. The survey, titled "Impact of Celebrity Endorsement on Buying Behavior of Customers" the focus was laid on the risks and returns involved in using celebrity endorsements to influence the purchase behavior of the consumers. The outcome of the research was that, it substantiated the fact that celebrity endorsements do have an impact in the Indian scenario. Mustafa, (2005). The critical analysis of the research convinced that the consumers seek variety of aspects like credibility, likeability, fit between the brand and the celebrity. Consumers were more likely to purchase expensive and/or complex products which were endorsed by expert celebrities rather than typical customers. If the celebrity is seen as trustworthy, similar, and credible then that effect may be transferred over to the willingness to buy. The celebrity status by itself will not influence the purchase intention of the consumers (Friedman and Friedman, 1979).

RESEARCH METHODOLOGY

Research Design is Exploratory and descriptive methods were used for this study. Bearing in mind the objective of the study and secondary data analysis, the research was carried out using a structured questionnaire. The survey was conducted in Durg-Raipur and the sample was chosen from the people from diverse background. The sample size for this study was seven hundred respondents. From the total respondents 413 are male and 287 are female and their age groups between 19 to 25. The respondents are selected by simple stratified sampling method. The data was collected day time, evening and weekends during three months period. Data collection comprises of primary data and secondary data. The primary data has been collected through questionnaires and secondary data from related journals and publications. The questionnaire was based on the initial research model and propositions. Primary data were collected through questionnaire survey.

ANALYSIS & DISCUSSION To evaluate the feasibility of the research proposal, a survey was conducted through distribution of questionnaires to a select group of student consumers. The sample size was 700 respondents. Based on the information and

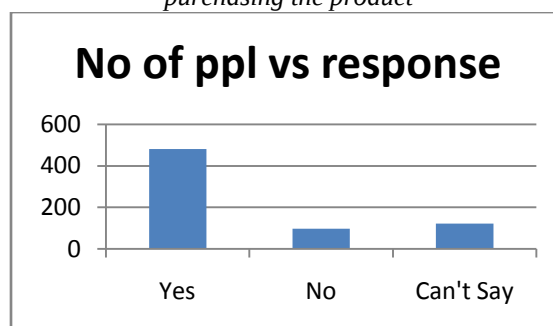
data provided by the consumers, the questionnaires were analyzed using statistical tools for the study.

Influence of Celebrity Endorsement

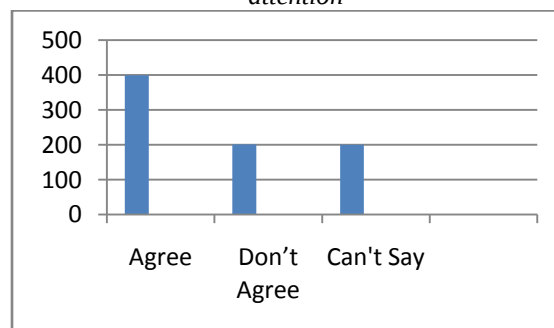
The presence of a celebrity in an advertisement is likely to be influential in the purchase of a product. To this extent, a favorable celebrity's presence and convincing value ironical given by such a celebrity may persuade the consumer to purchase the product. From the bar graphs shown below it is referred the celebrity endorsed advertisements increases the awareness of the product and the brand name. So the celebrity endorsed advertisement influences the consumer buying behavior in various ways. The celebrity endorsed advertisement attracts the consumers more and it motivate the consumers and it increases their possibility of purchasing the product and the presence of celebrity motivates for the purchase intention of the consumers. It also tells that the consumers gets more awareness about the product and the advertisements endorsed by celebrities creates enough interests on consumers and it holds their attention to view the advertisement. When multiple celebrities are endorsed in a single brand or a product, it also influences the consumer buying behavior. In certain cases the consumers prefer using the products when seeing celebrities as a dynamic, social and active on their endorsed products. It also prove that influence of celebrity endorsed advertisement makes the brand product more memorable on the consumer minds for a period of time. When the consumer goes for purchasing their desired product it influences more and increases their intention to purchase the product. The celebrities used in the advertisement influences positively on consumers buying preferences and the possibility level of purchasing the product in which the celebrities endorsed on the product. It also referred that all the factors influences on the consumer buying behavior while considering the independent variable family income. The celebrity endorsed advertisement makes the product more memorable on the consumers and the presence of celebrities influences more on the possibility of purchasing the product. The presence of celebrity creates more awareness on the brand products towards the consumers and it influences more on the purchasing decision taken by the consumers. The consumers are attracted more by the well known celebrities than the non celebrities like lay endorsers and experts. So the celebrities endorsed brand has more influence than the non celebrities endorsed brand or product. And the celebrities used in the advertisement helps the familiar products or brand to get and retains its brand image on the market place as well as on the

consumers. The multiple celebrities are used in advertising the single product to attract more consumers and to reach broadly as well as to fill the gap in the advertisement effect. The consumers are also influenced by this kind of advertisements advertisement and sometimes it confuses the consumers as well. Overall it has a positive impact on the buying preferences of the consumers. The celebrity endorsed advertisement gains the interest and attention to view the advertisement and at some extent when consumers seeing the celebrities as a dynamic, social and active which also influences on the consumer to prefer using those products.

