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## Contents

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# Calculating the prolonged length of service time through shock model in an organization

**G. Subash Chandra Bose[1], P. Pandiyan[2], G. Sudarvizhi[3], R.Vinoth[4*]**

**Abstract**

Every organization needs a workforce suitable for its tasks in order to reach its business aims. In an organization wastages are seen when employees moving from one grade to another, are exposed to different factors influencing them to leave the organization. The threshold level is the maximum amount of wastage that can be permitted in the organization beyond which the organization reaches a point of breakdown. This paper is an attempt to determine the expected time for recruitment, assuming the threshold distribution as Generalized Rayleigh distribution introduced by Surles and Padgett 2001[1].

**Keywords:** Expected time; Organization; Threshold; Wastage

## Introduction

Manpower planning can be defined as an attempt to match the supply of people with the jobs available in an organization, with the aid of statistical techniques. Length of service in a grade should necessarily be a natural criterion for promotion in order to create a healthy atmosphere among the employees. The leaving pattern or wastage process in any organization is also termed complete length of service. Mathematical model is obtained for the expected time of breakdown point to reach the threshold level.

Bartholomew 1971[2] provided a general review of the application of stochastic modeling to social systems, while Bartholomew and Forbes 1979[3] developed a more specific application of these principals to the manpower planning problem. Esary et al.1973[4] discussed that any component or device when exposed to shocks which cause damage to the device, or system, is likely to fail when the total accumulated damage exceeds a level called the threshold. The rate of accumulation of damage determines the lifetime of the component or device. One can see for more detail for the threshold to attain the expected time in Pandiyan et al. (2010)[5], Jeeva et al. (2004)[6] and Sathiyamoorthi (1980)[7].

### Assumptions

These assumptions are somewhat artificial, but are made because of the lack of detailed real-world information on one hand and in order to illustrate the proceedings on the other hand.

• Exit of person from an organization takes place whenever the policy decisions regarding targets, incentives, and promotions are made.

• The exit of every person from the organization results in a random amount of depletion of manpower (in man hours).

• The process of depletion is linear and cumulative.

• The inter- arrival times between successive occasions of wastage are i.i.d. random variables.

**Author's Affilation:** [1]Department of Statistics, Manonmaniam Sundranar University, Tirunelveli, Tamil Nadu, India. [2,4] Department of Statistics, Annamalai University, Tamil Nadu, India. [3]Department of Mathematics, Government Arts College, Chidambaram, Tamil Nadu, India.

**Reprint's request: Dr. G. Subash Chandra Bose,** [1]Department of Statistics, Manonmaniam Sundranam University, Tirunelveli, Tamil Nadu, India. E-mail: maalinga@gmail.com.

• If the total depletion exceeds a threshold level Y, which is itself a random variable, the breakdown of the organization occurs. In other words recruitment becomes inevitable.

• The process which generates the exits, the sequence of depletions and the threshold are mutually independent.

### Notations

$X_i$ : A continuous random variable denoting the amount of damage/depletion caused to the system due to the exit of persons on the $i^{th}$ occasion of policy announcement, $i = 1, 2, \ldots . k$ and $X_i's$ are i.i.d and $X_i = X$ for all i.

$Y$ : a continuous random variable denoting the threshold level having Generalized Rayleigh distribution.

$g(.)$ : The probability density functions of $X$.

$g_k(.)$ : The k- fold convolution of i.e., p.d.f. of $\sum_{i=1}^{k} X_i$

$T$ : a continuous random variable denoting time to breakdown of the system

$g^*(.)$ : Laplace transform of.

$g_k^*(.)$ : Laplace transform of $g_k(.)$.

$h(.)$ : The p.d.f. of random threshold level which has Generalized Rayleigh distribution and $H(.)$ is the corresponding c.d.f.

$U$ : a continuous random variable denoting the inter-arrival times between decision epochs.

$f(.)$ : P.d.f. of random variable U with corresponding c.d.f. $F(.)$.

$F_k(t)$ : The k-fold convolution functions of $F(.)$.

$S(.)$ : The survivor function i.e. $P[T>t]$.

$L(t)$ : $1-S(t)$

$V_k(t)$ : Probability that there are exactly 'k' policies decisions in (O, t).

### Results

In this paper, having the threshold which follows Generalized Rayleigh distribution is discussed with the shape parameter considered. The expected time and variance are obtained. The two-parameter Generalized Rayleigh distribution is a particular member of the Generalized Weibull distribution, originally proposed by Mudholkar and Srivastava (1993)[8].

Let $Y$ be the random variable which has the cdf defined as

$$F(x: \alpha, \lambda) = \left(1 - e^{-(\lambda x)^2}\right)^{\alpha}$$

The corresponding survival function is

$$\left(1 - e^{-2\lambda x}\right)^{\alpha} \sim \left(1 - e^{-2\lambda x}\right)^n = \sum_{r=0}^{n} (-1)^r \binom{n}{r} \left(e^{-(\lambda x)^2}\right)^r$$

$$\bar{H}(x) = \sum_{r=1}^{n} (-1)^{r+1} \binom{n}{r} \left(e^{-(\lambda x)^2}\right)^r \tag{1}$$

There may be no practical way to inspect an individual item to determine its threshold y. In this case the threshold must be a random variable. The shock survival probability is given by

$$P\left(\sum_{i=1}^{k} X_i < Y\right) = \int_0^{\infty} g_k(x) \, \bar{H}(x) \, dx \tag{2}$$

$$= \int_0^{\infty} g_k(x) \left[\sum_{r=1}^{n} (-1)^{r+1} \binom{n}{r} \left(e^{-(\lambda x)^2}\right)^r\right] dx$$

$$= \sum_{r=1}^{n} (-1)^{r+1} \binom{n}{r} g_k^*(\lambda r)^2 \tag{3}$$

Equation denotes the $k^{th}$ convolution.

Therefore $S(t)=P[T>t]$ is the survival function which gives the probability that the cumulative will fail only after time $t$.

$S(t)=P[T>t]=$ Probability that the total damage survives beyond $t$

$$= \sum_{k=0}^{\infty} P \text{ \{there are exactly k contacts in } (0,t] * P \text{ (the total cumulative } (0,t]\}$$

$$S(t) = P(T > t) = \sum_{k=0}^{\infty} V_k(t) P(X_i < Y) \tag{4}$$

A renewal process is a counting process such that the time until the first event occurs has some distribution F, the time between the

G. Subash Chandra Bose *et al* / Calculating the prolonged length of service time through
shock model in an organization

63

first and second event has, independently of the time of the first event, the same distribution F, and so on. When an event occurs we say that a renewal has taken place. It may happen that successive shocks become increasingly effective in causing damage, even though they are independent. This means that, the distribution function of the  damage is

$$P(\text{exactly k policy decesions in } (0,t]) = F_k(t) - F_{K+1}(t) \qquad \text{with} \quad F_0(t) = 1$$

$$= \sum_{k=0}^{\infty} \sum_{r=1}^{n} [F_k(t) - F_{k+1}(t)] \binom{n}{r} (-1)^{r+1} g_k^*(\lambda r)^2$$

$$= \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} - \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} (1 - g_k^*(\lambda r)^2) \sum_{k=1}^{\infty} [F_k(t)][g^*(\lambda r)^2]^{k-1}$$

$P(T < t) = L(t) = $ The distribution functions of life time (T). $L(t) = 1 - S(t)$

$$= 1 - \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} - \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} (1 - g^*(\lambda r)^2) \sum_{k=1}^{\infty} [F_k(t)][g^*(\lambda r)^2]^{k-1}$$

Where $[f^*(s)]^k$ is Laplace transform of $V_k(t)$ since the inter-arrival times are i.i.d. The above equation can be rewritten as,

$$= \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} (1 - g^*(\lambda r)^2) \sum_{k=1}^{\infty} [F_k(t)][g^*(\lambda r)^2]^{k-1} \qquad (5)$$

$$E(T) = -\frac{d}{ds} L^*(s) \quad \text{given } s = 0$$

$$E(T^2) = \frac{d^2 L^*(s)}{ds^2} \quad \text{given } s = 0$$

decreasing in for each t. It is also known from renewal process that

From which the Variance can be obtained.

$$f^*(s) = \left(\frac{c}{c+s}\right)$$

$$l^*(s) = \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \frac{(1 - g^*(\lambda r)^2) f^*(s)}{(1 - g^*(\lambda r)^2 f^*(s))} \qquad (6)$$

$$= \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \frac{c(1 - g^*(\lambda r)^2)}{(c + s - g^*(\lambda r)^2 c)} \qquad (7)$$

The mean and variance of the time to threshold to cross the breakdown point is derived.

$$E(T) = \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \frac{1}{c(1 - g^*(\lambda r)^2)} \qquad \text{on simplification} \qquad (8)$$

$$E(T^2) = \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \frac{2}{c^2(1 - g^*(\lambda r)^2)^2} \qquad \text{on simplification} \qquad (9)$$

$$V(T) = E(T^2) - [E(T)]^2$$

The inter-arrival time of the threshold follows exponential distribution. The Laplace transformation of the exponential is given by $\left[\mu / \mu + \lambda\right]$.

$$g^*(.) \sim exp(\mu), \quad g^*(\lambda r)^2 = \left[\frac{\mu}{\mu + (\lambda r)^2}\right]$$

$$E(T) = \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \left(\frac{1}{c}\right) \left[\frac{(\mu + (\lambda r)^2)}{(\lambda r)^2}\right] \qquad (10)$$

$$E(T^2) = \sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \left(\frac{2}{c^2}\right) \left[\frac{(\mu + (\lambda r)^2)}{(\lambda r)^2}\right]^2$$

$$V(T) = \left[\sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \left(\frac{2}{c^2}\right) \left[\frac{(\mu + (\lambda r)^2)}{(\lambda r)^2}\right]^2\right]$$

$$- \left[\sum_{r=1}^{n} \binom{n}{r} (-1)^{r+1} \left(\frac{1}{c}\right) \left[\frac{(\mu + (\lambda r)^2)}{(\lambda r)^2}\right]\right]^2 \qquad (11)$$

**Special case** $(\alpha = 1)$

Let the random variable  denoting inter arrival time which follows exponential with parameter. Now , substituting in the below equation  we get,

$$E(T) = \frac{(\mu + \lambda)^2}{c(\lambda^2 - 2\mu\lambda)} \qquad (12)$$

$$V(T) = \frac{(\mu + \lambda)^4}{c^2[\lambda^2 - 2\mu\lambda]^2} \qquad (13)$$

The shape parameter of the Generalized Rayleigh distribution $\alpha$ is kept fixed i.e. $\alpha = 1$. We obtained the following equation (12) and (13) as the expected time to E (T) and variance V (T).

*Numerical Illustration*

Simulation models are particularly useful in studying small systems where random fluctuations are likely to be more serious. To illustrate the method described in this paper (special case), we gave some limited simulation results. The expected time and variance from the above equation  and  was found with the changes in parameters and with increasing parameters which is observed in the given figures below.

**Conclusion**

When μ is kept fixed, the inter-arrival time 'c' which follows exponential distribution is an increasing case by the process of renewal theory. Therefore, the value of the expected time E (T) to cross the breakdown point of threshold is found to be decreasing, in all the cases of the parameter value μ=0,5,1,1,5,2. When the value of the parameter  increases, the expected time is also found decreasing, as observed in Figure 1. The same case is found in Variance V (T) which is observed in Figure 3.

When λ is kept fixed and the inter-arrival time 'c' increases, the value of the expected time E (T) to cross the threshold is found to be decreasing, in all the cases of the parameter

**Fig 1.**
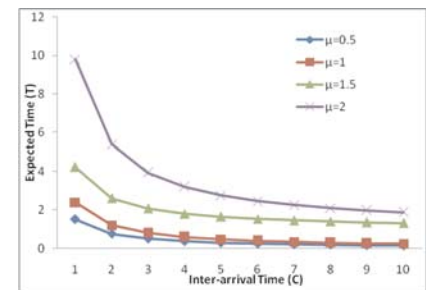
**Fig 2.**
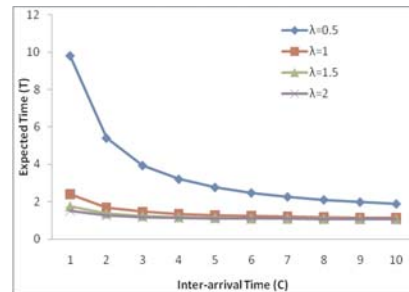


**Fig 3.**
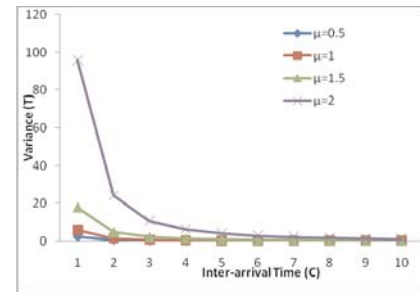


**Fig 4.**
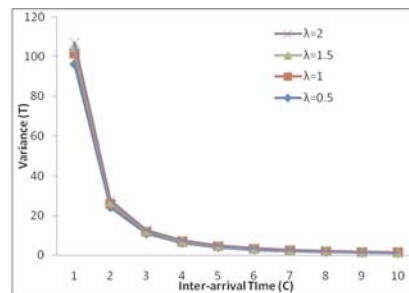


value λ=0,5,1,1,5,2.  When the value of the parameter  increases, the expected time is found increasing, as indicated in Figure 2. The same case is observed in the breakdown point of threshold for Variance *V (T)* which is observed in Figure 4.

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# Consumption patterns, nutritional norms and poverty levels of Scheduled Tribes in Andhra Pradesh: A study of Jatapu Tribe in Seethammapeta Mandal of Srikakulam District

**D. Pulla Rao**

**Abstract**

The Constitution of India seeks to secure for all its citizens, among other things, social and economic justice, equality of status and opportunity and assure the dignity of the individual. Several provisions have been incorporated in the constitution for safeguarding and promoting the interests of the scheduled tribes in various spheres so as to enable them to join the national mainstream. [In our study the income and expenditure relationship examined across different income groups indicates that there is a decline in the share of food expenditure as the income increase, indicating an inverse relationship between per capita income and share of food expenditure. Agriculture is the prime and predominant occupation of tribals and the culture of the tribal communities is reflected in their agricultural practices. The agro-climatic conditions and the resource potentialities differ from one tribal area to another. This is due to the nature of soil, fertility, availability of water etc. Due to prevalence of unemployment and underemployment, agriculture alone cannot sustain them throughout the year. So, the tribals must rely on labour works and the forest produce which occupies and plays an important role in their daily life. Hence, the tribal economy may rightly be called as agro- forest- based economy. The isolated location of the tribes from the mainstream of life is hindering their economic activities. The illiteracy among the tribals and the rich forest produce have tempted the money lenders and small traders to exploit the tribals. [The present paper attempts to examine the human development among tribal communities in Andhra Pradesh.

**Keywords:** Schedule Tribes; Andhra Pradesh; Agriculture; Forest based economy.

## Introduction

The tribes generally have a group of families living together and these groups have pre-historic economy, with several rituals and customs. Certain tribal languages have no script except speech. They live in interior forest areas far away from the civilized world. They have slash burn cultivation and hunting of wild animals as the way of life. They have a common religion, common customs and live as a community. In general, tribes are peculiar type of people living all over the world. Agriculture is the prime and predominant occupation and the culture of the tribal communities is reflected in their agricultural practices. The agro-climatic conditions and the resource potentialities differ from one tribal area to another. This is due to the nature of soil, fertility, availability of water etc. Due to prevalence of unemployment and underemployment, agriculture alone cannot sustain them throughout the year. So the tribals must rely on labour works and the forest produce which occupies and plays an important role in their daily life. Hence, the tribal economy may rightly be called as agro-forest- based economy. The isolated location of the tribes from the mainstream of life is hindering their economic activities. The illiteracy among the tribals and the rich forest produce have tempted the money lenders and small traders to exploit the tribals. India ranks the second in having the tribal concentration in the world, next only to Africa. India holds a unique position in the concentration of tribal communities. There are about 532 schedule tribes in India. They speak about 100 languages and 255 subsidiary languages.

**Author's Affilation:** Professor of Economics, Andhra University, Visakhapatnam-3, A.P.

**Reprint's request: Dr. D. Pulla Rao,** Professor of Economics, 3/5, Siripuram Quarters, Andhra University, Visakhapatnam-3, A.P.

The growth rates of schedule tribe population in Andhra Pradesh are 5.47, 2.24, 6.50, 2.79 and 3.01 for the years 1951, 1961, 1971, 1981, 1991 and 2001 respectively. Except 1961 and 1991, the decadal growth rate of tribal population is more than the growth rate of general population. From 1951 to 2001 the tribal population has increased by five fold, but for the general population it is only 1.5 times.

