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Probability of Occurrence of Rainy Days: Non-Rainfall Tendency in India

Dhritikesh Chakrabarty

Independent Researcher, Ex Associate Professor, Department of Statistics, Handique Girls' College, Guwahati – 781001, Assam, India

ABSTRACT: In a recent study probability has been defined on the basis of data on automatically happened outcomes by the application of the logic behind concept of empirical probability. This definition of probability has been applied in estimating the probability distribution of occurrence of rainfall (in terms of number of rainy days with respect to month) at 39 stations covering India. In order to obtain a picture of non-rainfall tendency, the probability of occurrence of each of zero rainy day, one rainy day and either zero or one rainy day has been considered in the study. This article has been prepared from the findings obtained in the study.

KEYWORDS: Automatically happened outcomes, rainy day, probability, non-rainfall tendency

I. INTRODUCTION

The theory of probability has become essentially useful for scientific analysis of data in almost every study of research and investigation type [11 , 21 , 25]. The evolution of theory of probability has progressed through five stages namely (1) Prehistoric era, (2) Scientific thinking era, (3) Bernoullian Era, (4) Russian School era, and (5) Modern era [9 , 16 , 23 , 37]. On the other hand, the development has been progressing six approaches namely (1) Subjective Approach [4], (2) Intuitive Approach [36 , 37 , 48], (3) Classical Approach [6 , 9 , 10 , 12 , 14 , 16 , 17], (4) Empirical Approach also termed as relative frequency approach or statistical approach [12 , 15 , 56 – 58], (5) Axiomatic Approach [7 , 8 , 33 , 35] and (6) Theoretical Approach [11 , 15 – 20 , 25].

Subjective approach to probability is a biased one and hence unscientific while the concept of intuitive approach is not based on scientific logic. On the other hand, the other approaches are based on scientific logic. Probability is determined in empirical approach by performing the associated experimentation while in classical approach probability is determined without performing the experimentation. Axiomatic approach is based on some conditions called axioms that are satisfied by probability and it is silent about how to determine the value of probability. In theoretical approach, probability is defined in theoretically ideal situation and is determined in practically ideal situation by performing the associated experimentation.

In a recent study, probability has been defined on the basis of data on automatically happened outcomes by the application of the logic behind concept of empirical probability [30]. The necessity of this definition arises due to the fact that in many real situations, experimentation need not be and/or cannot be performed but is automatically performed resulting in available outcomes. This definition of probability has been applied in estimating the probability distribution of occurrence of rainfall (in terms of number of rainy days with respect to month) at 39 stations covering India. In order to obtain a picture of non-rainfall tendency, the probability of occurrence of zero rainy day has been considered in the study. However, there may be rainfall at a place during a non-rainy period due to some random cause (chance cause or accidental cause). Of course, such rainfall is very little. In a non-rainy month there may be 1 (one) rainy day, though rare, due to this reason. Therefore, in order to obtain a picture of non-rainfall tendency, the probability of occurrence of each of zero rainy day, one rainy day and either zero or one rainy has been considered in the study. This article has been prepared from the findings obtained in the study. This study has been done due to the reason that there has not yet been any study on estimating most likely number of rainy days at a place though lot of studies had been done on various characteristics and behaviors of rainfall [1 – 3 , 5 , 13 , 22 – 24 , 26 – 34 , 38 – 46 , 49 – 55].



II. PROBABILITY RELATED TO AUTOMATICALLY HAPPENED OUTCOMES

Let us use the standard notation $P(E)$ to denote the probability of occurrence or happening of event E . Probability has recently been defined on the basis of automatically happened outcomes of a natural phenomenon as follows: [28]:

Definition (1):

If in a set of N outcomes of a natural phenomenon already happened, an event E has occurred n times then the probability of occurrence of E is

$$\text{the limiting value of the ratio } \frac{n}{N} \text{ as } N \rightarrow \infty$$

i.e. $P(E)$ can be approximated by the ratio $\frac{n}{N}$ provided N is large

and thus the ratio $\frac{n}{N}$ is a reasonable estimate of $P(E)$ provided the size N of outcomes is reasonably large.