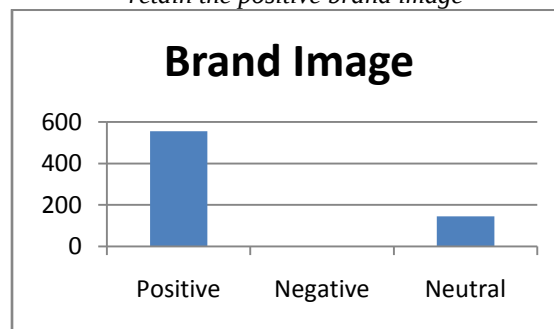
Celebrity Advertisement increases the possibility of purchasing the product



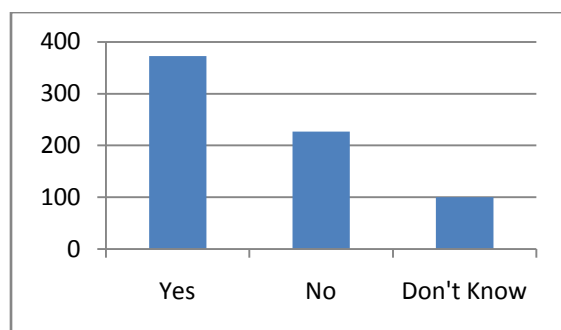
Advertisement creates enough interest to hold your attention



Celebrity helps the familiar products to get and retain the positive brand image



Celebrities make the desired product more memorable



FINDINGS

The result of this study indicated that the consumer has an overall positive attitude towards celebrity endorsements, and it increases the awareness of the product and it makes the brand product more memorable. The demographic factors like age, gender and family income has not much impact on the consumer buying behavior for the celebrity endorsed advertisements. It is found that the celebrity endorsement is an effective tool to affect positively the consumer's purchase decision towards a product, and the well known celebrities have more attractive than the non celebrity models like experts and lay endorsers. This study has found that celebrity endorsement enhances product information and creates awareness among consumers. It helps them to recall the brands which they endorse. The purchase attitude is influenced by the celebrity endorsement factors, product evaluation and brand recognition. It retains the brand image on the consumers. Only a less number of consumers prefer using products by seeing celebrities as a social, dynamic and actives. It increases the consumer's interest and holds their attention towards the advertisement. The consumers buying behavior was also influenced by the multiple celebrities endorsed a single brand and same time the purchase intentions of the consumers were increased when multiple celebrities endorsed a single brand or a product. Finally the celebrity endorsers have the direct positive effect towards the advertisement and the brand. Brands may carefully check the possibilities of the success of celebrities towards endorsing the product. It will be the best strategy to match the type of product with the field of the probable celebrity. The Multiple celebrities used in the advertisement sometimes confuse the consumers and gives negative impact. So the organization must be careful in selecting when to use multiple celebrities. The main criteria's for the selection of Celebrity Endorsement are: Credibility, Attractiveness and match up, which are most important for the successful advertisement. Celebrity

endorsements would be more effective if they are consistently used over time to create the link between the brand and the celebrity. They would be more effective when using a celebrity who is not strongly associated with another product or service.

CONCLUSION

The research results revealed that consumers hold favorable attitude towards celebrity endorsements. The favorable perception of the celebrity endorsement does not necessarily extend to buy the endorsed product. Fulfilling the requirement of the consumers is most important in advertising. The goal was to indicate the influence of using celebrity endorsement on consumer buying behavior. The result of this study showed that the positive and significant relationship between attitude toward celebrity endorser and attitude toward advertisements and brands. Celebrity endorsement positively gives more visibility to the product endorsed. Celebrities have always been the easiest way to attract the customers because of their mass appeal. But celebrity endorsement sometimes creates overexposure, overshadowing the brand, negative publicity of the endorser etc. All the celebrity endorsers don't have significant effect on the consumer buying behavior. The mismatch between the celebrity and the product affects the effectiveness of the advertisements. The image portrayed by the celebrities in the public as well as in their personal lifestyle influences the effectiveness of the celebrity endorsed advertisements. Finally result indicated that strong attachment to a celebrity encourages positive attitude towards the advertisement and brand regardless of the number of endorsements. A significant interaction effect is found for purchase intention, suggesting that both attachment and the number of endorsements influence likelihood of purchase.

LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

The research study is focused only on the Durg-Raipur city. The sample size for conducting the survey is limited to seven hundred samples. The time period of this study 2 months was a major constraint to get used to the various surface of the research study. The result of analysis made in the study depends fully on the accuracy; reliability of information's given by respondents. Brands may carefully check the possibilities of the success of celebrities towards endorsing the product. It will be the best strategy to match the type of product with the field of the probable celebrity. The Multiple

celebrities used in the advertisement sometimes confuse the consumers and gives negative impact. So the organization must be careful in selecting when to use multiple celebrities. The main criteria's for the selection of Celebrity Endorsement are: Credibility, Attractiveness and match up, which are most important for the successful advertisement. Celebrity endorsements would be more effective if they are consistently used over time to create the link between the brand and the celebrity. They would be more effective when using a celebrity who is not strongly associated with another product or service.

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A Study on Awareness of Edible and Ethnomedicinal Herbs of Ratanpur Block of Bilaspur District of Chhattisgarh

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Abstract Bilaspur district has large tribal population of Gond, Baiga, Kanwar, Agaria etc. These tribal people are very close to nature and are surrounded by natural vegetation, It is very much a part of their lives even today they utilize natural herbs to a great extent, indigenously for the treatment of various ailments.

The present paper deals with about [25] plants which are used as food resources and in general survey, [54] herb species belonging to [43] genera and [20] families were obtained. Which used as medicinal plant by traditional healers. The documented ethno medicinal plants were mostly used to cure diseases like stomachache, diarrhea, fever, skin disease, poison bites, cold, cough, wound, swelling, piles, jaundice, malaria etc. use of herbs for traditional healing is very common phenomena. Proper preparation and collection and tabulation of these edible and Ethnomedicinal herbs is urgent requirements of as our times. The solve various health related issues mass lead to better livelihood. But this time younger generation is not interested to carry on this tradition.