The tribal villages are inhabited by different variety of tribes. The important tribes are Gonds, Andhs, Thothis, and Kolanes in Adilabad district. Koya, Konda Reddies, Naikpads in Khammam, Warangal and Godavari districts. Bagatha, Valmiki, Kondhs and Jatapus in the districts of north coastal Andhra Pradesh. Chenchus in the pockets of Mahaboob Nagar, Kurnool and Prakasam Distiricts. The social structure of the various tribal groups resembles which is due to their similar clan organizations. The social practices, customs, beliefs and code of conduct are almost common among the various tribal groups. Almost all the tribal groups in Andhra Pradesh eat cooked food. Some tribes in higher community status generally do not accept cooked food from other tribal communities who have a lower status. The tribal economy is very poor and almost intertwined with the social phenomena.

**Methodology**

**T**he primary data comprised of collecting information during the months of June and July 2010 from the selected sample tribal households in the tribal areas. The multistage stratified random sampling method was used for the study. There were four stages in which sampling process was carried out. The first stage was selection of district, the second stage consisted of selection of mandal, the third stage was selection of villages and the fourth stage was selection of households. Out of the nine districts of Andhra Pradesh which have a concentration of tribal population, Srikakulam Districtwas selected.

The second stage of sampling consisted of selection of mandal. The selected Seethampeta was the only tribal concentrated mandal out of 37 mandals of Srikakulam district. Out of 37, 19 mandals have tribal population in Srikakulam district, with a total of 11, 9304 tribal population. Seethampeta alone had 40, 189 tribal population (33.69 per cent of total tribal population of the district).

The third stage of sampling consisted of selection of villages. The Seethampeta mandal consisted of 113 revenue villages and five uninhabited villages formed by 24 panchayats and 290 hamlets. To examine the socioeconomic conditions of prominent tribes in Srikakulam District, i.e. Jatapu, the specific tribe population concentration was considered in the selection of villages. Specific tribe population with 80 per cent and less than 90 per cent in the respective panchayats are considered as criteria for selection. After identification of specific tribe concentration in the panchayats, the Jatapu concentrated 10 villages were selected. To examine the differences in the living patterns of Jatapu tribe households in plain and interior villages, among the 10 selected villages, purposively, 5 villages-Panukuvalasa, Manapuram, Pedduru, Pedarama and Valegaadda villages on road side plain villages of the Seethampeta mandal are selected. Similarly the remaining 5 villages-Jayapuram, Kusumuru, Talada, Tadipai and Pedapolla were selected from the interior parts of the Seethampeta Mandal.

In the final stage, from Jatapu concentrated villages, a number of 20 households were selected from each selected village and, as a whole, from the selected 10 villages, a total of 200 Jatapu tribe households were selected.

This paper deals with the consumption patterns, nutritional norms and poverty levels of Jatapu Tribes in Seethammapeta Mandal of Srikakulam District of Andhra Pradesh.

*Consumption Patterns of the Sample Households*

The consumption expenditure pattern at a point of time speaks about the living standards

of the people. To analyze the patterns of consumption, household data were obtained from individual households regarding the expenditure on food and non-food items. Data relating to daily routine items of expenditure were obtained for a period of 30 days, whereas data relating to occasional items of expenditure were collected for a period of one year. The expenditure data on specific items obtained for one year were converted for one month to facilitate comparison.

The relationship between income and expenditure on food and non-food items, has assumed greater importance for many economists. Notable among them is Engle. Engle's hypothesis regarding the income-consumption relationship postulates that the share of expenditure on food declines with the rise in income of the families. Against this background of Engle's hypothesis, the income-consumption relationship of the different tribes is analyzed; as the present study refers to a single point in time, cross-section analysis was attempted. Village-wise average household monthly income and expenditure and average per capita monthly income and expenditure on food and non-food items was estimated.

*Consumption on Food Items*

It was observed that the share of expenditure on food items was high in case of all villages and also for the total as a whole. Thus, the results of this study are consistent with Engle's hypothesis of income-expenditure relationship.  To examine Engle's hypothesis in detail the average household and average per capita expenditure of all the sample households on various food and non-food items was collected. It is evident from Table 1 that in the total quantity of food consumption, rice constituted a substantial quantity (58.30%).  Out of 58.30 per cent of rice, 32.78 per cent of it was purchased from open market and the rest of 25.52 per cent from the fair price shops, run by government at subsidized prices.

The other important items purchased from the fair price shops by the tribal households were sugar, kerosene and vegetables that constituted about 14.00 per cent of total purchases. Other items like pulses, edible oils and meat constituted less than 5 per cent each. The variation in the percentage of quantity purchased by the households in the interior villages is relatively low when compared to their counterparts in the villages in the plain areas.

## Table 1. Consumption Pattern of Quantities of Food

(Quantity in Kgs.)

| S. No | Village | Rice from Open Market | Rice from F.P shops | Other items from F.P shops | Pulses | Edible oil | Meat | Vegetables | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | | | I. Villages in plain areas | | | | | |
| 1 | Panukuvalasa | 581 | 335 | 340 | 68 | 70 | 72 | 286 | 1752 |
| 2 | Manapuram | 575 | 315 | 215 | 65 | 61 | 75 | 253 | 1559 |
| 3. | Pedduru | 512 | 418 | 196 | 75 | 75 | 75 | 282 | 1633 |
| 4 | Pedarama | 545 | 431 | 148 | 68 | 63 | 65 | 225 | 1545 |
| 5 | Valegedda | 584 | 445 | 185 | 82 | 60 | 60 | 254 | 1670 |
| | | | | II. Villages in Interior areas | | | | | |
| 1 | Jayapuram | 350 | 325 | 220 | 55 | 49 | 65 | 189 | 1253 |
| 2 | Kusumur | 425 | 380 | 237 | 65 | 57 | 58 | 130 | 1352 |
| 3 | Talada | 355 | 319 | 204 | 59 | 59 | 58 | 151 | 1205 |
| 4 | Tadipai | 395 | 345 | 139 | 65 | 63 | 40 | 195 | 1242 |
| 15 | Pedapolla | 450 | 402 | 160 | 55 | 55 | 45 | 180 | 1347 |
| | Total | 4772 | 3715 | 2044 | 657 | 612 | 613 | 2145 | 14558 |
| | | (32.78) | (25.52) | (14.04) | (4.51) | (4.20) | (4.21) | (14.74) | (100.00) |

Note: The figures presented in the parenthesis are percentages to total.

Tribal people in general spent a higher proportion of their income on food items. Their food items included cereals like rice, Ragi, Samalu, Maize, Jowar, Bajra; pulses, like red-gram, black-gram, green-gram, horse-gram etc. They also consumed other items like vegetables, meat, fish, edible oil, salt, tamarind, jaggery etc. It is evident from the field data that  almost 58.56 per cent of the average monthly household expenditure was spent on food items. Among different villages, expenditure on food items was relatively higher among the households living in the interior villages rather than their counter parts villages in plain areas.  Further it is noticed

that nearly 70 per cent of food expenditure is spent on rice by all households. The information relating to the consumption pattern of value of food is presented in Table 2.

It can be noticed from the table that the information relating to consumption patterns of value of food corroborates with their consumption pattern of quantities of food. The households living in the interior villages spent more proportion of their incomes on food items rather than their counterparts living in the villages in the plain areas.

## Table 2. Consumption Pattern of Values of Food

(Amount in Rs.)

| Sl. No | Village | Rice from open market (Kgs.) | Rice from fair price shop (Kgs.) | Other items from fair shop (Kgs.) | Pulses (Kgs.) | Edible oil (Kgs.) | Meat (Kgs.) | Vegetables (Kgs.) | Total (Kgs.) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | **I. Villages in plain areas** | | | | | |
| 1 | Panukuvalasa | 3680 | 1530 | 720 | 1090 | 2020 | 1680 | 844 | 11564 |
| 2 | Manapuram | 3300 | 1442 | 772 | 920 | 1820 | 1520 | 635 | 10409 |
| 3. | Pedduru | 3929 | 1096 | 800 | 980 | 1760 | 1590 | 725 | 10880 |
| 4 | Pedarama | 3640 | 1313 | 718 | 1046 | 1800 | 1115 | 778 | 10410 |
| 5 | Valegedda | 3650 | 1306 | 681 | 990 | 2000 | 1560 | 710 | 10897 |
| | | | | **II. Villages in Interior areas** | | | | | |
| 1 | Jayapuram | 3370 | 1569 | 670 | 650 | 1712 | 900 | 720 | 9591 |
| 2 | Kusumur | 3330 | 1236 | 685 | 890 | 1600 | 1250 | 680 | 9671 |
| 3. | Talada | 3100 | 1220 | 640 | 780 | 1240 | 985 | 625 | 8590 |
| 4 | Tadipai | 3100 | 1390 | 690 | 790 | 1260 | 1020 | 643 | 8993 |
| 5 | Pedapolla | 3127 | 1306 | 572 | 755 | 1820 | 1520 | 635 | 9735 |
| | Total | 34326 | 13408 | 6948 | 8891 | 17032 | 13140 | 6995 | 100740 |
| | | (34.07) | (13.38) | (6.90) | (8.85) | (16.91 | (13.04) | (6.85) | (100.00) |

Note: The figures presented in the parenthesis are percentages to total.

### *Expenditure on Food and Non-Food Items*

Average monthly household expenditure and per capita expenditure of tribal households on non-food items revealed that about 46 per cent of the average household and per capita expenditure was spent on non-food items. On average, monthly per capita expenditure on non-food items was relatively higher on items such as clothing, fuel, lighting, cosmetics etc., by the households living in the villages in 'plain areas. On the other hand the households living in the interior villages spent more on items like tobacco, pan, beverages, festivals and ceremonies, house repairs etc. It is interesting to note that the per capita intoxicant expenditure was very high among the households in the interior villages than their expenditure on education and health. The information relating to consumption on

food and non-food items by the selected households in the interior and plain villages is presented in Tables 3 and 4.

It is evident from the Tables 3 and 4 that the percentage distribution of annual per capita consumption expenditure was according to different villages' income groups of households. It can be observed from the field data that the expenditure on food item was relatively high among the households in the first three lower income groups who were particularly from the interior villages. That means the proportion of expenditure on total food items declined with an increase in income in case of all villages. Among the different food items, expenditure on cereals  decreased while that on pulses and other food increased with an increase in the income in all the individual cases. On the non-food item front, the

## Table 3. Annual Per Capita Consumption Expenditure on Food and Non-food Items by the Households in Interior Villages

| S. No. | Items | Annual average per capita income groups | | | | | | Total (in Rs.) |
|---|---|---|---|---|---|---|---|---|
| | | Below 2000 | 2000-2500 | 2500-3000 | 3000-3500 | 3500-4000 | 4000 above | |
| | **I. Food items** | | | | | | | |
| 1. | Cereals | 55.63 | 53.16 | 49.76 | 44.67 | 40.72 | - | 49.30 |
| 2. | Pulses | 3.26 | 3.47 | 4.62 | 5.68 | 6.03 | - | 4.14 |
| 3. | Other food items | 10.29 | 10.95 | 11.14 | 12.51 | 13.03 | - | 11.56 |
| | Total food | 69.18 | 67.58 | 65.52 | 62.86 | 59.78 | - | 178 (65.00) |
| | **II. Non – Food items** | | | | | | | |
| 1. | Fuel & light | 3.25 | 3.46 | 3.72 | 4.24 | 4.71 | - | 4.12 |
| 2. | Tobacco & Pan | 5.24 | 5.12 | 4.79 | 4.16 | 3.68 | - | 4.51 |
| 3. | Intoxicants | 5.29 | 4.46 | 5.12 | 4.91 | 3.78 | - | 4.68 |
| 4. | Clothing | 4.14 | 4.67 | 4.79 | 5.28 | 5.87 | - | 5.13 |
| 5. | Festivals | 5.19 | 4.37 | 3.26 | 4.14 | 4.12 | - | 4.62 |
| 6. | Health | 0.56 | 0.83 | 1.37 | 1.46 | 2.23 | - | 1.24 |
| 7. | Education | 0.37 | 1.29 | 1.44 | 2.43 | 3.02 | - | 1.68 |
| 8. | Travel | 1.23 | 2.12 | 2.16 | 2.14 | 2.38 | - | 2.91 |
| 9. | House repairs | 1.12 | 2.31 | 2.66 | 3.12 | 3.46 | - | 2.82 |
| 10. | Cosmetics | 1.21 | 1.41 | 1.58 | 1.16 | 1.12 | - | 1.21 |
| 11. | Consumer durables etc. | 1.27 | 2.36 | 2.46 | 2.28 | 2.69 | - | 2.03 |
| | Total Non-food | 30.82 | 21.42 | 34.48 | 37.4 | 40.22 | - | 1104 (35.00) |
| | **Total Expenditure** | **(100.00)** | **(100.00)** | **(100.00)** | **(100.00)** | **(100.00)** | **-** | **282 (100.00)** |

expenditure on tobacco and pan, intoxicants and festivals was relatively higher in the lower income groups, particularly households from the interior villages. On the other hand, the expenditure on clothing, health, education, cosmetics and house repairs are relatively higher in case of higher income groups, particularly among the households from the plain areas. Thus, the expenditure patterns of the households synchronizes with the general expenditure pattern of the rural sector.

## Table 4. Annual Per Capita Consumption Expenditure on Food and Non Food Items by the Households in the Villages in Plain Areas

| S. No. | Items | Annual average per capita income groups | | | | | | Total (in Rs.) |
|---|---|---|---|---|---|---|---|---|
| | | Below 2000 | 2000-2500 | 2500-3000 | 3000-3500 | 3500-4000 | 4000 above | |
| | **I. Food items** | | | | | | | |
| 1. | Cereals | - | 43.16 | 40.54 | 36.82 | 33.67 | 28.46 | 36.52 |
| 2. | Pulses | - | 5.34 | 5.69 | 6.21 | 6.52 | 7.18 | 6.71 |
| 3. | Other food items | - | 8.64 | 9.97 | 12.33 | 15.03 | 16.62 | 10.66 |
| | Total food | - | 57.14 | 56.26 | 55.36 | 53.22 | 52.26 | 192 (54.00) |
| | **II. Non – Food items** | | | | | | | |
| 1. | Fuel & light | - | 4.12 | 3.29 | 4.47 | 4.80 | 5.26 | 4.27 |
| 2. | Tobacco & Pan | - | 3.19 | 3.16 | 3.41 | 3.53 | 1.59 | 2.86 |
| 3. | Intoxicants | - | 4.12 | 3.35 | 2.81 | 3.72 | 2.12 | 3.12 |
| 4. | Clothing | - | 3.27 | 4.28 | 5.32 | 5.16 | 6.43 | 5.26 |
| 5. | Festivals | - | 4.56 | 3.28 | 3.16 | 2.53 | 1.66 | 3.23 |
| 6. | Health | - | 3.12 | 4.46 | 5.10 | 5.24 | 5.37 | 5.16 |
| 7. | Education | - | 3.61 | 4.72 | 5.02 | 5.41 | 5.48 | 5.33 |
| 8. | Travel | - | 3.12 | 4.16 | 4.27 | 4.38 | 4.33 | 4.29 |
| 9. | House repairs | - | 2.53 | 3.23 | 3.36 | 3.52 | 4.67 | 4.52 |
| 10. | Cosmetics | - | 3.68 | 4.32 | 6.12 | 6.74 | 6.92 | 6.43 |
| 11. | Consumer durables etc. | - | 1.46 | 1.71 | 2.16 | 2.76 | 3.06 | 2.53 |
| | **Total Non-food** | **–** | **42.86** | **43.74** | **44.64** | **46.28** | **47.74** | **164 (46.00)** |
| | **Total Expenditure** | **–** | **(100.00)** | **(100.00)** | **(100.00)** | **(100.00)** | **(100.00)** | **356 (100.00)** |

Note: The figures presented in the parenthesis are percentages to total.

The major proportion of non-food consumption constituted their expenditure on clothes, health education and others. Across the villages, the extent of expenditure among the households of interior villages was more on food items than on non- food items. The percentage of money spent on entertainment constituted less than 2.85 per cent and was relatively higher in case of households in the villages in plains. Across villages, the households of plain villages spent more on clothes, health, education and others as their total non-food expenditure. However, the expenditure on these items was very limited in case of households in the some of the interior villages. The households in the interior villages spent more on tobacco, pan, intoxicants, ceremonies and festivals as their expenditure on non food items rather than on clothing, education, health etc.,

To know further applicability of Engle's law, the percentage distribution of annul per capita consumption expenditure across different villages are income groups of households It can be observed from the field data that the expenditure on food items was relatively high in the first three lower income groups. That means the proportion of expenditure on total food items declined with an increase in income in case of all villages. Among the different food items, expenditure on cereals decreased while that on pulses and other food items increased with an increase in the income in all the individual cases. Regarding non-food items, the expenditure on tobacco and pan, intoxicants and festivals was relatively higher in the lower income groups. On the other hand, the expenditure on clothing, health, education, cosmetics and house repairs was relatively higher in case of higher income groups. Thus, the expenditure patterns of the households synchronized with the general expenditure pattern of the rural sector and the law propounded by Engle.