Definition (2):

If in a set of N outcomes of a natural phenomenon already happened, an event E with probability of occurrence $P(E)$ has occurred n times then the number n of occurrence of the event E namely n is

$$\text{the limiting value of the ratio } N.P(E) \text{ as } N \rightarrow \infty$$

i.e. n can be approximated by $N.P(E)$ provided N is large

and thus $N.P(E)$ is a reasonable estimate of n provided the size N of outcomes is reasonably large.

II (a). PROBABILITY OF NUMBER OF RAINY DAYS

Let us consider the number of rainy days in a period containing D number of days at a place. Let R denote the number of rainy days in the period occurred at the place. Then the possible values of R are

$$0, 1, 2, 3, \dots, D$$

(If month is considered as the period, the possible value of D are 28, 29, 30, 31 depending upon length of the month.)

Suppose that R outcomes have already happened.

If out of R outcomes, d number of rainy days occurred r times

then by Definition (1), the probability of occurrence of r rainy days can be defined by

$$\text{the limiting value of the ratio } \frac{r}{R} \text{ as } R \rightarrow \infty$$

and can be approximated by this ratio provided R is large and thus can be reasonably estimated by this ratio provided the size R of outcomes is reasonably large.

The value of R that corresponds to the maximum value of probability of occurrence is the estimated most likely number of rainy days.

III. ESTIMATE OF PROBABILITY OF RAINY DAYS IN INDIA

Probability defined on the basis of the data on automatically happened outcomes, as stated above, has been applied in estimating the probability distribution of occurrence of rainfall (in terms of number of rainy days with respect to month) at 39 stations covering India. In order to obtain a picture of non-rainfall tendency, the probability of occurrence of each of zero rainy day, one rainy day and either zero or one rainy day has been considered in the study. The estimates have been computed on the basis of data number of rainy days at these stations from 1969 onwards collected from Meteorological Department of India [30]. Estimated values of the respective probabilities obtained have been shown in **Table - 5.1, Table - 5.2 & Table - 5.3.**

IV. CONCLUSION

If the probability of occurrence of zero rainy day at a place during a period is 1 then the period can be regarded as a certain to be non-rainy one.

In reality, there may be rainfall during a non-rainy period due to some random cause that occurs accidentally but not regularly and not always so that 1 rainy day can occur during a non-rainy period with very small (near to 0) probability. Thus, if the probability of occurrence of zero rainy day during a period is not 1 but near to 1 and the probability of occurrence of 1 rainy day during the period is very small such that the probability of occurrence of either 0 rainy day or 1 rainy day is 1 (i.e. there

are only 2 possible outcomes namely 0 and 1) then the period can be regarded as almost certain to be non-rainy period. On the other hand, if the probability of occurrence of zero rainy day during a period is 0 then, the period can be regarded as a certain rainy period. Also, if the probability of occurrence of zero rainy day during a period is not 0 but very small and very near to 0 the period can be regarded as almost certain rainy period.

Thus from the numerical findings of the estimates of the probabilities, shown in **Table - 5.1, Table - 5.2 & Table - 5.3.**, it is possible to detect certain non-rainy month(s), almost certain non-rainy month(s), certain rainy month(s) and almost certain rainy month(s) at the stations understudy.

It is to be mentioned that the findings obtained in this study are based on the assumption that data used in the analysis satisfy the condition(s) under which the definition of probability is valid. Thus the accuracy of findings is subject to the validity of this assumption.

At this stage, it can be concluded that the definition of probability formulated for automatically happened outcomes can be a convenient tool of determining most likely picture of rainfall at a place. Similar method can be used in determining most likely picture of rainfall at other places not considered in this study. Thus one problem for researchers, at this stage, is to go for study on finding the most likely picture of rainfall at the other places of the globe by the application of the definition of probability based on automatically happened outcomes. This type of study will carry significance in the interest of the globe.