Key words :- Edible and Ethnomedicinal herbs Ratanpur, Bilaspur tribal population.

Introduction :-

Chhattisgarh is one of the largest tribal states. It is situated between 17.46⁰ to 24.5⁰ North latitudes and 80.14⁰ to 83.15⁰ East longitudes and Bilaspur district situated in the northern region of Chhattisgarh state. The tribal and rural populations of the district are dependence on edible and ethno medicinal herbs. The socio-economic conditions of the tribles and their nutritional requirement of them can be improved only with tribles proper development of edible and ethno medical herbs available in are our new born state. The climatic condition of this state is suitable for edible and Ethnomedicinal plants grow naturally for all year.

Aims and Objectives :-

The Present work has been undertaken aiming to make a systemic compilation of

edible and Ethnomedicinal herbs commonly consumed by ethnic communities of the state of Chhattisgarh and to make biochemical analysis to establish nutritional and therapeutic authenticity. The study will create awareness towards restoration, protection and conservation of valuable herbs resources.

Methodology:-

Our study site is Ratanpur block of Bilaspur district of Chhattisgarh square kilometer study site situated in approximately 30 kilometer distance of Bilaspur city.

The work required extensive field survey and therefore a through and extensive survey of the Ratanpur block of Bilaspur district of Chhattisgarh will be done during the years 2012-2013. This method may be termed as spot identification method (Das and Chotopadhyay 2003) Then, the authentic identification was done using standard floras and literature and to prepare the pilot project by the listing of edible and ethnomedicinal herbs.

Observation :-

General survey of this site edible and ethnomedicinal herbs are obtained. Out of [25] species are noted in edible species, Mostly distributed edible species are *Madicago denticulata*, *Oxalis corniculata*, *Cleome gynendra*, *Hygrophila auriculata*, *Ipomoea aquatica*, *Cassia tora* etc. and some ethnomedicinal herbs are *Alysicarpus monilifer*, *Cyperus rotundus*, *Cynodon dactylon*, *Euphorbia hirta*, *Sida acuta*, *Eclipta alba*, *Eragrostis pilosa*, etc. As the survey is mostly based on personal contact. This survey I have spent about one year conducting field investigation through observation given in table.

Table
Edible and Ethnomedicinal herbs

S.No.	Botanical Name	Family
1	<i>Abelmoschus Moschatus</i>	Malvaceae
2	<i>Achyranthus aspera</i> Linn	Amaranthaceae
3	<i>Aerua lantana</i>	Astaraceae
4	<i>Ageratum conzyoides</i> Linn	Asteraceae
5	<i>Alternanthera sessillis</i> Br.	Amaranthaceae
6	<i>Alysicarpus monilifer</i>	Acanthaceae
7	<i>Amaranthus viridis</i>	Amaranthaceae
8	<i>Amaranthus hybridus</i> linn	Amaranthaceae
9	<i>Amaranthus spinosus</i>	Amaranthaceae
10	<i>Amorphophallus Sylvalicus</i>	Araceae
11	<i>Andropogon pumilus</i> Roxb.	Poaceae
12	<i>Arisaema tortuosum</i>	Araceae
13	<i>Basella rubra</i>	Basellaceae
14	<i>Canavalia gladiata</i>	Fabaceae
15	<i>Carthamus tirictorius</i>	Astaraceae
16	<i>Cassia tora</i>	Cesalpiniaceae
17	<i>Celosia orgentea</i>	Amaranthaceae
18	<i>Chenopodium album</i> linn.	Chenopodiaceae
19	<i>Cleome gynendra</i>	Ranunculaceae
20	<i>Commelina benghalensis</i>	Commelinaceae
21	<i>Cyanodon dactylon</i> Pers	Poaceae
22	<i>Cyperus difformis</i> Linn	Cyperaceae
23	<i>Cyperus flavidus</i> Retz	Cyperaceae
24	<i>Cyperus iria</i> Linn	Cyperaceae
25	<i>Cyperus haspan</i> Linn	Cyperaceae
26	<i>Cyperus rotundus</i>	Cyperaceae
27	<i>Desmodium trifolium</i>	Palionatae
28	<i>Digitaria Sanguina</i> Linn	Poaceae
29	<i>Echinochloa colona</i> Linn	Poaceae
30	<i>Echinochloa crusyalli</i> Beuve	Poaceae
31	<i>Eclipta alba</i> Hassk	Astaraceae
32	<i>Eclipta prostrate</i> Roxb	Astaraceae
33	<i>Eragrostis pilosa</i> Beauve	Poaceae
34	<i>Euphorbia hirta</i>	Euphorbiaceae
35	<i>Fimbristylis littoralis</i>	Cyperaceae
36	<i>Hygrophilla auriculata</i>	Acanthaceae

37	<i>Impomea aqualtica</i>	Convolvulaceae
38	<i>Impomea Cairica</i>	Convolvulaceae
39	<i>Ischaemum rugosum</i>	Poaceae
40	<i>Justicia simplex Don</i>	Acanthaceae
41	<i>Kyllinga Monocephala</i>	Cyperaceae
42	<i>Ludwigia parviflora</i>	Onagraceae
43	<i>Marsilea minuta</i>	Marsileaceae
44	<i>Medicago denticulata</i>	Malvaceae
45	<i>Oxalis corniculata Linn</i>	Oxalidaceae
46	<i>Polygonum plebejum Br.</i>	Poygonaceae
47	<i>Portulaca oleracea</i>	Portulacaceae
48	<i>Rungia pectinata Nees</i>	Acanthaceae
49	<i>Salvia plebeja</i>	Lamiaceae
50	<i>Scripus orossus linn</i>	Cyperaceae
51	<i>Setaria glance Beauré</i>	Poaceae
52	<i>Sida acuta Burm</i>	Malvaceae
53	<i>Sida cordifolia linn</i>	Malvaceae
54	<i>Solanum nigrum</i>	Solanaceae