## Possession of Consumer Durable Goods

Tribal economy is a subsistence economy and any possession of consumer durable goods

can be taken as a positive response to modern ways of living. Information relating to the possession of 10 goods like furniture, radio, watch, tape recorders, television, cycle, scooter, fan, iron, almirah, gas stove, cooker was collected from the sample households. Scores were given on the basis of possession of the articles. A score of O was given for non possession of any of these goods and a score of 1 for possession of any one of these goods. Thus, scores were obtained on the basis of minimum and maximum scores of 0 to 10. It was found that no single household had more than 8 of these identified items.The scores of possession of goods across villages are presented in Table 5.

It can be observed from the table that, as a whole, nearly 40.50 per cent of the households did not have any of the selected goods and, in this case, among the tribes, the proportion of households of interior villages was relatively higher than other households in the villages in plain areas. The households of interior villages possessed limited commodities compared to the households in the villages in plain areas. The change in the assets composition among the households of different villages reveals the process of transformation taking place in the living pattern of the households living in the plain areas.

*Expenditure on Selected Special Items*

Information relating to the household expenditure on certain items which reflects modern living was obtained. The items chosen were toilet soaps, face powder, tooth paste/ powder, wristwatch, transistor, torchlight, chairs, television, and cots. Scores were given according to the possession of selected items by the households. It is interesting to note that a higher proportion of households living in the villages in plain areas spent on more number of selected items rather than households living in interior villages. It may be observed that the responsiveness to modernity in terms of household expenditure on selected goods was more pronounced in case of households living in the villages in plain areas rather than the

**Table 5. Distribution of Households by Score of Consumer and Other Durable Goods**

| S. No. | village | No. of durable goods | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| | **I. Villages in plain areas** | | | | | | | | |
| 1. | Panukuvalasa | 8 | 5 | 3 | 2 | 0 | 1 | 1 | 20 |
| 2. | Manapuram | 7 | 4 | 4 | 3 | 1 | 1 | 0 | 20 |
| 3. | Pedduru | 6 | 6 | 3 | 2 | 2 | 0 | 1 | 20 |
| 4. | Pedarama | 5 | 7 | 4 | 2 | 1 | 1 | 0 | 20 |
| 5. | Valegedda | 7 | 5 | 3 | 2 | 1 | 1 | 1 | 20 |
| | **II. Villages in Interior areas:** | | | | | | | | |
| 1. | Jayapuram | 9 | 6 | 2 | 2 | 1 | 0 | 0 | 20 |
| 2. | Kusumur | 11 | 7 | 1 | 1 | 0 | 0 | 0 | 20 |
| 3. | Talada | 8 | 6 | 3 | 2 | 1 | 0 | 0 | 20 |
| 4. | Tadipai | 10 | 6 | 2 | 1 | 1 | 0 | 0 | 20 |
| 5. | Pedapolla | 10 | 5 | 3 | 1 | 0 | 1 | 0 | 20 |
| | **Total** | **81** | **57** | **28** | **18** | **8** | **5** | **3** | **200** |
| | | **(40.5)** | **(28.50)** | **(14.0)** | **(9.0)** | **(4.0)** | **(2.50)** | **(1.50)** | **(100)** |

Note: The figures presented in the parenthesis are percentages to total.

households living in the interior villages. The scores of selected goods across villages are presented in the Table 6.

It is indicated that only 6.0 per cent of households were without any selected commodities and most of them belonged to the interior villages. In the group of 39.0 per cent who possessed one commodity the households in the interior villages were more in number. The other 26.0 per cent possessed two items, 13.0 per cent three items, 8.0 per cent four items, 4.0 per cent five items. 2.5 per cent possessed six items, 0.5 per cent with seven item and 1.0 per cent household are possessed with a maximum of 8 selected commodities. Among these households the households, living in the villages in plain areas were more in number.

**Table 6. Distribution of Households by Score of Expenditure on Selected Goods across Villages**

| S. No. | Tribes | No. of selected goods possessed | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| | **I. Villages in plain areas** | | | | | | | | | | |
| 1. | Panukuvalasa | - | 6 | 6 | 3 | 2 | 1 | 1 | - | 1 | 20 |
| 2. | Manapuram | - | 6 | 4 | 4 | 4 | 1 | 1 | - | - | 20 |
| 3. | Pedduru | - | 7 | 5 | 3 | 2 | 1 | 1 | 1 | - | 20 |
| 4. | Pedarama | - | 9 | 6 | 3 | 1 | 1 | - | - | - | 20 |
| 5. | Valegedda | - | 8 | 4 | 3 | 2 | 1 | 1 | - | 1 | 20 |
| | **II. Villages in Interior areas** | | | | | | | | | | |
| 1. | Jayapuram | - | 8 | 6 | 4 | 1 | 1 | - | - | - | 20 |
| 2. | Kusumur | 4 | 10 | 4 | 1 | 1 | - | - | - | - | 20 |
| 3. | Talada | 2 | 9 | 6 | 1 | 1 | - | 1 | - | - | 20 |
| 4. | Tadipai | 6 | 8 | 5 | 1 | - | - | - | - | - | 20 |
| 5. | Pedapolla | - | 7 | 6 | 3 | 2 | 2 | - | - | - | 20 |
| | **Total** | **12** | **78** | **52** | **26** | **16** | **8** | **5** | **1** | **2** | **200** |
| | | **(6.0)** | **(39.0)** | **(26.0)** | **(13.0)** | **(8.0)** | **(4.0)** | **(2.5)** | **(0.5)** | **(1.0)** | **(100.00)** |

Note: The figures presented in the parenthesis are percentages to total.

## Incidence of poverty in the study area

The poverty line signifies a minimum level of consumption- expenditure, below which the household is considered poor. Sufficient care has been taken to account for the value of consumption of own produce in the data on expenditure alternatively. The state of 'poverty' may be defined in relation to nutrition and, thus, the extent of undernutrition can be measured based on a nutritional norm. It is argued that the poverty line should be related to basic needs; the basic food need has to be defined in relation to a nutritional norm or some other 'commodities norm' that can divide the population into poor and non-poor. Thus, it does appear as though some link between nutritional norm and poverty cut-off is inevitable. In spite of this observation, it must be stated that results based on nutritional norms and income poverty cut-off should not be mixed up. For instance, consider the results that can be obtained on the incidence of poverty with reference to an income/expenditure cut-off set to reflect a minimum nutrition norm (Say, the consumption of 2100 Cal per head per day). The incidence of under nutrition may differ widely for the simple reason that people who are not poor by the income/expenditure criterion may be poor on the calorie criterion. People may have the purchasing power but either because of habit, ignorance or sheer choice, they may not be poor compared to those who are undernourished due to lack of purchasing power or due to some other disability. The information pertaining to the per capita calorie intake of the selected households across villages is presented in Table 7.

The extent of calories depends largely upon households' consumption of cereals. Across the households belonging to different category of villages, the households in the villages in plain areas showed that they generated around 1130-1150 calories per capita per day by consuming rice. In the same villages in plain areas, the consumption of edible oil, Ragi, and other varieties of food grains seemed to be high, thereby generating more calories. From the available information relating to the socioeconomic indicators and calorie intake of the households of different villages, the selected 10 villages were grouped into two. The villages located on roadside plain areas were viewed as relatively better placed villages in case of calories intake  and the villages in the interior areas  treated as relatively poor placed villages in case of calories intake.

In this context, the per capita calorie intake of food consumed by the households in the different villages reveal that the calorie intake of food was recorded very high among the households belonging to villages in plain areas. On the other hand, the calorie intake of the households living in the relatively interior villages recorded lower extent of calorie intake. The data also revealed that the households living in the interior villages received more calories only through rice, Ragi, and meat. They were not able to acquire high calories from the consumption of pulses, vegetables and edible oils.

The extent of incidence of poverty in different selected villages following the norm of 2100 calories and 2400 calories is presented in Tables 8 and 9. It can be noticed that the incidence of poverty as seen from nutrition norms reveals that the nutrition norms chosen were 2400 and 2100 calories.  They were used to estimate the incidence of poverty.  Calories were derived using the nutrition conversion table.  For each household in each of the 10 villages, per capita consumption of various items was noted separately. These were converted into calories by using the nutrition conversion tables. Calories derived for each of the 20 households were aggregated and divided by the total number of households. The results are shown in Tables 8 and 9.

It may be seen from Table 8 that at the level of all households, the major proportion of calories was acquired from consumption of cereals.  Among the other items of consumption, vegetable oils were prominent in providing more calories. The calories noted for all the 10 villages were found to be lower than the conventional required norms. This is because the households were not able to

## Table 7. Village-wise Per Capita Calorie Intake of Food

| S. No | Village | Rice | Ragi | Meat | Pulses | Vegetable | Edible oil | Other varieties of food grain | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | I. Villages in plain areas | | | | |
| 1. | Panukuvalasa | 1225 | 210 | 49 | 80 | 69 | 182 | 135 | 1950 |
| 2. | Manapuram | 1020 | 115 | 41 | 65 | 56 | 160 | 105 | 1562 |
| 3. | Pedduru | 1030 | 145 | 45 | 90 | 60 | 198 | 110 | 1678 |
| 4. | Pedarama | 928 | 120 | 30 | 85 | 55 | 125 | 96 | 1439 |
| 5. | Valegedda | 1196 | 134 | 39 | 98 | 77 | 190 | 95 | 1829 |
| | | | | | II. Villages in Interior areas | | | | |
| 1. | Jayapuram | 1005 | 110 | 48 | 70 | 55 | 165 | 69 | 1522 |
| 2. | Kusumur | 955 | 119 | 39 | 69 | 50 | 155 | 95 | 1482 |
| 3. | Talada | 965 | 98 | 40 | 55 | 45 | 160 | 55 | 1418 |
| 4. | Tadipai | 942 | 140 | 36 | 52 | 55 | 110 | 85 | 1420 |
| 5. | Pedapolla | 980 | 125 | 45 | 67 | 50 | 170 | 98 | 1535 |
| | All Villages | 10246 | 1316 | 412 | 731 | 572 | 1615 | 943 | 15835 |
| | | (64.70) | (8.31) | (2.60) | (4.12) | (3.61) | (10.10) | (7.01) | (100.00) |

Note: Figures in brackets refer to percentages.

provide quantitative data relating to certain consumption items like meat which was not purchased by them. From Table 8 it can be noticed that among the households of the villages in the plain areas, 44 per cent of them were not able to fulfill the 2100 calories norm and 33 per cent were able to fulfill the 2100 calories norm, but not the 2400 calories norm. Only 23 per cent of households were able to fulfill the nutritional norm of 2400 calories.

## Table 8. Incidence of Poverty based on Nutrition Norm of 2100 Calories and 2400 Calories among the Households in the Villages in Plain Areas

| S. No. | Village | No. of Household below 2100 calories norm | | No. of Household below 2400 calories | |
|---|---|---|---|---|---|
| | | Incidence of poverty 2100 calories norm for person | Percentage of Household below 2100 calories norm | Incidence of poverty 2400 calories norm for person | Percentage of Household below 2400 calories norm |
| 1. | Panukuvalasa | 9 | 45 | 7 | 80 |
| 2. | Manapuram | 10 | 50 | 6 | 80 |
| 3. | Pedduru | 9 | 45 | 6 | 75 |
| 4. | Pedarama | 7 | 35 | 8 | 75 |
| 5. | Valegedda | 9 | 45 | 6 | 75 |
| | All Plain Villages | 44 | | 33 | |

From Table 9 a very precarious picture among the households of the villages in the interior areas is noticed. Around 74 per cent of them were not able to fulfill 2100 Calories norm and 16 per cent not able to fulfill the 2400 calories norm. Among the households of interior areas, only 10 per cent were able to fulfill the 2400 calories norm. As a whole the percentage of the households by using the norm of 2400 calories and 2100 calories to measure under nutrition.

As a whole, analysis reveals that except in the villages in plain areas, all the households belonging to the interior villages were found 2400 calories norm. Even the norm of 2100 calories, a large majority of households in the interior villages (more than 85%) fell below the norm. Particularly in the interior villages of Talada and Tadipai, all the selected households were in under nutrition category. It is evident from the field data that deficiency in the diet taken by the tribals exists with

**Table 9. Incidence of Poverty based on Nutrition Norm of 2100 Calories and 2400 Calories among the Households in the Villages in Interior Areas**

| S. No. | Village | No. of Household below 2100 calories norm | | No. of Household below 2400 calories | |
|---|---|---|---|---|---|
| | | Incidence of poverty 2100 calories norm for person | Percentage of Household below 2100 calories norm | Incidence of poverty 2400 calories norm for person | Percentage of Household below 2400 calories norm |
| 1. | Jayapuram | 12 | 60 | 4 | 80 |
| 2. | Kusumur | 13 | 65 | 4 | 85 |
| 3. | Talada | 17 | 85 | 3 | 100 |
| 4. | Tadipai | 18 | 90 | 2 | 100 |
| 5. | Pedapolla | 14 | 70 | 3 | 85 |
| | All Interior Villages | 74 | | 16 | |

regard to almost all selected commodities. The deficiency with regard to the cereal consumption was relatively less compared to other items. Further, the deficiency is very high in case of commodities like oils, mutton and chicken. Across tribes the situation was very alarming. Almost all households had deficiency of a higher order with regard to all the chosen items. However, the deficiency on food items was less in the case of households in the villages in plain areas rather than households in the interior villages. This situation calls for immediate attention of the government to intensify the delivery system of public distribution (PDS) in the interior villages of the tribal areas with a view to provide food security and support to the tribal people.

Realizing the need to provide essential commodities like rice, kerosene oil, Palmolive, wheat, sugar besides other daily requirements, the Girijan Co-Operative Corporation (GCC) has opened a number of daily requirement depots exclusively for the purpose of tribals in the state. All the essential commodities are supplied at the subsidized prices as fixed by the Government of Andhra Pradesh. Other goods of daily requirements are supplied at reasonable prices fixed by GCC and its regional and divisional offices. The tribal households are given white/pink ration cards depending upon the estimated annual household income.[The field data reveals that all the selected households had ration cards; among

them 86.25 per cent were white cards holders and only 3.75 per cent were pink card holders. In the field survey majority of the households expressed their satisfaction over the functioning of public distribution system in the study area.

An attempt was also made to adopt the income norm to measure poverty of the households. The poverty line for the income norm is estimated by using Consumer Price Index for Agricultural Labour (CPIAL). The poverty line estimated by the expert committee for 2000-01 prices was taken into account. The information relating to head count ratio of the households in the interior and plain villages revealed that among the households in the interior areas, 77 per cent were below the per capita expenditure norm and only 23 per cent registered above the norm of percapita total expenditure. At current prices the poverty head count ratio varied from 35 per cent to 95 per cent across selected villages. The income poverty seems to be less than poverty as measure by undernutrition norm. These variations are related to socio-economic characteristics of the selected households, both in the villages in interior and plain areas.

**Conclusions**

The pattern of consumption expenditure of tribal households at tribe level reveals that the

selected Jatapu households spend a higher proportion of their incomes on food items than nonfood items. However, the income and expenditure relationship examined across different income groups indicates a decline in the share of food expenditure as the income increases indicating an inverse relationship between per capita income and share of food expenditure. This was more or less noticed in all the villages. Also, it was observed that the households living in the roadside plain villages spend proportionately less amount of money on food items while the households living in the interior villages spend relatively more on food items. Further, more than half of the food expenditure of these households was found to be on the consumption of cereals, while it was on non-cereal items in case of households living in the villages in the plain areas. Among the food items, the expenditure on cereals decreased while the expenditure on other food items like edible oils, vegetables increased with an increase in income.

Regarding the expenditure on non-food items, the relatively lower income groups, particularly those living in the interior villages, spent more on tobacco and pan, intoxicants, festivals and ceremonies and fuel and light. On other hand, households in the villages in plain and roadside areas spent more on clothing, health, education, cosmetics, travel, and consumer durables. It is evident from the analysis relating to the expenditure on selected 10 commodities which represent modernity and change in the consumption patterns among the households, that only 3.73 per cent households did not utilize any one out of the ten commodities. The households in the villages in plain and roadside areas used relatively more number of commodities than the households in the interior areas. It may be observed that the responsiveness to modernity in terms of households' expenditure on selected goods was more pronounced among the households living in the plain and roadside villages.

The extent of incidence of poverty in different selected villages, following the norm of 2100 calories and 2400 calories, was estimated. To estimate the incidence of poverty, calories are derived using the nutrition conversion table. For each household in each of the 10 villages, per capita consumption of various items was noted separately. These were converted into calories using the nutrition conversion tables. Calories derived for each of the 20 households were aggregated and divided by the total number of households. It was indicated that the major proportion of calories were acquired from consumption of cereals. Among the other items of consumption vegetable oils are prominent item in providing more extent of calories. The calories noted for all the 10 villages are found to be lower then the conventional required norms. This is because the households are not able to provide quantitative data relating to certain consumption items like meat which are not purchased by them.