One more point to be noted is that in this study attempt has been made on estimating/approximating the probability distribution of number of rainy days at a place. This has been done by the application of definition of probability based on automatically happened outcomes. There is possible scope of applying this definition of probability in defining mathematical expectation [47] and thus in estimating expected number of rainy days in a given period at a place.

V. TABLES OF FINDINGS

Table - 5.1
(Probability of occurrence of **no (zero) rainy day** at various stations in India)

Station	Estimated Value of Probability of Occurrence in the Month											
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Agartala	0.6	0.16	0.16	0	0	0	0	0	0	0	0.24	0.52
Ahmadabad	0.781	0.906	0.969	0.844	0.656	0.031	0	0	0.094	0.625	0.75	0.813
Allahabad	0.187	0.406	0.625	0.5	0.468	0.094	0	0	0	0.281	0.719	0.656
Amritsar	0.242	0.061	0	0.121	0.151	0.03	0	0	0.061	0.424	0.364	0.426
Bangalore	0.875	0.719	0.719	0.991	0	0	0	0	0	0	0.062	0.312
Bhopal	0.433	0.5	0.633	0.69	0.393	0	0	0	0.033	0.276	0.621	0.643
Bhubaneswar	0.741	0.259	0.407	0.107	0.036	0	0	0	0.036	0	0.407	0.667
Bhunter	0	0.03	0.03	0.065	0.065	0.065	0.065	0	0	0.258	0.484	0.267
Chennai	0.53	0.8	0.77	0.6	0.3	0	0	0	0	0	0	0.1
Chandigarh	0.23	0.18	0.09	0.281	0.194	0.	0	0	0	0.471	0.619	0.333
Dehra Dun	0.04	0.04	0	0.087	0.091	0	0	0	0	0.348	0.607	0.304
Dhubri	0.42	0.33	0.08	0	0	0	0	0	0	0	0.308	0.846
Dibrugarh	0.13	0	0	0	0	0	0	0	0	0	0.25	0.261
Guwahati	0.32	0.25	0	0	0	0	0	0	0	0	0.308	0.538
Hisar	0.24	0.3	0.36	0.424	0.333	0	0	0	0.094	0.606	0.812	0.656
Hyderabad	0.63	0.73	0.57	0.233	0.2	0	0	0	0	0	0.333	0.7
Imphal	0.37	0.07	0.04	0	0	0	0	0	0	0	0.107	0.5
Jaipur	0.56	0.5	0.69	0.625	0.437	0.064	0	0	0.097	0.516	0.742	0.742
Jammu	0.05	0.091	0	0.1	0.095	0	0	0	0.048	0.3	0.4	0.4
Kolkata	0.43	0.14	0.36	0.073	0	0	0	0	0	0.036	0.393	0.714
Lucknow	0.26	0.29	0.52	0.645	0.323	0.032	0	0	0	0.387	0.645	0.581
Mumbai	0.937	0.9	0.94	0.906	0.75	0.031	0	0	0	0.156	0.625	0.788
Nagpur	0.27	0.23	0.43	0.4	0.286	0	0	0	0	0.214	0.538	0.571
New Delhi	0.3	0.15	0.28	0.375	0.212	0	0	0	0.062	0.437	0.75	0.5
Palam	0.21	0.112	0.303	0.264	0.29	0	0	0	0.031	0.485	0.719	0.531
Panjim	0.333	0.967	0.967	0.633	0.2	0	0	0	0	0.967	0.267	0.867
Patiala	0.217	0.136	0.174	0.609	0.273	0	0	0	0.091	0.591	0.652	0.364