Discussion & Conclusion

The data presented in this block is preliminary survey report of the most remote and less accessed tribal group of Bilaspur district. The majority of population depends here on herbal medicine for their health care. Due to degradation the tribal culture over exploitation of medicinal plants and large scale destruction of natural habitat, population of traditional healers. The population of medicinal plants is decreased and such plants have become rare and threatened. Therefore, to protect the important plant wealth and culture for human health care it is moral duty and key role of ethno biologists to conserve tribal culture and their traditional knowledge and natural habitats of medicinal plants from biotic effects.

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Comparative Analysis of Heuristic Optimization for Achieving Maximum Efficiency of Multi-Fuel Boiler

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Abstract—In, this paper, we propose operator point of view of optimizing combustion efficiency of steam boiler maintaining targeted superheat temperature and pressure. For this purpose, the data from actual running steam boiler has been noted from Bhilai Steel Plant (Steel Authority of India). We adopted data-mining approach to model boiler and its process variables. The variables selected play vital role in control of combustion efficiency for multi-fuel boiler with operating constraints and variables. These variables are divided into two categories: controllable and non-controllable. Controllable variables are those which can be adjusted by operator easily like air flow, feed water temperature, mass flow rate of fuel etc. Non-controllable variables are those that are not affected by changes of controllable variables, e.g. the boiler's room temperature, humidity, quality of fuel etc. This paper illustrates the implementation of heuristic approach to control boiler and industrial case study has also developed.

Index Terms— Artificial Neural Network, Data Mining, Efficiency, Genetic Algorithm, Process Control, Regression Tree.

INTRODUCTION

Increase in population, its huge power demand and depletion of non-renewable fuels across the world makes the mankind to find optimum solution for power generation and energy management. The optimization of power generating organization has become one of the most important fields in engineering since last decade. In last decade numerous of thermo-economic and multi-objective models have been presented: providing better optimum solutions and systems [1]. Recently, applications of soft computing techniques such as artificial neural network, fuzzy logic, genetic

algorithm etc have become more popular than conventional thermodynamics analysis [2]. Because of complex, non-stationary and non-linear combustion process conventional approach of thermodynamics was very tedious and prone to calculation errors. With advancement of intelligent control theory (like artificial neural network, fuzzy logic, evolutionary computing) one can easily model complex problem, and also get acceptable results which shows great possibility of growth.

To optimize the combustion efficiency of boiler with prediction of performance index and non-linear constraints S.S Shieh *et al.*[3] applied neural network and hence successfully replace trial and error method of finding optimum solution. Evolutionary computational algorithm was used by P. Stoll *et al.*[4] to design system with minimum NO_x emission as well as minimum pressure fluctuation. Hybrid algorithm (evolutionary computational techniques and neural network) was used by B. Radl *et al.*[5] to find optimal fuel/air ratio. Fuzzy logic was implemented appreciably by S. Tanaka *et al.*[6] to control combustion process in coal fired power plant. Farzanelis *et al.*[7] proposed NSGA-II and ANN techniques to optimize steam cycle power plant (maximize efficiency subject to minimize the cost of operation). Dincer *et al.* [8] use multi-objective approach for optimization for gas turbine and combined cycle power plant. They indeed energy efficiency and total cost as its objective function. Zhe *et al.* [9] used K-means clustering data mining algorithm to control boiler efficiency.

Heuristic approaches are mainly classified into three major categories. Rule based expert systems are

fall under this category, in this knowledge base of domain is coded in form of rules. Soft computing techniques e.g. neural network, evolutionary techniques, fuzzy logic etc, contributes to second category. Among all soft-computing techniques neural network, fuzzy logic and genetic algorithm are popular in optimization of power plants. The third category normally called as hybrid systems which include both first and second categories.

In this paper we presented a data driven computational approach to find optimum mass flow rate of fuel for targeted efficiency, superheat temperature and boiler pressure for different boiler load of Bhilai Steel Plant. To find optimum value we used three heuristic techniques: Neural Network, Genetic algorithm and Regression tree.

This paper is designed in four sections: Section I contributed to the introduction. Section II includes the thermal modeling of boiler and formulation problem statement. Section III includes introduction about heuristic techniques. Finally last section IV includes result and conclusion part of the paper.

THERMAL MODELING OF BOILER

In order to model thermal efficiency of boiler we must be familiar with controllable and non-controllable variables. Feed water temperature, superheated water temperature, pressure in boiler drum, boiler load, water consumption, flue gasses concentration rate, mass of fuel low rate are taken as controllable variables. Whereas boiler constraints like drum radius, boiler's surface etc, and fuels properties, boiler room temperature and humidity etc are taken as non-controllable variables.

According to first law of thermodynamics mass balance equation as follows

$$\sum \dot{m}_i = \sum \dot{m}_e \quad (0)$$

Energy balance equation

$$\dot{Q} - \dot{W} = \sum \dot{m}_e h_e - \sum \dot{m}_i h_i \quad (2)$$

Subscripts *i* and *e* stands entering and leaving the control volume respectively.

The performance index of boiler is defined by its evaporation capacity. However equivalent evaporation from feed water at 100°C and converted into dry and

saturated steam at 100°C at normal atmospheric pressure.