Among the households of the villages in the plain areas 44 per cent of them are not able to fulfill 2100calories norm and 33 per cent are able to fulfill the 2100 calories norm but they are not able to fulfill the 2400 calories norm. Only 23 per cent of households are able to fulfill the nutritional norm of 2400 calories. Similarly among the households of the villages in the interior areas we can notice very precarious picture. Around 74 per cent of them are not able to fulfill 2100calories norm and 16 per cent are not able to fulfill the 2400 calories norm. Among the households of interior areas only 10 per cent are able to fulfill the 2400 calories norm. As a whole the percentage of the households by using the norm of 2400 calories and 2100 calories to measure under nutrition. Except in few of the first five of the villages in plain areas, all the households belonging to the interior villages are found with below the calorie of 2400 calories. Even the norm of 2100 calories, a large majority of households in the interior villages (more than 85 per cent) fall below the norm. Particularly in the interior villages of Talada and Tadipai all the selected households are with under nutrition. It is evident from the field data that, deficiency in the diet taken by

the tribals exists with regard to almost all selected commodities. The deficiency with regard to the cereal consumption is relatively less compared to other items. Further, the deficiency is very high in case of commodities like oils, mutton and chicken. Across tribes the situation is very alarming. Almost all households have deficiency of a higher order with regard to all the chosen items. However, the deficiency on food items is less in the case of households in the villages in plain areas rather than households living in the interior villages.  This situation calls for immediate attention of the Government to intensify the delivery system of public distribution (PDS) in the interior villages of the tribal areas with a view to provide food security and support to the tribal people.

Realizing the need to provide essential commodities like rice, kerosene oil, Palmolive, wheat, sugar besides other daily requirements, the Girijan Co-Operative Corporation (GCC) has opened a number of daily requirement depots exclusively for the purpose of tribals in the state. All the essential commodities are supplied at the subsidized prices as fixed by the Government of Andhra Pradesh. Other goods of daily requirements are supplied at reasonable prices fixed by GCC and its regional and divisional offices. The tribal households are given white/pink ration cards depending upon the estimated annual household income. The field data reveals that all the selected households are having ration cards among them 86.25 per cent are white cards holders and only 3.75 per cent are pink card holders. In the field survey majority of the households expressed their satisfaction over the functioning of public distribution system in the study area.

An attempt is also made to adopt the income norm to measure poverty of the households. The poverty line for the income norm is estimated by using Consumer Price Index for Agricultural Labour (CAPITAL).  The poverty line estimated by the expert committee for 2000-01 prices is taken into account. The information relating to head count ratio of the households in the interior and plain villages indicate that among the households in the plain areas 36 per cent are below the per capita expenditure norm and 64 per cent registered above per capita total expenditure. Among the households in the interior areas 77 per cent are below the per capita expenditure norm and only 23 per cent registered above per capita total expenditure. At current prices the poverty Head Count Ratio various from 35 per cent to 95 per cent across selected villages. The income poverty is seems to be less than poverty as measure by under nutrition norm.  These variations are related to socio-economic characteristics of the selected households both in the villages in interior and plain areas.

From the analysis of the incidence of poverty it is noticed that there is widespread poverty among the selected Jatapu tribal households. The results of the study ultimately reveal that the levels of living seem to be better among the households in the villages which are on the roadside plain areas rather than the households living in the interior villages.

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# Inter-District Disparity in Agriculture and Infrastructure Development in Uttar Pradesh: A Factor Analysis Approach

**Reena Kumari\*, Rakesh Raman\*\***

**Abstract**

Agriculture is the largest and most important sector of the Indian economy which is directly linked with the infrastructure facility. It plays a prominent role in providing food to the nation, employment to the people, raw materials to the industrial sector and surplus for national economic development. A good infrastructure facility is helpful in accessing market of agricultural product and raw material from form to non-form sector and huge employment opportunity to masses. However, what is worse is the growth of agriculture is not satisfactory and it varies across the region. On the other hand, the problem of disparity is crucial in larger states, in comparison to smaller state, and it is very intricate in a state like Uttar Pradesh, which is one of the most populous states of India. The factor analysis shows that high concentration exists in western region in both agriculture as well as infrastructure sectors. The region, Bundelkhand, is very backward in terms of agricultural development and infrastructure except two districts Jhansi and Jalaun are high developed in infrastructure. This empirical evidence indicates that there is a very high degree of correlation between infrastructure facility and agricultural development.

**Keywords:** Agriculture; Infrastructure; Disparity; Factor analysis; Co-relation.

## Introduction

The Indian economy has recently grown at historically unprecedented rates and is now one of the fastest growing economies in the world. The share of service sector and manufacturing has also been increasing rapidly in the course of the country's economic growth but the share of agricultural output has declined drastically. The high transformation of Indian economy has achieved high growth and it has announced itself as one of the second best growing and superpower economies after China. But what is worse is, the growth of India is not inclusive in nature. There is a strong indication that the improvement in the growth of income might have not been distributed well and club to some certain pockets of the states and has remained impoverished in spite of their overall growth. On the other hand, regions are very different at desperate level such as economic, sector (agriculture, industry, services), social status, religion, urban-rural, caste and others.

Agriculture is the largest and most important sector of Indian economy which is directly associates with infrastructure facility. It plays a prominent role in providing food to the nation, employment to the people, raw materials to the industrial sector and surplus for national economic development. The agricultural sector directly accounts for more than two-fifth of the gross domestic product (GDP). It is also responsible for the growth of industry, trade, transport, banking services which in turn influence the growth of GDP. A good infrastructure facility is helpful in accessing market of agricultural product and raw material from form to non-form sector. It also generates huge employment and full capacity of agricultural output. But what is shocking in the era of globalization and rapid economic growth, is the share of agriculture sector has declined drastically and there has been increasing inter-district disparity in agriculture and infrastructure facility.

**Author's Affilation:** \*Junior Research Fellow, Department of Economics, Banaras Hindu University, Varanasi-221 005, Uttar Pradesh. \*\*Associate Professor, Department of Economics, Faculty of Social Sciences, Banaras, Hindu University, Varanasi-221005, U.P.

**Reprint's request:** Ms. Reena Kumari, Junior Research Fellow, Department of Economics, Banaras Hindu University, Varanasi-221 005, Uttar Pradesh.

E-mail: raireena86@gmail.com

Here, it is important to notice that scholars have not widely discussed the disparity which exists at inter-district level within a state. States are divided on the basis of homogenous units but there is great dearth of findings to show that regions are not similar across the districts. The study on disparity at individual level would be appropriate for estimating the gap across the regions but lack of data unavailability and some other constraints makes it impossible to find out necessary information at more disaggregate level. Similarly, the problem of disparity is crucial in larger states in comparison to smaller states, and it is very intricate in a state like Uttar Pradesh, which is one of the most populous states of India. The state is divided into four well- defined regions, administratively, and there exists massive disparity within and between the regions. Therefore, disparity in Uttar Pradesh is generating serious problem and it has become a challenging task for the economy and policy makers.

This paper is an attempt to measure the inter-district disparity in agricultural and infrastructure sector in the state economy of Uttar Pradesh for the year 2000-01. The paper also tries to identify the level and status of backward and advanced regions on the basis of their index value and also seeks how all the indicators of agriculture and infrastructure are co-related to each other which have widened the regional disparity. Further, this paper seeks to know how infrastructure facility has influenced agricultural productivity. The paper is divided into three sections the first section deals with brief literature review which supports the present write-up.  The second section focuses on methodology and data-set; the third section gives result and discussions, and some suggestions and conclusions.

*Section I: Brief Literature Review*

The literature on regional disparity is very vast and varied. It can be classified on a number of bases such as the unit of discussion-nation, state or district; methodology used (using multivariate analysis for developing composite indices or resorting to simple rank analysis etc.); coverage (including all the important sectors of the economy or concentrating on few sectors only); results and findings (showing increase or otherwise in the extent of disparity) etc. Since we are attempting to discuss inter-district disparity we concentrate only on those works related to this.

A number of studies have been conducted dealing with the issue of disparity and level of development at the sub-state level. These studies have used a number of development indicators. The important studies include the one by Iyenger and Sudershan, (1982), which used multivariate data for the two developed regions- Karnataka and Andhra Pradesh- to find out the level of development in various social and economic indicators; Shaban & Bhole (1999) for the state of Maharashtra using Principle Component Analysis (PCA) and 62 indicators (72 variables) to measure the level of development of districts for the benchmark years 1972-73, 1982-83 and 1988-89. Shastri (1988) has examined the regional disparity for the state of Rajasthan which covers a period of 23 years (1961-1984). The study delineates the 'developed' and 'underdeveloped' districts and, within the districts, the 'developed' and 'underdeveloped' sectors which require the attention of policymakers. Wang X (2007) developed a composite index using various social and economic indicators for Chinese economy and tried to find out the level of inter-province disparity. Debapriya and Mohanty (2008) tried to identify the inter-district disparity in the levels of development for the state of Orissa in two significant sectors health and education and related 16 sub-indicators using Principal Component Index.

Among the studies that do not use multivariate analysis, a prominent one related to Uttar Pradesh is that by Diwakar (2009). The study examines the regional disparity at disaggregate level, using district as a unit for the state of Uttar Pradesh, and finds that no district in the Eastern and Bundelkhand regions was in the most developed category.

At the same time, many districts in the Western and Central regions were also on the lower rungs. Lori McDoudall (2000) sees the level of gender disparity in literacy attainment in Uttar Pradesh during 1951-1991. The study reveals significant regional variations in female achievement and gender gap. Devesh Kapur et.al (2010) identified the causes and extent of disparities in caste, particularly for dalit community, to capture the social practices and conditions of living in the society.

A brief review of literature creates two impressions first, there is in general, shortage of studies discussing how inter-district disparity has evolved in Uttar Pradesh over a period of time and how the launching of new reforms has affected this disparity; and second, what is the extent of disparity in agricultural and infrastructure development among different districts and regions in Uttar Pradesh. It is precisely these two gaps that the present write- up attempts to bridge.

As far as Uttar Pradesh State is concerned, there are very few studies dealing with the problem of backward region development. Even here, comprehensive analysis on the overall developmental issues is limited. Most of the studies are concerned with particular aspects such as industrial development, command area development, education and agriculture. In the following section, a brief review of some of the important studies has been presented in the light of research issues raised.

### Section II: Methodology and Database

To find out the extent of disparity, it is necessary to measure the disparity. Normally, economists are concerned with the growth and development of the economy. While growth indicators are generally macro-economic parameters, development indicators take into account the social aspect and are broader in concept. The choice of the most appropriate method depends on the type of data available, the nature of the problem and the objective of the study. For the same, one has to choose a set of indicators and decide about the weight to be assigned to each indicator. Further, as different indicators of development would give a different order of ranking, it becomes necessary to combine the indicators in a suitable way so as to develop an integrated index of regional disparities. The size and nature of regional disparity ultimately depends on the chosen set of indicators, assigned weight and the method of combing them. [This study based on Principal Component Analysis and suggests a way of combining various indicators and helps in deciding the weights objectively. Various indices are based on various indicators, and further divided into two different sectors agriculture and infrastructure.

The present work is based on secondary data. Available secondary data sources are Economic Census 1990 & 1998 of U.P. and District Statistical Diaries, Data from Planning Commission, and U.P. Agricultural Department Report. The study covers a period of 2000-01 for which most of the information is available. As given above, for the methodological issue and data constraint, the present paper develops suitable indicators to determine the growth of the economy of UP. All these indicators are different and heterogeneous across the district of economy. The selection of data is based completely on the availability of data. Thus, the paper develops two broad development indicators of growth indices which are based on different sub-indicators at district level.

Each of the sub-indicators represents a certain field of development, and together they contribute the overall index of agricultural and infrastructure sector. The study computes composite indices for agriculture; this index system focuses on the relative position of each district. For the better understanding and reliability Principal Component Analysis was used to give weight to the indices. The values of the selected indicators for all the 70 districts of the state were collected and tabulated. Then the tabulated data was transformed into $X_{id}$'s, where $X_{id}$ stands for the value of the 'i'th development indicator in the 'd'th district. Similarly, 'd'th runs from 1 to 70 representing

the 70 districts of the state. The growth factor or the coefficients of the 'i'th factor, denoted as '$Y_{id}$; and the values of the growth coefficients for the sector were computed using the following formula:[ for positive indicators (greater numbers reflect higher level of development), the scores are calculated using the following equation:

$$Yid = \frac{(Xid - Min\ Xid)}{Max\ Xid - Min\ Xid}$$

Where Min $X_{id}$ and Max $X_{id}$ represent respectively the minimum and maximum of $X_{i1}$, $X_{i2}$,

$X_{in}$ stands for the individual indicators. It would be evident that the scaled values of '$Yid$'s vary between '0' to '1'.

For negative indicators (smaller numbers reflect a higher level of development), the following equation is used:

$$Yid = \frac{Max\ Xid - Xid}{Max\ Xid - Min\ Xid}$$

Where Min Xid and Max Xid represent respectively the minimum and maximum of $X_{i1}$, $X_{i2}$, $X_{in}$ represent the individual indicators as mentioned above.

Now the measure of the stage of sectoral development of the 'dth' district ($Y_d$) is assumed to be a weighted linear function of $Y_{id}$'s, which is constructed as follows:

$Y_{d\ =}W_1Y_{1d} + W_1Y_2+..............+ W_mY_md,$

Where $0<W_i<1$ and $\sum_{i=1}^{m} = 1$ and $W_1$ to $W_m$ are the weights of the $Y_id$'s. The weights $W_i$ vary inversely as the variation in the respective sectoral components of Composite Development Index of the District subject to the condition:

Such that,

$$Wi = \frac{K}{\sqrt{Variance\ (yi)}}$$

Here, '(yi)' represent Sectoral Composite Index.

The overall district index of development, $Y_{d'}$ also varies from 'o' to '1'. The choice of weights in this manner ensures that large variation in any one of the sectoral indicators will not unduly dominate the contribution of the rest and distort the inter-district comparison.

**List of Indicators:**

*Agriculture:*

X1: Per capita food-grain production

X2: Distribution of total fertilizer per hectare of gross area sown

X3: Percentage of gross irrigated area to gross sown area

X4: Percentage of area under commercial crops to gross sown area

X5: Cropping intensity

X6: Percentage of net area sown to total reporting area

X7: Percentage of net area sown to cultivable land

X8: District-wise percentage distribution of government tube-wells

X9: Percentage of barren and uncultivable land to total reporting area

X10: Percentage of net irrigated area to net sown area

X11: Percentage of area irrigated by government tube-wells to net irrigated area

*Infrastructure:*

X12: Percentage of villages with electricity to total number of villages inhabited

X13: Per capita consumption of electricity

X14: Number of telephone connections per lakh of population

X15: Number of post offices per lakh of population

X16: Percentage of domestic electricity consumption to total consumption

X17: Percentage of electricity consumption in agriculture sector to total consumption

**Section III: Result and Discussions**

*Co-relation Co-efficient in Agriculture*

As far as inter-district disparity in agriculture is concerned, Table 1 shows that there is a strong and high correlation among number of sub-indicators which simultaneously affect the agricultural growth and output of the state economy. The factor analysis results shows the correlation matrix of the original set of eleven agricultural development indicators, which accounts for the inter-district variations among the variables in descending order of magnitude (i.e., the first factor accounts for the largest proportion of the total variance, the second factor accounts for remaining variance and so on). Co-efficient of co-relation analysis has been attempted to see the degree of relationship among various indicators of agricultural development. Table 1 reveals a co-relation matrix and inter-relationship of various indicators related to agricultural development which shows positive and significant correlation of X2 (Distribution of total fertilizer per hectare of gross area sown) with X3(Percentage of gross irrigated area to gross area sown), X4 (Percentage of area under commercial crops to gross area sown) and X5 (Crop intensity). It means that the area that is well fertilized, also irrigated properly, the rising distribution of total fertilizer increases the percentage of area under commercial crops. It is also interesting that distribution of fertilizer increases crop intensity which positively affects the total agricultural output of the state economy. It has been seen that there is a very strong relationship between X3 and X10 and X5 with X10. It is clear that rising percentage of gross irrigated area to gross area sown, increasing the percentage of net irrigated area sown to net area sown. Similarly, it is evident that rising crop intensity is the result of rising percentage of net irrigated area sown to net sown area. This component analysis shows that various indicators of agricultural development are positively and significantly associated with each other. On the other hand a number of agricultural indicators are negatively associated with each other, but that is very negligible in the above result.

*Co-relation Co-efficient in Infrastructure*

In addition, there is a strong indication shown in Table 6, that reveals positive but not high degree of co-relation in number of infrastructural indicators which include X14 (number of telephone connection per lakh of population) with X12 (percentage of electrified villages to total number of villages inhabited) and X13 (Per capita consumption of electricity). The evidence shows that the rising electricity facility in villages and per capita electricity consumption increased telephone facility. On the other hand, X15 was also positively associated with X16 and X17, meaning that electricity consumption in domestic sector and agriculture sector both increased the post office facility to the population.

Thus, the result shows that agriculture and infrastructural facility are inter-related. An adequate and better infrastructure like telephone connection, electricity facility, post office services and all these communication and information facilities make one familiar with market conditions, new information about technology, irrigation facility and other related agricultural input and advertisement concerned with food-grains and agricultural development programmes provided by government and local institutions.