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Patna	0.233	0.379	0.517	0.5	0.167	0.067	0	0	0	0.172	0.767	0.6
Pondicherry	0.467	0.733	0.667	0.8	0.241	0.067	0.067	0	0	0	0	0
Port Blair	0.3	0.235	0.467	0.2	0	0	0	0	0	0	0	0.133
Pune	0.879	0.879	0.818	0.424	0.182	0	0	0	0	0.151	0.4	0.767
Shilong	0.321	0.107	0.036	0	0	0	0	0	0	0	0.154	0.308
Silchar	0.312	0.125	0	0	0	0	0	0	0	0	0.117	0.454
Simla	0.05	0.05	0.05	0.15	0	0	0	0	0	0.263	0.438	0.316
Srinagar	0	0	0	0	0.059	0.056	0	0.111	0.158	0.278	0.278	0.228
Tezpur	0.185	0.172	0.034	0	0	0	0	0	0	0	0.286	0.333
Trivandrum	0.467	0.433	0.167	0	0	0	0	0	0	0	0	0.067
Udaipur	0.8	0.71	0.935	0.613	0.433	0	0	0	0.138	0.448	0.69	0.793
Varanasi	0.154	0.185	0.63	0.704	0.346	0.077	0	0	0	0.112	0.692	0.625

Table - 5.2

(Probability of occurrence of **exactly one rainy day** at various stations in India)

Station	Estimated Value of Probability of Occurrence in the Month											
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Agartala	0.2	0.28	0.08	0	0	0	0	0	0	0.04	0.24	0.32
Ahmadabad	0.219	0.063	0.031	0.133	0.188	0.094	0	0	0.094	0.219	0.094	0.156
Allahabad	0.344	0.25	0.219	0.344	0.258	0.031	0	0	0	0.226	0.161	0.322
Amritsar	0.182	0.091	0.182	0.364	0.212	0.091	0	0.03	0.121	0.273	0.212	0.242
Bangalore	0.093	0.156	0.094	0.188	0	0	0	0	0	0	0.063	0.25
Bhopal	0.233	0.2	0.267	0.2	0.429	0	0	0	0.033	0.31	0.103	0.143
Bhubaneswar	0.185	0.185	0.222	0.321	0.038	0	0	0	0	0	0.185	0.222
Bhunter	0.129	0.069	0	0.065	0.032	0.067	0	0.035	0.035	0.161	0.2	0.214
Chennai	0.133	0.067	0.167	0.133	0.367	0.1	0.067	0	0	0	0	0.067
Chandigarh	0.046	0.136	0.227	0.048	0.191	0	0	0	0	0.191	0.143	0.238
Dehra Dun	0.087	0.25	0.318	0.261	0.174	0	0	0	0	0.217	0.174	0.217
Dhubri	0.417	0.5	0.25	0	0	0	0	0	0	0.154	0.25	0.083
Dibrugarh	0	0.044	0	0	0	0	0	0	0	0	0.167	0.217
Guwahati	0.25	0.071	0.1481	0	0	0	0	0	0	0.103	0.269	0.269
Hisar	0.394	0.212	0.212	0.364	0.091	0.156	0	0	0.219	0.2121	0.125	0.156
Hyderbad	0.267	0.172	0.233	0.367	0.2	0.033	0	0	0.033	0.2	0.133	0.233
Imphal	0.185	0.143	0.036	0	0	0	0	0	0	0	0.214	0.208
Jaipur	0.344	0.344	0.188	0.156	0.188	0.194	0.032	0	0.161	0.229	0.129	0.226
Jammu	0	0.046	0.227	0.25	0.05	0.053	0	0	0.048	0.35	0.35	0
Kolkata	0.286	0.393	0.071	0.214	0.036	0	0	0	0	0.038	0.179	0.071
Lucknow	0.355	0.29	0.161	0.161	0.161	0.032	0	0	0.032	0.258	0.226	0.258
Mumbai	0.063	0.094	0.094	0.094	0.094	0	0	0	0	0.066	0.066	0.125
Nagpur	0.276	0.345	0.167	0.31	0.25	0	0	0	0.033	0.138	0.172	0.214
New Delhi	0.212	0.344	0.219	0.375	0.125	0.061	0	0	0.031	0.25	0.125	0.25
Palam	0.188	0.303	0.364	0.364	0.129	0.212	0.03	0	0.031	0.212	0.156	0.406
Panjim	0.033	0.033	0.033	0.267	0.167	0	0	0	0	0.033	0.267	0.067
Patiala	0.174	0.136	0.304	0.13	0.182	0.136	0.046	0	0.046	0.261	0.261	0.182
Patna	0.667	0.31	0.241	0.214	0.1	0	0	0	0	0.034	0.133	0.333
Pondicherry	0.233	0.2	0.2	0.067	0.419	0.267	0.067	0	0.067	0	0	0
Port Blair	0.267	0.194	0.226	0.129	0	0	0	0	0	0	0	0.097
Pune	0.121	0.091	0.121	0.333	0.242	0	0	0	0	0.091	0.212	0.121
Shilong	0.214	0.25	0.143	0	0	0	0	0	0	0	0.231	0.308
Silchar	0.438	0.125	0	0	0	0	0	0	0	0	0.267	0.273
Simla	0.1	0.1	0.048	0.1	0.095	0	0	0	0	0.05	0.2	0.2
Srinagar	0.048	0.095	0.046	0	0	0.1	0.1	0.05	0.143	0.15	0.2	0.15