As the water is already at 100°C, it requires only latent heat at 1.013 bar to convert it into steam at 100°C. The value of latent heat is taken at 2257 kJ/kg [10].

Equivalent evaporation “from and at 100°C”,

$$E = \frac{\text{Total heat required to evaporated feedwater}}{2257}$$

(3)

t_1 = Temperature of feed water in °C

h_{f1} = Enthalpy or sensible heat of feed water in

kJ/kg of steam corresponding to t_1 °C.

h = Enthalpy or total heat of steam kJ/kg of steam corresponding to a given working pressure (from steam table)

$$h = h_f + x h_{fg} \dots \dots \quad (\text{For wet steam})$$

$$(4) \quad h = h_f + h_{fg} \dots \dots \quad (\text{For dry steam})$$

(5)

$$= h_g + c_p (t_{sup} - t) \quad)$$

(6)

Boiler efficiency may be defined as the ratio of heat actually used in producing steam to the heat liberated in the furnace. It can be shown as follows:

$$\eta = \frac{\text{Heat actually used in producing steam}}{\text{Heat labirated in the furnace}}$$

m_e = mass of water actually evaporated kg/kg of fuel

m_s = Total mass of water evaporated into steam in kg

C = Calorific value of fuel in kJ/kg of fuel.

m_f = Mass of fuel in kg.

So,

$$\eta = \frac{m_s (h - h_{f1})}{m_f \times C}$$

(7)

The efficiency of boiler is defined in equation no. 7 is taken as first objective function for genetic algorithm and cost of fuel i.e. wealth cost of fuel per standard quantity as second objective function.

Problem statement from running boiler of Bhilai Steel Plant at 630 hrs-730hrs was taken:

Feed water temp=109°C
 Temperature of super-steam=450°C
 Pressure in Boiler Drum=40 kgms/cm²
 Boiler load =140Ton/hr
 Feed Water Pressure=53kgms/cm²
 Water Consumption=24(L) 115 (R) Ton/hr
 No's of coal dust burner=6 of (6Ton/hr)
 No's of oil burner=2 of (2 kiloliter/hr)
 Blast Furnace gas=60000 M³/hr
 CO gas=8000 M³/hr

Fuel	Calorific Value
Blast Furnace Gas (BFG)	900 to 1100 cal per NM ³
Coke Oven Gas (COG)	400 to 4500 cal per NM ³
Basic Oxygen Furnace Gas (BOFG)	2,000 kcal per Nm ³
PCM Oil	8500 Kcal per Kg

Till now we restricted our research only to BFG and COG. For calculation c_p (specific heat of superheated steam) is taken as 2.1. kJ/kg K.:

Mass of water evaporated $m_s = 140$ Ton or 140000 kg.

Mass of fuel used $m_f = (60000 \text{ M}^3/\text{hr} \text{ (BFG)} \text{ and } 8000 \text{ M}^3/\text{hr} \text{ (COG)})$.

From steam table, corresponding to a feed water temperature of 100°C:

$$h_f = 419.1 \text{ kJ/kg.}$$

At corresponding to a steam pressure of 39.2266bar

$$h_g = 2800.4 \text{ kJ/kg at } 250^\circ\text{C}$$

So, total heat required:

$$h_{sup} = h_g + c_p (t_{sup} - t) = 2800.4 + 2.1 \times (450 - 250) = 3220.4 \text{ kJ/kg}$$

HEURISTIC TECHNIQUES

3.1 Genetic Algorithm

Multi-objective optimization problem consists of optimizing more than one objective function with equality, non-equality constraints simultaneously. The solution of multi-objective problem requires satisfactory solution of number of objective function and often conflicting objectives. It is point to note that no combination of variables can optimize all objectives simultaneously. Moreover it provides best trade-off between all the objectives.

The problem can be expressed as :

Find

.

$$x = (x_i) \forall i = 1, 2, 3, \dots, N_{param} \text{ such as}$$

$$f_i \text{ is minimum (respectively maximum)}$$

$$\forall i = 1, 2, 3, \dots, N_{obj}$$

subjected to:

$$g_j(x) = 0 \forall j = 1, 2, \dots, M$$

$$h_k \leq 0 \forall k = 1, 2, \dots, K$$

Where x is vector containing the N_{param} design parameters, $(f_i)_{i=1, \dots, N_{obj}}$ the objective function and N_{obj} the number of objectives. The objective function $(f_i)_{i=1, \dots, N_{obj}}$ returns the vector containing the set of N_{obj} values associated with the elementary objective to be optimized simultaneously.

As defined by Deb and Goel [10], an individual $X(a)$ is said to constrain-dominate an individual $X(b)$, if any of the following conditions are true:

(1) $X(a)$ and $X(b)$ are feasible, with

(a) $X(a)$ is no worse than $X(b)$ in all objective, and

(b) $X(a)$ is strictly better than $X(b)$ in at least one objective.

(2) $X(a)$ is feasible while individual $X(b)$ is not.

(3) $X(a)$ and $X(b)$ are both infeasible, but $X(a)$ has a smaller constraint violation.

Here, the constraint violation $l(X)$ of an individual X is defined to be equal to the sum of the violated constraint function values

$$l(X) = \sum_{j=1}^B \gamma(g_j(X)) g_j(X)$$

where γ is the Heaviside step function. A set of non-dominated individuals is used to form a Pareto-optimal fronts.

Tournament selection

Each individual competes in exactly two tournaments with randomly selected individuals, a procedure which imitates survival of the fittest in nature.