**Identification of Level of Development of District**

*Agriculture*

It is very interesting to identify the level of development of various districts of state on the basis of their attainment of agricultural development index. Table 2 indicates that western region is the most developed in agricultural sector and major districts of the region show better attainment in this sector. In addition, some districts of eastern region keep their position as very highly developed,

but they are few. It is also very surprising to see that no district of central and Bundelkhand region of the state, retained a high position in agricultural development. The evidence shows that eastern region is high developed and only one district (Lucknow) in central region, but no district of Bundelkhand and western region, their position is high in agricultural development. Almost all the region touches their position in moderate except Bundelkhand. The result shows that major district, their position in agricultural development is low, concerned to eastern region except some district of central and one district of western (Eatawa). It can be observed that all the district of Bundelkhand and major district of eastern region which condition is very low in the performance of agricultural development.

### Infrastructure

The level of development in infrastructure of various districts of Uttar Pradesh is also very interesting. Most of districts of western region, hold high position is very high in infrastructural development. Besides western region major districts of eastern region, which position is also very high. It has been seen that only two district (Lucknow, Kanpur Nagar) of central region and two districts (Jalaun, Jhansi) of Bundelkhand, they keep their position in very high developed. The result shows illusive facts that all the districts of western region which position in infrastructure development is high and no district of other region and similarly all the districts of eastern region which are developed moderately. On the other hand, the result indicates that almost all the districts of eastern and some districts of western followed by central region they keep low performance in infrastructure development. It is also clear that some districts of western followed by eastern region which position is very low in infrastructure development.

The empirical result shows that there is a very strong association between agricultural development and infrastructure facility. The

districts which were very high developed in infrastructure were also very highly developed in agricultural development during the period 2000-01. The Principal Component Analysis shows that western region is very developed in both the sectors as against Bundelkhand region which is very backward in agricultural development, except some districts, and also very backward in infrastructure facility. The reason for poor development in agriculture is not only poor infrastructure but other social and economic problems in Bundelkhand region, like financial assistance, banking facility, climate, irrigation facility, center-state transfer, public policy and other.

### Cluster of Districts in Agriculture and Infrastructure

Table 7 reveals a very broad picture of analysis of cluster of districts situated across the state. It a very high concentration has existed in very high development in agriculture development with very high development in infrastructure facility. On the other hand next concentration exists in very low development in agricultural development with low infrastructure development. This result clears that infrastructure facilities are highly co-related to agricultural development in the state. In the first condition, very high development in agriculture and a very high development in infrastructure, almost all the districts of western region should a very good performance. Same way, the second condition shows that almost all the districts of Bundelkhand are very low developed in agriculture and also low in infrastructure.

### Factor Loadings

### Agriculture and Infrastructure

Table 4 clearly reveals factor loadings for the year 2000-01, Communality value of all the variables of agricultural development varied between 0.5034 and 1.0942. Factor 1 explained about 50.34 percent of total variation Factor 2 explained 26.02 percent, and

Reena Kumari / Inter-District Disparity in Agriculture and Infrastructure Development in
Uttar Pradesh: A Factor Analysis Approach

85

Factor-3 only 16.42 percent, and total variation explained was 9278 percent. First factor loads heavily on X10, X3, X5, and X2. Second factor loads heavily on X6, X7, X9, X8 and third factor loads on X11 and X2. The third component is ignored in view of the lower percentage of variance explained by it. Similarly, in infrastructure development, first factor explained 50.39 percent, second factor explained 49.96 percent and third factor explained 42.96 percent, and the total variation explained was 75.22 percent.

*Section-III: Summary and Conclusions*

The analysis brings into sharp focus the spatial pattern of variation in the levels of agriculture and infrastructure. The study showed that development in Uttar Pradesh in both the agriculture and infrastructure sectors has polarized in western region except some districts of central followed by eastern region in 2000-01. The position of Bundelkhand is very low in both the sectors indicating that bad infrastructure is responsible for lower development of agriculture sector. The central followed by eastern region improved their position but very slowly. The study clears that inter-district disparity in Uttar Pradesh has widened during the new reform period. It can thus be concluded that we are facing several bottlenecks in our development process, and without improving the condition of infrastructure facility, agricultural sector will not be able to tackle this problem. So there is a need to allocate resources towards backward areas. The study also highlights the fact that policy should not be formulated on the basis of aggregate, but a specific planning strategy should be prepared for the backward districts so as to enable them to come into the mainstream within a short time period.

**Table 1. Co-relation matrix of various indicators of agricultural development**

|     | X1    | X2    | X3    | X4    | X5    | X6    | X7    | X8    | X9    | X10   | X11 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| X1  | 1     |       |       |       |       |       |       |       |       |       |     |
| X2  | -0.24 | 1     |       |       |       |       |       |       |       |       |     |
| X3  | 0.03  | 0.64* | 1     |       |       |       |       |       |       |       |     |
| X4  | -0.26 | 0.50* | 0.52* | 1     |       |       |       |       |       |       |     |
| X5  | 0.25  | 0.41* | 0.53* | 0.16  | 1     |       |       |       |       |       |     |
| X6  | 0.16  | 0.34  | 0.29  | 0.27  | 0.18  | 1     |       |       |       |       |     |
| X7  | -0.03 | -0.06 | -0.40 | -0.28 | -0.08 | 0.39  | 1     |       |       |       |     |
| X8  | -0.13 | 0.26  | 0.10  | -0.01 | 0.13  | 0.28  | 0.25  | 1     |       |       |     |
| X9  | 0.02  | -0.16 | -0.05 | -0.20 | -0.27 | -0.28 | -0.40 | -0.29 | 1     |       |     |
| X10 | 0.13  | 0.61* | 0.88* | 0.43  | 0.65* | 0.35  | -0.33 | 0.03  | -.07  | 1     |     |
| X11 | -0.30 | 0.35  | -0.11 | -0.15 | -0.08 | 0.07  | 0.25  | 0.31  | -.07  | -0.13 | 1   |

**Source: Computed by Author**

Here * represent high and positive correlation

**Table 2. Status of development of various districts in agricultural attainment**

| Development Status | Districts |
|---|---|
| **Very High** | Saharanpur, Muzzafar Nagar, Bijnor, Moradabad, Rampur, Jyotba Phule, Meerut, Baghpat, Ghaziabad, Barabanki, Bulandsahar, Aligarh, Hathras, Mathura, Firozabad, Eath, Mainpuri, Budaun, Bareilly, Pilibhit, Shahjahanpur, Deoria, Mau, Farrukhabad, Kannauj, Faizabad, Ambedkar Nagar, Ghazipur, Varanasi, Sant Ravidas Nagar |
| **High** | Allahabad, Basti, Gorakhpur, Azamgarh, Chandauli, Lucknow |
| **Moderate** | G.B. Nagar, Agra, Kheri, Hardoi, Unnao, Kushinagar, Ballia, Jaunpur, Auraiya |
| **Low** | Etawah, Sitapur, Rae Bareilly, Pratapgarh, Sultanpur, Maharajganj, |
| **Very Low** | Jalaun, Jhansi, Lalitpur, Hamirpur, Mahoba, Banda, Chitrakoot, Bahraich, Shrawasti, Balrampur, Gonda, Siddarth Nagar, Santkabir Nagar, Mirzapur, Sonebhadra, Fatehpur, Kausambi, Kanpur Dehat, Kanpur Nagar |

**Table 3. Status of development of various districts in infrastructure development**

| Development Status | Districts |
|---|---|
| **Very High** | Saharanpur, Muzzafar Nagar, Moradabad, Rampur, Jyotba Phule, Meerut, Baghpat, Ghaziabad, Hathras, Mathura, Firozabad, Bareilly, Varanasi, Lucknow, Allahabad, Sonebhadra, Kanpur Nagar, G.B. Nagar, Agra, Jalaun, Jhansi, |
| **High** | Bijnor, Bulandsahar, Aligarh, Mainpuri, Farrukhabad, Kannauj, |
| **Moderate** | Gorakhpur, Mau, Chandauli, |
| **Low** | Eath, Shahjahanpur, Etawah, Auraiya Kheri, Sitapur, Hardoi, Unnao, Rae Bareilly, Kanpur Dehat, Barabanki, Lalitpur, Hamirpur, Mahoba, Banda, Chitrakoot, Pratapgarh, Sultanpur, Faizabad, Ambedkar Nagar, Bahraich, Shrawasti, Balrampur, Gonda, Siddarth Nagar, Santkabir Nagar, Basti, Maharajganj, Kushinagar, Deoria, Azamgarh, Jaunpur, Ghazipur, Sant Ravidas Nagar, |
| **Very Low** | Budaun, Pilibhit, Fatehpur, Kausambi, Ballia, Mirzapur, |

Reena Kumari / Inter-District Disparity in Agriculture and Infrastructure Development in
Uttar Pradesh: A Factor Analysis Approach

87

**Table 4. Factor loading of agricultural sector for principal component analysis**

| Variables | Principal Component | | | Communalities |
|---|---|---|---|---|
| | I | II | III | |
| X1 | 0.1442 | 0.1477 | -0.4913 | 0.5034 |
| X2 | 0.6596 | 0.1396 | 0.5121 | 0.7636 |
| X3 | 0.8974 | -0.0166 | -0.0077 | 0.9278 |
| X4 | 0.4302 | 0.0473 | -0.0197 | 1.0188 |
| X5 | 0.6638 | 0.0333 | -0.0714 | 1.0725 |
| X6 | 0.3033 | 0.7494 | 0.0136 | 1.0927 |
| X7 | -0.367 | 0.6336 | 0.1914 | 1.0942 |
| X8 | 0.0842 | 0.2455 | 0.3645 | 1.0843 |
| X9 | 0.0585 | 0.3497 | 0.0623 | 1.0675 |
| X10 | 0.9478 | 0.0518 | -0.0668 | 1.0416 |
| X11 | -0.0841 | 0.1294 | 0.7052 | 1 |
| Variance Explained | 50.34 | 26.02 | 16.42 | 92.78 (Total) |

**Table 5. Factors loading of infrastructure sector for principal component analysis**

| Variables | Principal Component | | | Communalities |
|---|---|---|---|---|
| | I | II | III | |
| X12 | 0.2996 | 0.4442 | -0.0938 | 0.7041 |
| X13 | 0.2418 | 0.0882 | 0.554 | 0.6268 |
| X14 | 0.5634 | 0.1078 | 0.2571 | 0.6049 |
| X15 | -0.413 | -0.1174 | -0.202 | 0.7749 |
| X16 | -0.0935 | -0.5622 | -0.135 | 0.657 |
| X17 | -0.1361 | 0.3233 | -0.3532 | 0.7522 |
| Variance Explained | 50.39 | 49.46 | 42.96 | 75.22(Total) |

**Table 6. Co-relation matrix of various indicators of infrastructure development**

| | X12 | X13 | X14 | X15 | X16 | X17 |
|---|---|---|---|---|---|---|
| X12 | 1 | | | | | |
| X13 | -0.005 | 1 | | | | |
| X14 | 0.22 | 0.32 | 1 | | | |
| X15 | -0.12 | -0.24 | -0.41 | 1 | | |
| X16 | -0.33 | -0.25 | -0.09 | 0.28 | 1 | |
| X17 | 0.12 | -0.27 | -0.16 | 0.21 | -0.17 | 1 |

**Table 7. Cluster of districts in agriculture and infrastructure in 2000-01**

| Infrastructure | | | | | |
|---|---|---|---|---|---|
| **Agriculture** | **VH** | **H** | **A** | **L** | **VL** |
| **VH** | Saharanpur, Bijnor, Muzzafar Nagar,Bulandsahar, Moradabad, Rampur,Aligarh, Jyotba Phule, Meerut,Mainpuri, Baghpat, Ghaziabad,Farrukhabad, Hathras, Mathura,Kannauj, Firozabad, Bareilly, Varanasi, | | Mau | Eath, Shahjahanpur,Budaun, Barabanki, Faizabad,Pilibhit, Ambedkar Nagar, Deoria, Ghazipur, Sant Ravidas Nagar, | |
| **H** | Allahabad, Lucknow | ------------- | Gorakhpur, Chandauli | Basti, Azamgarh | ------------- |
| **A** | G.B. Nagar, Agra | --------- | ------- | Kheri, Hardoi, Unnao,Ballia Kushi Nagar, Jaunpur, Aauriya | |
| **L** | | --------- | ----- | Etawah, Sitapur, Rae Bareilly, Pratapgarh, Sultanpur, Maharajganj, | -------- |
| **VL** | Sonebhadra, Jalaun, Jhansi, Kanpur Nagar | ---------- | -------------- | Kanpur Dehat, Barabanki,Mirzapur, Lalitpur, Hamirpur,Fatehpur, Mahoba, Banda,Kaushambi Chitrakoot, Bahraich, Shrawasti, Balrampur, Gonda, Siddarth Nagar, Santkabir Nagar, | |

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Reena Kumari / Inter-District Disparity in Agriculture and Infrastructure Development in Uttar Pradesh: A Factor Analysis Approach

89

**Table 8. Level of development of various districts of Uttar Pradesh in agriculture Sector**

| District | Index | Rank | District | Index | Rank | District | Index | Rank | District | Index | Rank | District | Index | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Saharanpur | 2.15 | 6 | Agra | 1.579 | 40 | Hardoi | 1.55 | 45 | Chitrakoot | 0.25 | 70 | Mahrajganj | 1.51 | 47 |
| Muzaffarnagar | 2.36 | 1 | Firozabad | 1.768 | 27 | Unnao | 1.55 | 44 | Pratapgarh | 1.46 | 50 | Gorakhpur | 1.69 | 33 |
| Bijnor | 1.88 | 18 | Etah | 1.797 | 23 | Lucknow | 1.69 | 32 | Kaushambi | 1.19 | 57 | Kushinagar | 1.57 | 42 |
| Moradabad | 2.07 | 10 | Mainpuri | 1.796 | 24 | Rae Bareli | 1.5 | 48 | Allahabad | 1.65 | 36 | Deoria | 1.84 | 20 |
| Rampur | 2.09 | 9 | Budaun | 1.909 | 15 | Kanpur Dehat | 1.26 | 56 | Faizabad | 1.9 | 16 | Azamgarh | 1.68 | 35 |
| Jyotiba Phule | 2.17 | 5 | Bareilly | 1.932 | 14 | Kanpur Nagar | 1.43 | 52 | AmbedkarNagar | 2.01 | 12 | Mau | 1.74 | 28 |
| Meerut | 2.28 | 2 | Pilibhit | 1.9 | 17 | Fatehpur | 1.38 | 53 | Sultanpur | 1.52 | 46 | Ballia | 1.57 | 41 |
| Baghpat | 2.28 | 3 | Shahjahnpur | 2.046 | 11 | Barabanki | 1.83 | 21 | Bahraich | 0.93 | 62 | Jaunpur | 1.62 | 37 |
| Ghaziabad | 2.23 | 4 | Farrukhabad | 1.736 | 29 | Jalaun | 0.85 | 64 | Shrawasti | 0.98 | 60 | Ghazipur | 1.82 | 22 |
| G.B.Nagar | 1.55 | 43 | Kannauj | 1.783 | 25 | Jhansi | 0.84 | 65 | Balrampur | 0.97 | 61 | Chandauli | 1.7 | 31 |
| Bulandshahr | 2.13 | 7 | Etawah | 1.453 | 51 | Lalitpur | 0.9 | 63 | Gonda | 1.33 | 55 | Varanasi | 2.1 | 8 |
| Aligarh | 1.95 | 13 | Auraiya | 1.6 | 39 | Hamirpur | 0.64 | 68 | Siddharth Nagar | 1.18 | 58 | Sant Ravidas | 1.73 | 30 |
| Hathras | 1.88 | 19 | Kheri | 1.618 | 38 | Mahoba | 0.68 | 67 | Basti | 1.68 | 34 | Mirzapur | 1.13 | 59 |
| Mathura | 1.77 | 26 | Sitapur | 1.473 | 49 | Banda | 0.69 | 49 | Sant Kabi | 1.38 | 54 | Sonbhadra | 0.42 | 69 |