Controlled elitism sorting

To preserve diversity, the influence of elitism is controlled by choosing the number of individuals from each subpopulation, according to the geometric distribution.

To form a parent search population, $P(t+1)$ (denote the generation), of size S , where $0 < c < 1$ and w is the total number of ranked non-dominated.

Crowding distance

The crowding distance metric proposed by Deb and Goel [10] is utilized, where the crowding distance of an individual is the perimeter of the rectangle with its nearest neighbors at diagonally opposite corners. So, if individual $X(a)$ and individual $X(b)$ have same rank, each one has a larger crowding distance is better.

Crossover and mutation

Uniform crossover and random uniform mutation are employed to obtain the offspring population, Q_{t+1} . The integer-based uniform crossover operator takes two distinct parent individuals and interchanges each corresponding binary bits with a probability, $0 < p_c \leq 1$. Following crossover, the mutation operator changes each of the binary bits with a mutation probability, $0 < p_m < 0.5$.

3.2 Artificial Neural Networks

The feed-forward neural networks are the most popular architectures due to their structural flexibility, good representational capabilities and availability of a large number of training algorithms. Here the individual element inputs are $I_1, I_2, \dots, I_R$ multiplied by weights $w_{11}, w_{12}, \dots, w_{1R}$ and the weighted values are fed the summing junction. The neuron has a bias b , which is summed with the weighted inputs to form the net input n . This sum, n , is the argument of the transfer function F :

$$a = F(n) = F(w_{11}I_1 + w_{12}I_2 + \dots + w_{1R}I_R + b)$$

This network consists of neurons arranged in layers in which every neuron is connected to all neurons of the next layer.

3.3 Regression Tress

Multivariate regression analysis is widely accepted tool according to Drapper and Smith [11] traces back to back work of SIR Francis Galton a British anthropologist and meteorologist. Regression analysis can be loosely defined as application of methods that investigate the relationship between a dependent (or response) variable and set of independent variable (or predictor) variables.

Linear regression is a global model, where there is a single predictive formula holding over the entire data-space. When the data has lots of features which interact in complicated, nonlinear ways, assembling a single global model can be very difficult and hopelessly confusing when you do succeed. An alternative approach to nonlinear regression is to subdivide, or partition, the space into smaller regions, where the interactions are more manageable.

RESULT & CONCLUSION

Optimization:

In this paper total boiler efficiency and fuel cost has taken as two objective functions. The efficiency is defined by equation (7). And cost of fuels is modeled by equation as

$$\text{Cost}_{\text{fuel}} = c_1 m_{f1} + c_2 m_{f2} + c_3 m_{f3} + c_4 m_{f4} \quad (8)$$

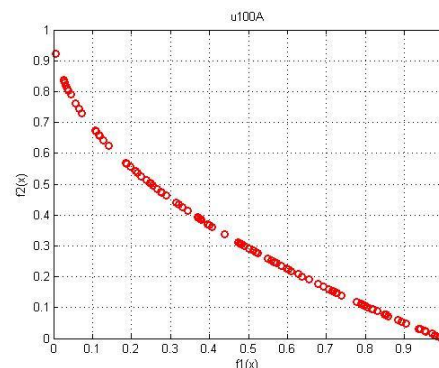
Where c_1, c_2, c_3, c_4 is the cost of fuels and $m_{f1}, m_{f2}, m_{f3}, m_{f4}$ is the mass flow rate of fuel.

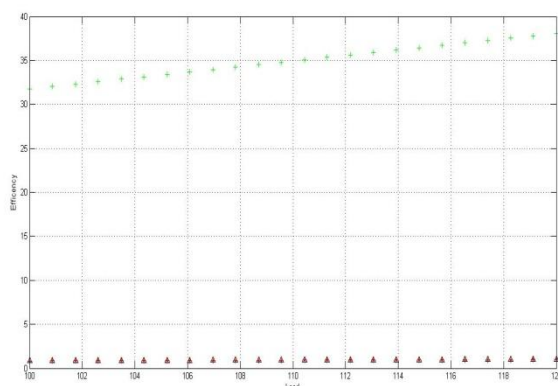
Defining multi-objective problem as Pareto problem we minimize the cost of fuel and maximize the efficiency subjected to:

Super-heat temperature = 450°C.

Boiler pressure = 40 kgms/cm².

Boiler load = 140 Ton/hr.



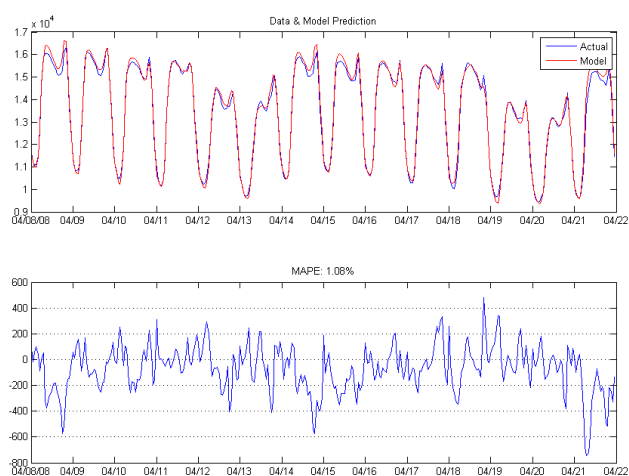


controllable and non-controllable variables and Y is the output of plant.

Controllable variables include feed water temperature, water consumption, and fuel consumption. Non-controllable variables include boiler room temperature, humidity, and calorific value of fuel. Thus $Y=f(\text{feed water temperature, water consumption, and fuel consumption, boiler room temperature, humidity, boiler load and calorific value of fuel})$. And $Y = \text{super-heat temperature, constant boiler pressure, and maximum efficiency}$.

Efficiency is set to 87.5% to 90%, super-heat temperature at 450°C and boiler pressure at 40kgms/cm²

We first train feed forward 20 neurons neural network with thousand data, after training the neural network we test our neural network with 100 test data.



Conclusion:

We have compared the multi-objective optimization problem with three heuristic approaches Genetic algorithm, artificial neural network and regression tree. We have considered feed water temperature, feed water pressure, boiler pressure, boiler load, water consumption, fuel consumption as design variable to achieve targeted super-heat steam temperature and pressure. It should be noted that the data mining approach using ANN produce minimum mean square error.

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ग्रामीण जीवन में पलायन का सामाजिक एवं सांस्कृतिक प्रभाव

श्रीमति सीता चंद्रा

पोध छात्रा (समाजशास्त्र)

डॉ.सी.व्ही.रमन वि.वि.कोटा

मो.नं.-9425537144

यह अध्ययन जॉजगीर चांपा जिले के ग्रामीण क्षेत्रों से पलायनरत् भूमिहीन कृषक के जीवन पर पड़ने वाले सामाजिक एवं सांस्कृतिक प्रभाव पर आधारित है।

जिले की जनसंख्या 2011 के अनुसार 1620632 है, और गाँवों की संख्या 889 हैं जिसमें रहने वाले ग्रामिणों की संख्या 13,94646 है जो कुल जनसंख्या का (86 प्रतिशत) हैं, यहाँ से पलायन करने वाले ग्रामिणों की संख्या लगभग 40 प्रतिशत है। यहाँ मुख्यतः कृषि से ही आजीविका प्राप्त होती है खरीफ के मौसम में यहाँ धान की खेती होती है जो मानसून पर आधारित होता है। अक्टूबर-नवम्बर में फसल की कटाई होने के बाद मजदूर वर्ग के ग्रामिण अपने गाँव से दूसरे घरों में रोजगार की तलाश में पलायन करते हैं तथा ये अगले मौसम के कृषि कार्य के पूर्व लौट आते हैं। इस प्रकार इनका 4-6 माह तक कार्यकाल चलता है। इसी प्रकार कुछ लोग पूरे वर्ष दूसरे जगह रहते हैं ये लोग गाँव लौटकर नहीं आते, एवं वहीं रहकर कुछ वर्षों तक कार्यकर अपना एवं अपने परिवार का जीवन निर्वाह करते हैं।

जिले में पलायन की स्थिति को चार्ट के माध्यम से समझा जा सकता है।

“जिले में स्थितिगत पलायन करने वालों की संख्या (ब्लकों के अनुसार 2013)”

संख्या	ब्लक का नाम	परम्परागत पलायन करने वाले श्रमिकों की संख्या	अधिक पारिश्रमिक हेतु पलायन करने वाले श्रमिकों की संख्या
1.	अकलतरा	540	1228
2.	बम्हिनडिह	688	233
3.	बलौदा	181	212
4.	डभरा	78	96
5.	जैजैपुर	151	344

6.	मालखरौदा	835
7.	नवागढ़	498
8.	पामगढ़	457
9.	सक्ति	221

योग 3649
3996

श्रोत : श्रम कार्यालय जांजगीर

1

इस आँकड़े में पलायन करने वालों का पंजियन किया गया है उसी की जानकारी है बाकी कई लोगों का तो पंजियन ही नहीं हो पाता। परम्परागत पलायन करने वाले श्रमिक वे हैं जो हर वर्ष 4-6 माह के लिए पलायन करते हैं एवं इनकी आर्थिक स्थिति हमेशा कमजोर रहती है आँकड़ों के अनुसार मालखरौदा ब्लॉक से सबसे ज्यादा लगभग 835 लोग पलायन किये हैं और सबसे कम डभरा ब्लॉक से लगभग 78 लोग पलायन किये हैं पूरे नौ ब्लॉक से पलायन करने वालों की संख्या लगभग 3649 हैं। इसी प्रकार कई लोग अधिक पारिश्रमिक हेतु पलायन करते हैं इन्हें अपने आवश्यक कार्य हेतु अधिक पैसे की आवश्यकता होती है जैसे-बिमारी के कारण कर्ज, बच्चों की शादी, खेती में नुकसान, आदि। इन सब की भरपाई के लिए ये पलायन करते हैं आँकड़ों के अनुसार अकलतरा ब्लॉक से सबसे अधिक पलायन करने वाला ब्लॉक है जो लगभग 1228 है और मालखरौदा ब्लॉक से सबसे कम संख्या में पलायन लगभग 49 करते हैं। पूरे जिले भर में देखा जाए तो 3996 लोग इस प्रकार का पलायन करते हैं।

इस तरह हम कह सकते हैं कि इस प्रकार के पलायन में मजदूर अपने आवश्यकता कि पूर्ति के लिये ही पलायन करते हैं और बाद में अपने गाँव में ही रहकर मजदूरी करते हैं।

पलायन के मुख्य कारण कौन-कौन से हैं और किस कारण से सबसे ज्यादा लोग पलायन करते हैं इसे चार्ट के माध्यम से समझा जा सकता है।

पलायन के मुख्य कारण एवं इसमें लोगों की अनुमानित संख्या”