**Table 9. Level of development of various districts of Uttar Pradesh in infrastructure sector**

| District | Index | Rank | District | Index | Rank | District | Index | Rank | District | Index | Rank | District | Index | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Saharanpur | 0.244 | 9 | Agra | 0.314 | 5 | Hardoi | -0.11 | 50 | Chitrakoot | -0.128 | 55 | Mahrajgan | -0.1 | 48 |
| Muzaffarnagar | 0.233 | 10 | Firozabad | 0.148 | 18 | Unnao | -0.05 | 43 | Pratapgarh | -0.128 | 56 | Gorakhpur | 0.038 | 28 |
| Bijnor | 0.052 | 27 | Etah | -0.07 | 45 | Lucknow | 0.58 | 2 | Kaushambi | -0.024 | 37 | Kushinagar | -0.16 | 61 |
| Moradabad | 0.208 | 14 | Mainpuri | 0.064 | 24 | Rae Bareli | 0.001 | 32 | Allahabad | 0.2219 | 12 | Deoria | -0.14 | 58 |
| Rampur | 0.1 | 21 | Budaun | -0.03 | 40 | Kanpur Dehat | -0.18 | 63 | Faizabad | -0.127 | 54 | Azamgarh | -0 | 34 |
| Jyotiba Phule | 0.11 | 20 | Bareilly | 0.18 | 16 | Kanpur Nagar | 0.418 | 4 | Ambedkar Nagar | -0.119 | 52 | Mau | 0.03 | 29 |
| Meerut | 0.307 | 7 | Pilibhit | -0.03 | 39 | Fatehpur | -0.02 | 36 | Sultanpur | -0.038 | 42 | Ballia | -0.01 | 35 |
| Baghpat | 0.154 | 17 | Shahjahanpur | -0.12 | 51 | Barabanki | -0.23 | 68 | Bahraich | -0.106 | 49 | Jaunpur | 3E-04 | 33 |
| Ghaziabad | 0.551 | 3 | Farrukhabad | 0.063 | 25 | Jalaun | 0.223 | 11 | Shrawasti | -0.248 | 69 | Ghazipur | -0.07 | 46 |
| G.B.Nagar | 0.69 | 1 | Kannauj | 0.074 | 22 | Jhansi | 0.134 | 19 | Balrampur | -0.181 | 65 | Chandauli | 0.012 | 30 |
| Bulandshahr | 0.071 | 23 | Etawah | -0.05 | 44 | Lalitpur | -0.21 | 67 | Gonda | -0.179 | 64 | Varanasi | 0.195 | 15 |
| Aligarh | 0.062 | 26 | Auraiya | -0.13 | 57 | Hamirpur | -0.17 | 62 | Siddharth Nagar | -0.035 | 41 | Sant Ravidas | -0.12 | 53 |
| Hathras | 0.31 | 6 | Kheri | 0.002 | 31 | Mahoba | -0.18 | 66 | Basti | -0.429 | 70 | Mirzapur | -0.03 | 38 |
| Mathura | 0.249 | 8 | Sitapur | -0.15 | 59 | Banda | -0.1 | 47 | Sant Kabir Nagar | -0.155 | 60 | Sonbhadra | 0.213 | 13 |

# Studying the impact of Organizational and Conceptual Factors on Manager's Decision Making

**Amalendu Bhunia**

**Abstract**

The purpose of the present research is to investigate the impact of organizational factors on the regarding manager's decision- making styles and the difference between the perception of managers and employees of the styles used by managers in India. Questionnaire validity, content validity and compatibility listed by10 experts and professors as well as the experimental implementation of the questionnaire and also analyzing exploratory factor for both questionnaires were checked. The results showed that in the county like governor, the dominant style used from the viewpoint of both staff and managers is the third priority.

**Keywords:** General decision-making style; organization's size, position of manager, perception difference, government organizations

## Introduction

Decision making is the most difficult practice and sometimes the most dangerous work that every manager has to do. A manager, by an incorrect decision, may cause irreparable damage to the body of his or her organization (Atayi, 2010). During environmental changes and shifts, organizations look to their managers to overcome alterations, demands and environmental challenges ahead. In such circumstances, managers need endless skills and capabilities (Gholi pour, 2008). Decisions are taken along with achieving goals and by considering the available resources. Decisions determine the kind of goals and the way to achieve them. Therefore, decision making is a mechanism which encompasses all the activities of the organization, and indeed affects all members of the organization as an individual or as a member of the group.

Organization collapsed without any mechanism to decide and to set its own target individuals who are looking for (Moorhead and Griffin, 2007).

Studying decision- making processes is not a new topic. In recent years, numerous studies have been done on decision making and have offered several classifications in relation to style and decision-making models which have been presented by experts (Olivera, 2007).

Scott and Bruce paid great attention to decision-making styles of individuals and factors affecting the internal characteristics and individual differences of the people. On this basis they introduced five styles of decision making as general decision making -styles. These five styles are: rational decision-making styles, decision-making style of intuition, dependent decision making-style, instantaneous decision-making style and avoidance style of decision making (Hadyzadh Moghaddam 2009).

The aim of this study is to find check the effect of organizational factors like size, position in the organizational hierarchy on managers decision-making style and the difference in perception between staff and managers about decision making.

**Author's Affiliation:** Dr. Amalendu Bhunia, Reader in Commerce, Fakir Chand College under University of Calcutta.

**Reprint's request: Dr. Amalendu Bhunia**, 135, R.N. Tagore Road, Sudha Apartment, Bediapara, Dumdum, Kolkata, West Bengal, India, Pin-700077, E-mail-bhunia.amalendu@gmail.com, Mobile-+91-9432953985

## Methodology

This study made use of a quantitative research approach, and from the viewpoint of relationship between the variables (dependent and independent variables) is a type of correlation research.

### Population and Sample

The population for this study includes all employees and managers in the counties, governorships and the general-governor of India in the year 2010, which according to 2010 statistics is 920 people among which 352 are selected including 60 managers and 290 employees which have been classified through a random sampling method with a simple proportional allocation.

### Research Instrument

The measuring instrument used was a structured questionnaire which was developed and validated by Hadyzadeh and Tehrani (2008) Of course with the help of this questionnaire the content validity was also approved by professors and managers too. For the structural validity, exploratory and confirmatory factor analysis and the KMO index was used. The KMO value equals 0.852 and the Bartlett test, even at a meaningful level of 0.99% (Sig = 0.000) is rejected. Where the variances were equal to 55.21 and specific values   of each factor were greater than one, we concluded that the credibility factor of this variable is appropriate.

### Reliability

Chi-square test was used to check for the study of relationship status in decision-making style. MANOVA or multivariate one-sided was used to investigate the relationship between style of decision-making managers and size of organization. The two sample T test was used to check for homogenization of styles used by managers and the style diagnosed used by the staff for managers. Friedman test was used for showing the ranking of decision-making from the perspective of managers and employees and Pearson correlation test was used to determine correlation between the styles used by managers. Using two softwares, SPSS 18 and LISREL 8.5, analysis was developed and answers were codified with Likert's range of five options.

### Validity

When assessing validity, researchers determine whether a measure used in the study actually does measure what the researchers intend to measure. As already indicated, the measurement instrument developed Hadyzadeh and Tehrani (2008) was used in this study. The instrument was considered valid for the purpose of the present study.

Table I indicates descriptive statistics based on the organization. It can be seen for each style based on organizations, means are not equal and a difference between them is observed. For dependent style, mean scores for the county is larger, therefore, it is said that county managers have greater tendency to use the dependent style.

For styles of avoidant and instantaneous we can't say which organizations used this kind of style more because approximately they have equal means.

Table 2 shows the homogeneity of variance tests wherein homogeneity of variance test here will be accepted with regard to Sig = 0.142. Most often this test is rejected, in which the statistical population is non-normal; but data in this study is normal. Two indexes of Pillai's Trace and Wilks' Lambda are used to show this irrespective of whether the mean for the group offered is equal or not. Most Social Science studies use Wilks' Lambda index. The Pillai's Trace is also a good substitute for this.

In this section it can be seen that the Wilks' Lambda is equal to 1.802 and Sig = 0.006, showing that this test is statistically meaningful. (F (10, 106) = 7.24, P <0.05) shows that the theory of equality between the average

**Table I. Descriptive Statistics; Effect of Size of Organization on Decision -Making Styles**

|  | Organization | Mean | Standard Deviation |
|---|---|---|---|
| Intuitive | Governor-General | 2.71 | 0.64 |
|  | Governor | 3.30 | 0.63 |
|  | County | 2.58 | 0.70 |
|  | Total Sum | 2.86 | 0.68 |
| Dependency | Governor-General | 2.84 | 0.69 |
|  | Governor | 2.93 | 0.83 |
|  | County | 3.55 | 0.69 |
|  | Total Sum | 3.53 | 0.71 |
| Rational | Governor-General | 3.46 | 0.76 |
|  | Governor | 2.24 | 0.98 |
|  | County | 2.11 | 0.94 |
|  | Total Sum | 2.26 | 0.84 |
| Instant | Governor-General | 2.29 | 1.08 |
|  | Governor | 2.31 | 1.02 |
|  | County | 2.17 | 0.72 |
|  | Total Sum | 2.38 | 1.00 |
| Avoidant | Governor-General | 1.65 | 0.77 |
|  | Governor | 1.76 | 1.03 |
|  | County | 1.50 | 0.52 |
|  | Total Sum | 1.67 | 0.80 |

of three organizations for the styles used by managers can be rejected and it can be shown that in any organization of which style is used more. Also, according to the last column of Table 3 (the relationship between two factors), this ratio is equal to 0.405 which shows a good relationship between organization size and type of style management use.

According to Table IV and test results it can be seen that according to values for t = 3.32 and p-value = 0.001 and the value of the mean difference equaled to 0.21, the result is a meaningful difference between the style used by managers and the type style used by managers from employees viewpoint. As it is observed, the style managers have offered about their decisions is different from the style employees recognize for their managers.

The test results used for the styles of managers with value of chi-square = 102.385 and on the two-star level (sig = 0.000) is meaningful. Also test to see the style used by managers from employees viewpoint were checked. The test result value chi-square = 319.29 and with the value of 0.000 is meaningful.

**Discussion and conclusion**

The purpose of the present research is to investigate the impact of organizational

**Table 2. Homogeneous variance test**

| | |
|---|---|
| Box's M | 53.769 |
| F | 1.490 |
| df1 | 30 |
| df2 | 3658.630 |
| Sig | .142 |

**Table 3. Multivariate analysis of one- way variance to evaluate the relationship between the kind of management decision style and size of organization**

| | | Coefficients | Coefficients | F | Valence Degree | Sig. | Coefficient of relationship between two factors |
|---|---|---|---|---|---|---|---|
| Constant | Pillai's Trace | .987 | 811.083a | 5.000 | .000 | .987 |
| Amount | Wilks' Lambda | .013 | 811.083a | 5.000 | .000 | .987 |
| Age | Pillai's Trace | 1.202 | 8.212 | 10.000 | .002 | .401 |
| | Wilks' Lambda | 1.802 | 7.238a | 10.000 | .006 | .405 |

**Table 4. Two sample T test to evaluate homogeneity of style used by managers and the style diagnosed by the employees for the managers**

| p-value | T | Valence Degree | Mean differences and confidence interval | Standard Deviation | Mean | Number | Group | Title |
|---|---|---|---|---|---|---|---|---|
| 0.001 | 3.32 | 384 | .21, (.086 , 0.34) | .69786 | 3.24 | 100 | Managers | Homogeneity of style used by managers and the distinguished style used by employees for managers |
| | | | | .38379 | 3.03 | 500 | Employees | |

**Table 5. Friedman test ratings of decision-making styles from the viewpoint of managers and employees**

| Style Used with Managers from Employees Perspective | | Style Used with managers | | Decision- making Style |
|---|---|---|---|---|
| Rank | Coefficient | Rank | Coefficient | |
| 3 | 2.99 | 1 | 3.98 | Rational |
| 1 | 3.97 | 2 | 3.84 | Intuitive |
| 2 | 3.52 | 3 | 2.98 | Dependent |
| 4 | 2.70 | 4 | 2.13 | Instant |
| 5 | 1.83 | 5 | 2.07 | A |

**Table 6. Friedman test as a meaningful one on prioritizing the style used by managers and the style used by managers through employee's viewpoint**

| Style Used by Managers from Employees Viewpoint | Style Used by managers | |
|---|---|---|
| 290 | 60 | Number |
| 319.291 | 102.385 | $chi-squar$ |
| 4 | 4 | Valence |
| | | Degree |
| .000 | .000 | $sig$ |

factors on the styles of manager's decision making and the difference between the perception of managers and employees regarding of the styles used by managers in the Governor-General Office in India. Findings of this research indicate there is a relationship between position of managers in organizational hierarchy and decision-making style. The research results indicate that organizational factors such as size of the organization and position of director of the organization in the organization's hierarchy influence the style of overall decision making by the manager. Also, there is a meaningful difference between the perception of managers and staff about the style of manager's decisions.

The t test results for each organization confirmed the chi-square test results. The average scores for the Governor-General has the highest mean, which shows that in the governor-general rational style is used which is the prevailing style. For the governor in the second row it shows that the majority of managers use intuitive style. Also for the county it can be seen that the mean of opinion offered was less than average which shows the usage of managers.

We surved relationship between the size of the organization (Governor–General, Governor and county) and decision making styles. We used multivariate analysis of variance or MANOVA and, due to this case, the scene meaningful is smaller than acceptable meaningful level of value (005/0). So, according to table results, we can conclude

that for the rational style the highest mean is in the Governor-General and for the Governor, the highest mean belongs to intuitive style, and for dependent style the highest mean can be seen in the county section of the study. Also this research indicates there is difference between managers and the staff perception of decision-making models in different organizations.

## Acknowledgements

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# Through shock model impacting the maximum sum of two system in an organization

## K. Kannadasan, P. Pandiyan, R.Vinoth

**Abstract**

The main factors which predominantly determine the behavior of a manpower system are recruitment, promotion and wastage. Accumulated additively and the system fails if the total damage exceeds a certain threshold. In many cases the extent of the damage from a given shock varies in time. The expected time to reach the recruitment status of the organization and its variance is found through alpha-Poisson distribution. The analytical results are numerically illustrated by assuming the alpha-Poisson distributions for the practical use of the model.

**Keyword:** Alpha-Poisson; Grades; Threshold; Recruitment.

## Introduction

In order to have a better understanding of the turmoil within the system- whatever may be the cause of it;- one has to observe the system through its constituents. Study of manpower corresponds to a system or an organization in particular; therefore, necessarily boils down to observing its members moving along various grades or set of classes. Esary et al' consider a system, which can be either an engineering system or a bio-system, subjected to shocks occurring randomly in time. One can see for more details in Pandiyan et al.2, Jeeva et al.3 and Sathiyamoorthi 4 about the expected time to cross the threshold level of the organization. Mathematical model is obtained for the expected time of breakdown point to reach the threshold level through alpha-Poisson distributions

*Assumptions*

These assumptions are somewhat artificial, but are made because of the lack of detailed real-world information on one hand and in order to illustrate the proceedings on the other hand.

1. The organization comprises two grades of personnel.

2. Mobility or transfer of manpower from one grade to the other is permitted.

3. The time to recruitment is equal to the maximum time taken for each one of the two grades to cross the threshold, which follows alpha-Poisson distribution.

4. The processes which give rise to policy revisions and the threshold random variables are statistically independent.

5. The policy decisions are taken with inter-arrival times which are i.i.d. random variables depending upon the market environment, production, etc.

*Notations*

$X_i$: a continuous random variable denoting the amount of loss of manpower caused to the system on the ith occasion of policy announcement

**Author's Affilation:** Department of Statistics, Annamalai University, Tamil Nadu, India - 608 002.

**Reprint's request: K. Kannadasan,** Ph.D. Research Scholar, Department of Statistics, Annamalai University, Chidambaram.

E-mail: kannadasanfeb85@sify.com

(Shock), 1, 2….k and $X_i$'s are i.i.d

$Y_1, Y_2$: continuous random variable denoting the threshold levels for the two grades which follows alpha-Poisson distribution.

$U_i$ : a random variable denoting the inter-arrival times between contact with c.d.f. $F_i(.)$, $i = 1,2,3 \dots k$.

$g(.)$ : The probability density function of $x_1$.

$g^*(.)$ : Laplace transform of g(.).

$g_k(.)$: The k- fold convolution of i.e., p.d.f. of $\sum_{j=1}^{k} x_t$

$f(.)$: p.d.f. of random variable denoting between successive policy announcement with the corresponding c.d.f. $F(.)$.

$F_k(.)$: k-fold convolution of $F(.)$.

$S(.)$: Survival function.

$V_k(t)$: Probability of exactly k policy announcements.

$L(t)$   : 1-S(t).