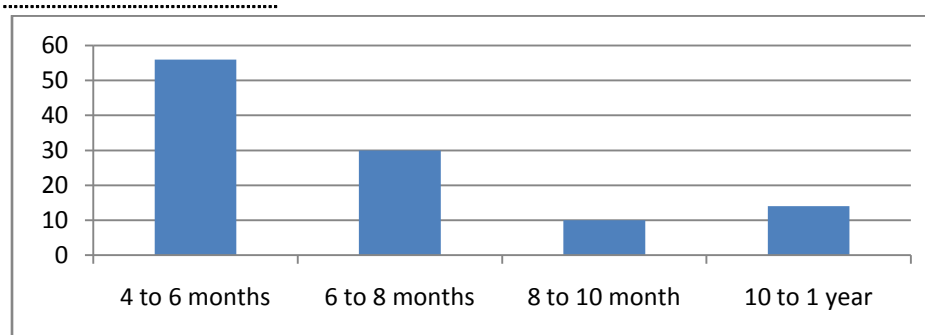
	पलायन के कारण	लोगों की अनुमानित संख्या प्रतिषत में
1	ऋणग्रस्तता	20
2	भूमिहिनता	20
3	अधिक मजदूरी की आषा	15
4	बेरोजगारी	35
5	अन्य	10

श्रोत: अनुसूची के माध्यम से किया गया अध्ययन ।

लोगों से जानकारी लेकर निकाला गया आँकड़ा यह दर्शाता है कि सबसे अधिक लोग बेरोजगारी के कारण पलायन करते हैं जो लगभग 35 प्रतिषत हैं ऋणग्रस्तता के कारण 20 प्रतिषत और भूमिहिनता के कारण 20 प्रतिषत लोग दूसरे क्षेत्र में धन कमाने की आषा लेकर जाते हैं । इसी प्रकार अन्य कारण के लिए 10 प्रतिषत लोग बाहर जाते हैं, जैसे— पारिवारिक कलह, अधिक मजदूरी की आषा, आधुनिक जीवन, नगरों का आकर्षण आदि हैं ।

इसी प्रकार मजदूरों के पलायन करने का समय भी रहता है वे खेती के कार्य से निवृत्त होकर दूसरे स्थान रोजगार की तलाष में जाते हैं उनके जाने का समय इस प्रकार का होता है ।

2 लोगों के पलायन के समय का आँकड़ा



श्रोत—अध्ययन के अनुसार निकाला गया आँकड़ा

3
अधिकांष मजदूरों (लगभग 56 प्रतिषत) के पलायन का सबसे ज्यादा समय 4–6 माह का होता है, उसके बाद 30 प्रतिषत का 6–8 माह 14 प्रतिषत का 10–1 वर्ष के लिए एवं सबसे कम 10 प्रतिषत 8–10 माह

माह
लोगों की अनुमानित संख्या प्रतिषत में

- | | | |
|----|------------------|----|
| 1. | जनवरी—फरवरी | 28 |
| 2. | मार्च – अप्रैल | 10 |
| 3. | मई – जून | 10 |
| 4. | सितंबर – अक्टूबर | 20 |
| 5. | नवंबर – दिसंबर | 32 |

अधिकांष मजदूरों के पलायन करने का समय होता है धान की कटाई एवं मिंजाई का कार्य पूर्ण होने के बाद नवंबर—दिसंबर में, गांव के सारे काम निपटाने के बाद ये लोग काफी संख्या में पलायन करते हैं । नवंबर—दिसंबर में 33 प्रतिषत लोग पलायन करते हैं एवं कुछ लोग अपनी सुविधानुसार पलायन करते हैं । जनवरी—फरवरी 20 प्रतिषत लोग, मई—जून में 15 प्रतिषत, एवं सितंबर—अक्टूबर में 20 प्रतिषत लोग पलायन करते हैं । कुछ लोग तो पूरे वर्ष भर के लिए बाहर रहते हैं ।

पलायन कर दूसरे स्थान में कार्य के दौरान श्रमिकों के रहने का समय प्रतिषत अनुसार

के लिए पलायन करते हैं । इस प्रकार हम देखते हैं कि कुछ मजदूर अधिक समय के लिये अपने घरों से दूर नहीं रह पाते उन्हें अपने गांव में रहने वाले परिवारों की भी देखभाल करनी पड़ती है, अतः वे कम समय के लिए ही बाहर जाना ज्यादा बेहतर समझते हैं । इससे स्पष्ट है कि उक्त प्रकार के मजदूर हर वर्ष कुछ समय के लिये

पलायन करते हैं एवं नियत समय पर पुनः अपने गांव वापस आ जाते हैं वे घर के सदस्यों की देखभाल, आवश्यकता पूर्ति कर, एवं खेती कार्य कर पुनः पलायन कर जाते हैं ।

निष्कर्ष :- उपयुक्त अध्ययन के अनुसार हम यह कह सकते हैं कि ग्रामिण जीवन में पलायन की परंपरा रही है। जो वर्षों से चली आ रही है। वे अपनी जरूरतों को पूरा करने के लिए शहरों की ओर निरंतर पलायन करते रहे हैं ।

पलायन की यही प्रवृत्ति रही तो आने वाले समय में और भी अधिक सामाजिक एवं सांस्कृतिक समस्या सामने आएगी ।

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जिले में सबसे अधिक पलायन का जो कारण पाया गया है उसमें प्रमुख है बेरोजगारी, भूमिहीनता, एवं ऋणग्रस्तता, इन सभी समस्याओं के समाधान के लिए लोग गांव से शहरों की ओर जाते हैं। वैसे देखा जाए तो सरकार ग्रामीण क्षेत्रों की स्थिति सुधारने एवं पलायन पर रोक लगाने के लिए समय-समय पर अनेक कार्यक्रम और योजनाएँ लागू करते रहती है, परन्तु इन सभी से उतना लाभ नहीं हो रहा है ।

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