### Results

Any component or devices exposed to shocks which cause damage to the device or system is likely to fail when the total cumulated damage exceeds a level called threshold.

$$\bar{H}(x) = (a_1 - a_1 r)(a_2 - a_2 r) \tag{1}$$

In general, assuming that the threshold Y follows an alpha-Poisson distribution with parameter $r$, it can be proved that

$$(PX_i < Y) = \int_0^\infty g_k(x) \ \bar{H}(x)\,dx$$

Transfer of system from $Y_1$ to $Y_2$ is also possible. We have the breakdown of the system is at Y=max $(Y_1, Y_2)$.

$$P[max(Y_1, Y_2)] = P[(Y_1 < y) \cap (Y_2 < y)]$$

$$= P[Y_1 < y]P[Y_2 < y]$$

Now that $Y_1$ and $Y_2$ follow alpha-Poisson distribution with parameter $\lambda_1, \lambda_2$

$$= \int_0^\infty g_k(x)[a_1 a_2 - 2a_1 a_2 r + a_1 a_2 r^2]\,dx$$

$$= [g^*(a_1 a_2)]^k - [g^*(2a_1 a_2 r)]^k + [g^*(a_1 a_2 r^2)]^k$$

Survival analysis is a class of statistical methods for studying the occurrence and timing of events. The survival function S(t) is

$$P(T > t) = \sum_{k=0}^{\infty} P[\text{there are exactly k instants of exit in}(0,t)]$$
$$* P[\text{the system does not fail in } (0,t)]$$

$$S(t) = P(T > t) = \sum_{k=0}^{\infty} V_k(t) P(X_i < max(Y_1, Y_2))$$

It may happen that successive shocks become increasingly effective in causing damage, even though they are independent. This means that $V_k(t)$, the distribution function of the k$^{th}$ damage is decreasing in k=1,2,... for each t. It is also known from renewal process that

*P* (exactly k policy decesions in *(0,t)* = $F_k(t)$-$F_{k+1}(t)$ with $F_0(t)=1$

$$= \sum_{k=0}^{\infty} V_k(t) P(X_i < Y)$$

$$= \sum_{k=0}^{\infty} V_k(t) \ [[g^*(a_1 a_2)]^k - [g^*(2a_1 a_2 r)]^k + [g^*(a_1 a_2 r^2)]^k]$$

$$S(t) = \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] \ [g^*[(a_1 a_2)]]^k - \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] \ [g^*[2a_1 a_2 r]]^k$$
$$+ \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] \ [g^* a_1 a_2 r^2]^k \tag{2}$$

Now, $L(T) = 1 - S(t)$

Taking Laplace transform of *L(T)*, we get *L(T)=1-S(t)*

$$= 1 - \left\{ \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)] \ [g^*(a_1 a_2)]^k - \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)][g^* 2a_1 a_2 r]^k \right.$$
$$\left. + \sum_{k=0}^{\infty} [F_k(t) - F_{k+1}(t)][g^*(a_1 a_2 r^2)]^k \right\}$$

$$l^*(s) = \frac{[1 - g^*(a_1 a_2)]f^*(s)}{[1 - g^*(a_1 a_2)]f^*(s)} - \frac{[1 - g^*(2a_1 a_2 r)]f^*(s)}{[1 - g^*(2a_1 a_2 r)]f^*(s)} + \frac{[1 - g^*(a_1 a_2 r^2)]f^*(s)}{[1 - g^*(a_1 a_2 r^2)]f^*(s)} \tag{3}$$

Let the random variable U denoting inter arrival time which follows exponential with

parameter c. Now $f^*(s) = \left(\frac{c}{c+s}\right)$, substituting in the above equation (3) we get

$$
= \frac{[1 - g^*(a_1 a_2)]\frac{c}{c+s}}{[1 - g^*(a_1 a_2)]\frac{c}{c+s}} - \frac{[1 - g^*(2a_1 a_2 r)]\frac{c}{c+s}}{[1 - g^*(2a_1 a_2 r)]\frac{c}{c+s}} + \frac{[1 - g^*(a_1 a_2 r^2)]\frac{c}{c+s}}{[1 - g^*(a_1 a_2 r^2)]\frac{c}{c+s}}
$$

$$
E(T) = -\frac{d}{ds} l^*(s), given\ s = 0
$$

$$
E(T) = \frac{1}{c\,[1 - g^*(a_1 a_2)]} - \frac{1}{c\,[1 - g^*(2a_1 a_2 r)]} + \frac{1}{c\,[1 - g^*(a_1 a_2 r^2)]} \tag{4}
$$

$g^*(.) \sim$ *Mittag Leffler Distribution* $\dfrac{1}{1 + \lambda^\alpha}$

$$
E(T) = \frac{1 + (a_1 a_2)^\alpha}{c\,(a_1 a_2)^\alpha} - \frac{1 + (2a_1 a_2 r)^\alpha}{c\,(2a_1 a_2 r)^\alpha} + \frac{1 + (a_1 a_2 r^2)^\alpha}{c\,(a_1 a_2 r^2)^\alpha} \tag{5}
$$

$$
E(T^2) = \frac{d^2}{ds^2} l^*(s) \quad given \quad s = 0
$$

$$
= -\frac{[1 - g^*(a_1 a_1)]c}{[c + s - g^*(a_1 a_1)c]^2} + \frac{[1 - g^*(2a_1 a_1 r)]c}{[c + s - g^*(2a_1 a_1 r)c]^2} - \frac{[1 - g^*(a_1 a_1 r^2)]c}{[c + s - g^*(a_1 a_1 r^2)c]^2}
$$

$$
= \frac{2}{c^2[1 - g^*(a_1 a_2)^2]} - \frac{2}{c^2[1 - g^*(2a_1 a_2 r)^2]} + \frac{2}{c^2[1 - g^*(a_1 a_2 r^2)^2]}
$$

$$
E(T^2) = \frac{2}{c^2\left[1 - \frac{1}{1 + (a_1 a_2)^\alpha}\right]^2} - \frac{2}{c^2\left[1 - \frac{1}{1 + (2a_1 a_2 r)^\alpha}\right]^2} + \frac{2}{c^2\left[1 - \frac{1}{1 + (a_1 a_2 r^2)^\alpha}\right]^2}
$$

$$
E(T^2) = \frac{2\,[1 + (a_1 a_2)^\alpha]^2}{c^2[(a_1 a_2)^\alpha]^2} - \frac{2\,[1 + (2a_1 a_2 r)^\alpha]^2}{c^2[(2a_1 a_2 r)^\alpha]^2} + \frac{2\,[1 + (a_1 a_2 r^2)^\alpha]^2}{c^2[(a_1 a_2 r^2)^\alpha]^2} \tag{6}
$$

From which $V(T)$ can be obtained through equation (5) and (6), $V(T) = E(T^2) - [E(T)]^2$

$$
V(T) = 2\left[\left(\frac{1 + (a_1 a_2)^\alpha}{c\,(a_1 a_2)^\alpha}\right)\left(\frac{1 + (2a_1 a_2 r)^\alpha}{c\,(2a_1 a_2 r)^\alpha}\right) - \left(\frac{1 + (a_1 a_2 r^2)^\alpha}{c\,(a_1 a_2 r^2)^\alpha}\right)\left(\frac{1 + (a_1 a_2)^\alpha}{c\,(a_1 a_2)^\alpha}\right)\right.
$$
$$
\left. + \left(\frac{1 + (2a_1 a_2 r)^\alpha}{(2a_1 a_2 r)^\alpha}\right)\left(\frac{1 + (a_1 a_2 r^2)^\alpha}{c\,(a_1 a_2 r^2)^\alpha}\right)\right] \tag{7}
$$

**Numerical Illustration**

On the basis of the numerical illustration, the following conclusions regarding expected time and variance consequent to the changes in the different parameters can be observed in Figs 1a,2b,2a,2b.

Figure 1a



Figure 1b



Figure 2a



Figure 2b
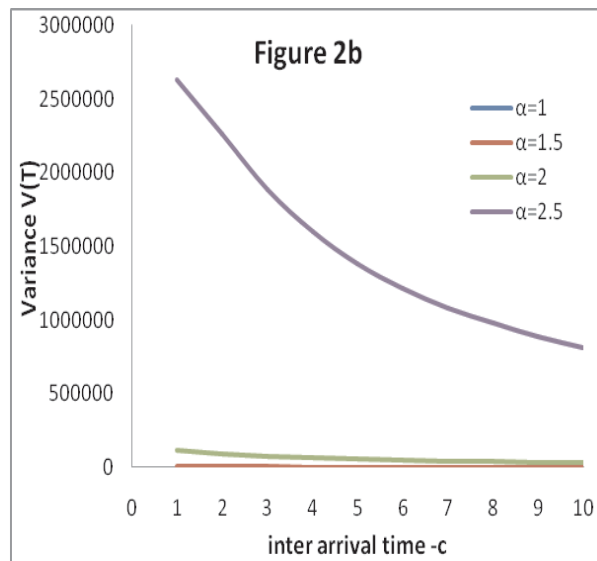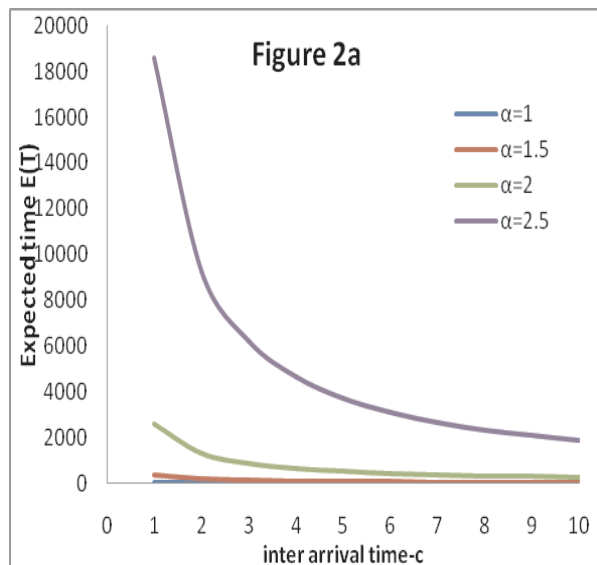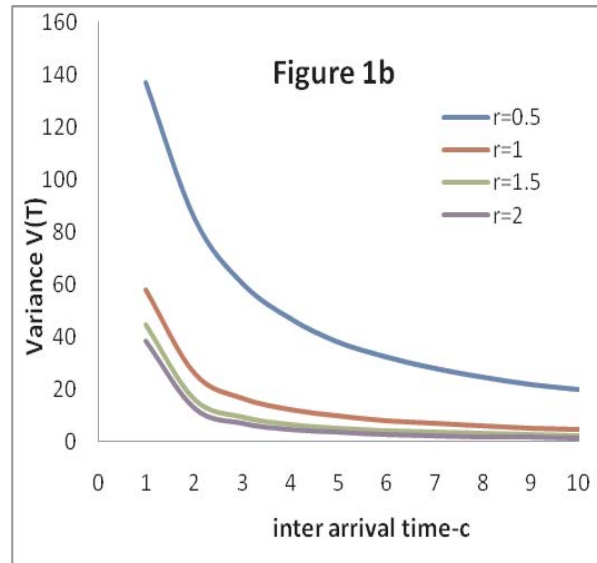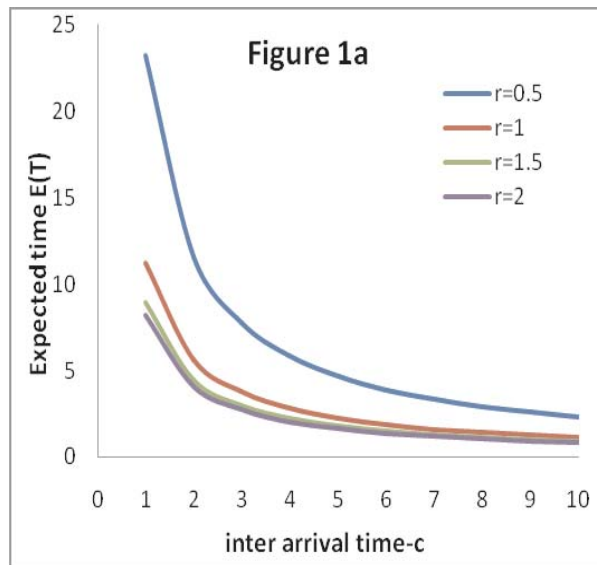
## Conclusions

When  is kept fixed with other parameters, the inter-arrival time  which follows exponential distribution, is an increasing parameter. Therefore, the value of the expected time  to the system in an organization decreases, for all cases of the parameter value. When the value of the parameter  increases, the expected time is also found decreasing, as observed in Figure 1a. The same case is found in Variance V (T) which is observed in Figure 1b.

When  is kept fixed with other parameters, the inter-arrival time  increases, the value of the expected time E (T) to the system in an organization is found to be decreasing, in all the cases of the parameter value When the value of the parameter  increases, the expected time is found increasing. This is indicated in Figure 2a. The same case is observed for Variance V (T) which is seen in Figure 2b.

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# Non performing assets of NBFI'S in India

**S. Kamalaveni\*, R. Anitha\*\***

**Abstract**

This paper focuses on the non-Performing assets of NBFI's in India. The reasons, problems and impact of NPAs have been given due importance. An asset is classified as Non-performing Asset (NPA) if dues in the form of principal and interests are not paid by the borrower for a period of 90 days. Non-performing asset is a term very frequently used by lending institutions. The reasons for NPAs may be wrong selection of borrower, non scrutiny of units, delay in sanction of loans etc. Due to several steps taken by the RBI, NPAs have reduced considerably. Foreign experiences must also be used along with a clear understanding of the local conditions to create a tailor- made solution which is transparent and fair to all stakeholders. Though NPAs have been reduced to some extent, it should be kept in mind that it will not raise further in the future.

**Keywords**: Asset; Impact; Loans; NBFIs; Non-performing assets; Recovery.

## Introduction

Financial institutions have conventionally been the major source of long-term funds for the economy in line with the development objective of the state. Financial institutions can be broadly categorized as all- India or state-level institutions depending on the geographical coverage of their operations. Based on their functions, all-India financial institutions (AIFIs) can be classified as [i] Term-lending institutions which extend long-term finance to different industrial sectors e.g.: IFCI Ltd., Industrial Investment Bank of India (IIBI) Ltd., Infrastructure Development Finance Company (IDFC) Ltd., Export-Import Bank of India (EXIM Bank) and Tourism Finance Corporation of India (TFCI) Ltd.; [ii] Refinance institutions which extend refinance to banking as well as nonbanking financial intermediaries for lending to agriculture, small scale industries (SSIs) and housing sectors, respectively; e.g. National Bank for Agriculture and Rural development (NABARD), Small Industries Development Bank of India (SIDBI) and National Housing Bank (NHB)] [iii] Investment institutions which deploy their assets largely in marketable securities. State/ regional level institutions are a distinct group and comprise various State Financial Corporation's (SFCs), State Industrial and Development Corporations (SIDCs) and North Eastern Development Finance Corporation (NEDFi) Ltd., Life Insurance Corporation of India (LIC) and General Insurance Corporation of India (GIC) and its erstwhile subsidiaries.

Non-performing asset is the term very frequently used by lending institutions. Lend – Lease companies and others for the defaulter's assets, Which were originally pledged to lenders at the time of grant of loans. The borrowers who continue to pay their interests and installments have also pledged some property, machines, etc to lenders, but their assets are performing assets, in as much as that they continue to honour the commitments to lenders. On the other hand, the borrowers whose loans have gone sore and

**Author's Affiliation:** \*Assistant Professor, Sree Saraswathi Thyagarja College,Pollachi-642107, \*\*Associate Professor, Sasi Creative School of Business, Coimbatore-32.

**Reprint's request: Dr. R. Anitha**, Associate Professor, Sasi Creative School of Business, Coimbatore-32. E-Mail: anirkgoutham@yahoo.co.in

have become defaulters, their assets are non performing.  Lenders may solicit valuer's services to ascertain what price or value these assets will fetch if sold in the open markets.

### Meaning of NPAS

An asset was earlier classified as Non-performing Asset (NPA) if dues in the form of principal and interests not paid by the borrower for a period of 180 days. However, with effect from March 2004, default status would be given to a borrower if dues are not paid for 90 days. If any advance or credit facilities granted by banks to a borrower become non-performing, then the bank will have to treat all the advances/credit facilities granted to that borrower as non-performing without having any regard to the fact that there may still exist certain advances/credit facilities having performing status.

### Term loan

Interest or installment of the principal remains due for two quarters or more.

### Cash credit or OD

It remains out of order for a period of two quarters.

### Bills purchased and discounted

If the bill remains overdue for a period of two quarters it will be considered as NPA.

### Agricultural advances

Interest installment of the principal remains unpaid for a period of two quarters.

### Advances against term deposit & NSFCS Advances

Advance against securities such as national savings and term deposits. Until the outstanding debt is covered by the realizable value of the securities, the account may

continue to be treated as standard assets even if overdue for quarters.

### Computation of NPAS

It is generally expressed in the percentage form as

NPAs = Gross or Net NPAs / Total or Net advances X 100

Where, net NPAs = Gross NPAs less provision for NPAs.

## Objectives

1. To study the non-performing assets or NPAs in NBFIs

2. To find out the reasons for the NPAs and its impact on the economy

### Classification of Loan Assets
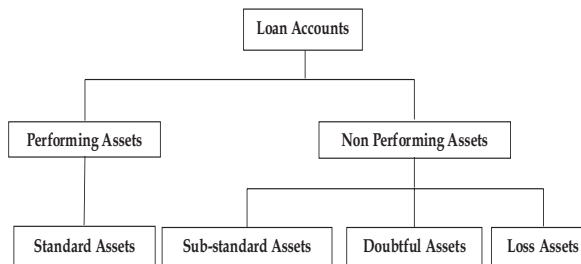


Advances given by banks can be classified into four groups.

1. Standard Assets

It does not create any problem while paying interest/installments of the principal. It usually carries more than normal risk attached to the business.

2. Sub-standard Assets

It is treated as NPA for a period exceeding two years. However, this period was reduced to 18 months with effect from 31.03.2001.

3. Doubtful Assets

These assets are those which have remained NPA for a period exceeding two years. This period of two years was reduced to 18 months

by March 31, 2001. These assets are so weak that their collection or liquidation in full is considered highly improbable in order to arrive at the amount of provision to be made against doubtful assets, unsecured portions and the secured portions of these assets.

4. Loss Assets

A loss asset is one which has been identified by the bank or internal or external auditors or the RBI inspectors, but the amount has been written off wholly or partly. Non-performing assets play an important role in financial sector, where the NPAs assume a large portion if an asset is classified as a loss of recoverability.

*Reasons for Growing NPAS*

1. Expansion of business and Diversification of funds.

2. Time overruns during implementation.

3. Improper selection of the borrowers, inadequacy of capacity and capital of the borrowers.

4. Deficiencies in approval, processing, sanction and disbursements.

5. Inadequate sanction of the limit of economic size of the unit.

6. Unrealistic condition of sanctions and fixing unrealistic repayment settlement.

7. Political interference.

8. Lack of infrastructural facilities of units like raw material, power, transportation, marketing and technical support.

9. Lack of inter bank co-ordination as well as co-operation with financial institution in exchanging information.

10. Changes in Government policies like import duties.

## Basis For An Account Becoming NPA
### From the borrower part

➢ Failure to bring in requisite capital.

➢ Too ambitious project.

➢ Longer gestation period.

➢ Unnecessary expenses.

➢ Over trading.

➢ Imbalances of inventories.

➢ Lack of proper planning.

➢ Reliance on single customers.

➢ Lack of expertise.

**From the bank part**

➢ Incorrect selection of borrower.

➢ Poor credit evaluation.

➢ Unhelpful in supervision.

➢ Tough stand on issues.

➢ Too rigid attitude.

➢ Systems congested.

➢ Non scrutiny of units.

➢ Lack of motivation.

➢ Delay in sanction.

**Other causes**

➢ Lack of infrastructure.
➢ Increase in material cost.
➢ Fast changing technology.
➢ Government policies and taxation
➢ Unhelpful attitude of the government.
➢ Laws.
➢ Changes in consumer preferences.
➢ Credit policies.
➢ Civil commotion.
➢ Legal obstruction and time consuming nature of asset disposal process.
➢ Manipulation by the debtors using political influence has been cause for industrial bad debt being so high.
➢ Political tool – directed credit to SSI and rural sectors.

*Impact of NPAS*

NPAs reduce the earning capacity of assets and badly affect the return on assets. Creating higher provisions adversely affect the capital adequacy and affect the profitability of banks. If NPAS are considered for computing total advances, an average income asset shows lower balance than actual balances. While calculating the return on total assets, return on equity and capital adequacy ratios the NPAS are considered. The cost of capital will be increased due to NPAs and require economic value to be added. It decreases the value of shares some times even below their book value in the capital market.

*Problems due to NPAs*

1. Recession in the economy.

2. Downturn in most of the segments.

3. Fresh addition of NPAs every year.

4. Tightening of income recognition and asset classification norms by RBI.

5. Slow progress in legal course of action for recovery through civil & other legal forum/machineries.

*NBFI's non -performing assets*

Non-Banking Financial Institutions (NBFIs) supplement the efforts of scheduled commercial banks in credit delivery and financial intermediation. Given their growing inter-linkages with the banking sector, financial soundness of NBFIs assumes considerable importance to ensure overall financial stability.

Apart from commercial banks and cooperative credit institutions (urban and rural), the financial system in India consists of a wide variety of NBFIs, such as Non-Bank Financial Companies (NBFCs), financial institutions and primary dealers. NBFIs form a diverse group not only in terms of size and nature of incorporation, but also in terms of their functioning. In addition to enhancing competition in the financial system, these institutions play a crucial role in broadening the access of financial services to the population at large. With the growing importance assigned to the objectives of financial penetration and financial inclusion, NBFIs are being regarded as important financial intermediaries, particularly for the small scale and retail sectors. Table 1 shows the amount of NPAs during 2005-06 to 2009-10.

**Table 1. Non performing assets of NBFIs from 2005-06 to 2009-10**

(Rs. in crores)

| Year | Amount of NPAs | Net NPA % (Net NPA/Net advances) |
|------|------|------|
| 2005-06 | 1180 | 27.7 |
| 2006-07 | 160 | 0.68 |
| 2007-08 | 151 | 0.56 |
| 2008-09 | 135 | nil |
| 2009-10 | 180 | nil |
| **Total** | **1806** | |

Table 1 shows the amount of NPAs for five years from 2005-06 to 2009-10. It was very high during 2005-06 and it reduced to a great extent in the following years. The percentage of net NPA was very high in the year 2005-06. The following chart shows the amount of NPAs during the period of study.

**Chart 1. NPA of NBFIs**
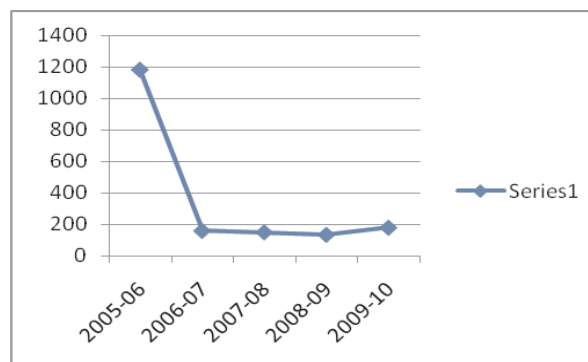


*Asset classification of NBFIs*

The NPAs are classified into Standard Assets, Sub-standard Assets, Doubtful Assets and Loss Assets. Table 2 shows the details for the study period.

**Table 2. Classification of assets of NBFIs from 2005-06 to 2009-10**

(Rs. in crores)

| Year | Standard assets | Sub-standard assets | Doubtful assets | Loss assets |
|------|-----------------|---------------------|-----------------|-------------|
| 2005-06 | 1,13,077 | 174 | 1006 | 0 |
| 2006-07 | 1,26,297 | 143 | 17 | 0 |
| 2007-08 | 1,50,425 | 67 | 84 | 0 |
| 2008-09 | 1,80,605 | 51 | 85 | 0 |
| 2009-10 | 2,16,583 | 120 | 56 | 0 |

From Table 2 it is clear that the NBFIs did not have any loss assets during the study period. In case of sub-standard assets and doubtful assets it was very high during 2005-06 when compared to other years. In 2007-08 and 2008-09 the doubtful assets are more than sub-standard assets. It was very low in the year 2006-07. Chart 2 reveals the asset classification for the study period.

Table 3 shows the NPA and recoveries during the study period. NPA was very high during the year 2005-06 but gradually it started to decline. This shows the efficiency of the financial institutions in recovery.

**Chart 2. Assets classification of NBFIs**
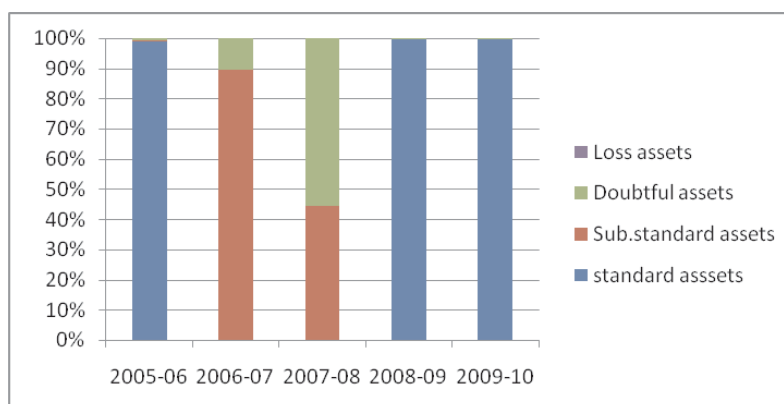


**Table 3. Details of NPAs, amount recovered and the NPAs at the end of year**

(Rs. in crores)

| Particulars | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 |
|-------------|---------|---------|---------|---------|---------|
| NPA in the beginning of the year | 3678 | 1180 | 160 | 151 | 135 |
| Recoveries / additions against NPA | 2498 | 1020 | 9 | 16 | +45 |
| NPA at the end of the year | 1180 | 160 | 151 | 135 | 180 |

*Preventive Measures*

RBI to prevent slippage of NPAs from substandard to doubtful/loss category, the following recommendations are suggested.

➢ Recognize the problem early.

➢ Early alert system.

➢ Prompt corrective action.

➢ Meeting with borrowers.

➢ Creation of proper database.

➢ Creating awareness among bank staffs.

➢ Suitable recovery measures.

➢ Compromise settlement scheme.

➢ One time settlement scheme.

➢ Debt recovery tribunals.

➢ Bringing attitudinal changes.

➢ Delayed payment by government undertakings.

➢ Writing – off bad debts.

➢ Involvement of staffs in recovery progress.

## Conclusion

NPAs are posing a major threat not only to the financial institutions, But to the economy as a whole. Financial institutions should pay attention to various factors like ability of the borrower to repay the loan, usefulness of the project to which the loan is to be sanctioned and its profitability nature in future etc. NPAs adversely affect the profitability of banks and it leads to financial crisis, so care should be taken to prevent NPA. Though NPAs have been reduced to a considerable extent it is not possible to have zero NPAs in the balance sheet. Due to several steps taken by the RBI to reduce NPAs, it has reduced considerably. Foreign experiences must also be used along with a clear understanding of the local conditions to create a tailor- made solution which is transparent and fair to all stakeholders.

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# Business Communication and its Strategy

## Mitushi Jain

**Abstract**

Communication is used to promote a product, service, or organization; relay information within the business; or deal with legal and similar issues. It is also a means of relaying between a supply chain, for example the consumer and the manufacturer. Business communication is known simply as "Communications". It encompasses a variety of topics, including marketing, branding, customer relations, consumer behavior, advertising, public relations, corporate communication, community engagement, research & measurement, reputation management, interpersonal communication, employee engagement, online communication, and event management. It is closely related to the fields of professional communication and technical communication. In business, the term communications encompasses various channels of communication, including the Internet, Print (Publications), Radio, Television, Ambient media, Outdoor. The word of business communication is somewhat different and unique from other types of communication since the purpose of business is to make money. Therefore, since communication is the message issued by a corporate organization, body, or institute profitability, the communicator should develop good communication skills.

**Keywords:** Communications; Business communication; Channels of communication, Emotional and intellectual communication.

## Introduction

Communication used to promote a product, service, or organization; relay information within the business; or deal with legal and similar issues. It is also a means of relaying between a supply chain, for example the consumer and manufacturer.

Business Communication is known simply as "Communications". It encompasses a variety of topics, including Marketing, Branding, Customer relations, Consumer behavior, Advertising, Public relations, Corporate communication, Community engagement, Research & Measurement, Reputation management, Interpersonal communication, Employee engagement, Online communication, and Event management. It is closely related to the fields of professional communication and technical communication.

Business communication is goal oriented. The rules, regulations and policies of a company have to be communicated to people within and outside the organization. Business communication is regulated by certain rules and norms. In earlier times, business communication was limited to paper-work, telephone calls etc. But now with the advent of technology, we have cell phones, video conferencing, emails, and satellite communication to support business communication. Effective business communication helps in building the goodwill of an organization.

*Types of Communication*

Business communication can be of two types:

**Author's Affilation:** Associate Professor, Dept. of Applied science and Humanities (Management), IIMT Engineering College, Meerut, U.P.

**Reprint's request: Dr. Mitushi Jain**, Associate Professor, Dept. of Applied science and Humanities (Management), IIMT Engineering College, Meerut, U.P.

E-mail: molshri2000@rediffmail.com

### Oral Communication

Oral communication can be formal or informal. Generally, business communication is a formal means of communication, like meetings, interviews, group discussion, speeches etc. An example of informal business communication would be grapevine.

### Written Communication

This includes agenda, reports, manuals etc.

## Methods /Channels of Communication

### Web-based Communication

For better and improved communication, anytime anywhere;

### Video conferencing

Which allows people in different locations to hold interactive meetings;

### E-mails

Which provide an instantaneous medium of written communication worldwide;

### Reports

Important in documenting the activities of any department;

### Presentations

Very popular method of communication in all types of organizations, usually involving audiovisual material, like copies of reports or material prepared in Microsoft PowerPoint or Adobe Flash;

### Telephonic meetings

Which allow for long- distance speech;

### Forum boards

Which allow people to instantly post information at a centralized location; and

### Face-to-face meetings

Which are personal and should be succeeded by a written follow-up.

Business communication is somewhat different and unique from other types of communication since the purpose of business is to make money. Thus, since communication is the message issued by a corporate organization, body, or institute profitability, the communicator should develop good communication skills.

There are many types of communication between people, e.g. family communication, business communication, social communication, emotional communication and intellectual communication.

Other types include common interest communication, common spiritual belief communication, student/teacher communication, and more. The most meaningful communication we have is emotional communication. Connecting with others at a deeper level is important for a happy and healthy life. Emotional communication is truly food for the soul.

Communication on an emotional level can be seen everyday. Hugs, high-fives, pats on the back, shaking hands and broad smiles are some of the simple ways that we emotionally connect with one another.

Then, there is a deeper layer of communication that we can create with others. These are special relationships that are internal, longstanding and strong. They can be with friends, family, coworkers or others who we share a special bond with.

The strength of communication between two people is governed, in part, by personal needs. If a person is career focused, he or she will have a more pressing need to create stronger business communication than

someone who isn't as concerned about advancing.

Beyond personal needs, the length of time that two people have known each other plus the amount of consideration each person consistently shows for the another leads to a stronger communication.

**Fig 1. Communication types that feed into emotional communication**
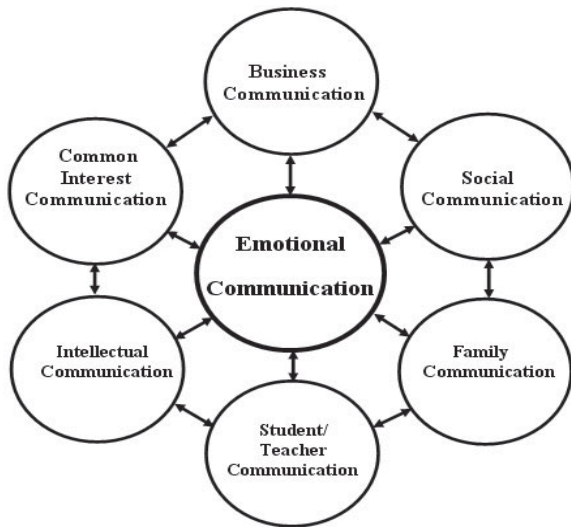


**Source:** College-Student-Success.com

Everyone wants strong emotional connections; however many people have a difficult time achieving them. You can build strong relationships, albeit they aren't easy. Building strong relationships takes time, patience and sincerity. The rewards are much more enriching and fulfilling.

*Internal and External Communication*

One of the most important things in the world of business is to trigger off great relationships with other enterprises so that you earn a name in the business. In order to establish a reputation in the business world, you need to have a great business communication strategy. Business communication can essentially be divided into internal and external communication.

Things like establishing a brand, marketing your products and services, advertising, working on things like public relations, media

management and even business dealings with customers or other business firms fall in the category of external business communication.

The internal business communication, category includes building up ideals of your company, setting certain guidelines that you expect to follow in your business, carving out strategies and goals to ensure success, keeping your employees inspired and egging on all those involved in your business.

All the things mentioned above contribute to the betterment of your business prospects. Be it internal business communication or external business communication, it ultimately contributes to the growth of your business. Thus, business communication is an integral aspect of your business that will help you go ahead and establish yourself.

When it comes to business communication, or for that matter, any aspect of the business, the most important thing is the customer. You need to ensure that you deliver what the customer wants. Even when it comes to things like marketing or advertising, you need to create what the customer appreciates and likes.

Different customers accept different kinds of marketing. It all depends on you to ensure that via business communication, you are able to cater to the choices of a wide range of people. If you are able to master the art of impressing many people by various means, you will be able to take your business to the top.

However, merely enticing your customer by showing them certain things is not good business. Good business means getting a quality product together and then marketing for it wisely so that people accept it. Just promising your customers a lot and then delivering nothing can be harmful to your business.

Thus gauge your products and services and then embark upon advertising and marketing. Internal business communication is the key to get all your people together and then inspire them to deliver the best.

## Conclusion

Business communication is a very important aspect of any business and you need to take great care in improving your communication strategy so that your business keeps booming!

If you want to create a world class product, the first thing that you need to do is believe in yourself. This is where internal business communication comes in. It helps you get all your employees together and tell them that you can pull it off with élan.

If there is a lot of positive thinking and bursting enthusiasm in your camp, the spirit will manifest in your product. Thus, your employees are an integral part of the company, so keeping them happy and making them believe in the company and themselves is very important.

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### Reference from electronic media

[9] National Statistics Online — Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ 20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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