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Tezpur	0.407	0.25	0.179	0	0	0	0	0	0	0.035	0.25	0.37
Trivandrum	0.333	0.167	0.2	0.007	0	0	0	0	0.033	0.033	0	0.033
Udaipur	0.167	0.229	0.032	0.226	0.2	0.1	0.035	0	0	0.241	0.172	0.172
Varanasi	0.346	0.462	0.308	0.148	0.269	0.074	0	0	0	0.231	0.154	0.167

Table - 5.3

(Probability of occurrence of **either zero or one rainy day** at various stations in India)

Station	Estimated Value of Probability of Occurrence in the Month											
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Agartala	0.8	0.44	0.24	0	0	0	0	0	0	0.04	0.48	0.84
Ahmadabad	1	0.969	1	0.977	0.844	0.125	0	0	0.188	0.844	0.844	0.969
Allahabad	0.531	0.656	0.844	0.844	0.726	0.125	0	0	0	0.507	0.88	0.978
Amritsar	0.424	0.152	0.182	0.485	0.363	0.303	0	0.03	0.182	0.697	0.576	0.454
Bangalore	0.401	0.875	0.813	0.282	0	0	0	0	0	0	0.125	0.562
Bhopal	0.666	0.7	0.9	0.89	0.822	0	0	0	0.066	0.343	0.724	0.786
Bhubaneswar	0.926	0.444	0.629	0.428	0.074	0	0	0	0.036	0	0.592	0.889
Bhunter	0.129	0.099	0.03	0.13	0.097	0.067	0.065	0.035	0.035	0.419	0.684	0.481
Chennai	0.663	0.867	0.937	0.733	0.667	0.1	0.067	0	0	0	0	0.167
Chandigarh	0.276	0.316	0.317	0.329	0.385	0	0	0	0	0.662	0.762	0.571
Dehra Dun	0.127	0.29	0.318	0.348	0.265	0	0	0	0	0.565	0.781	0.521
Dhubri	0.837	0.83	0.33	0	0	0	0	0	0	0.154	0.558	0.929
Dibrugarh	0.13	0.044	0	0	0	0	0	0	0	0	0.547	0.478
Guwahati	0.25	0.321	0.1481	0	0	0	0	0	0	0.103	0.577	0.807
Hisar	0.634	0.512	0.572	0.364	0.424	0.156	0	0	0.313	0.818	0.937	0.812
Hyderbad	0.897	0.902	0.803	0.6	0.4	0.033	0	0	0.033	0.2	0.466	0.933
Imphal	0.555	0.213	0.076	0	0	0	0	0	0	0	0.321	0.708
Jaipur	0.904	0.844	0.878	0.781	0.625	0.258	0.032	0	0.258	0.745	0.871	0.968
Jammu	0.05	0.137	0.227	0.35	0.145	0.053	0	0	0.096	0.65	0.75	0.4
Kolkata	0.716	0.533	0.431	0.287	0.036	0	0	0	0	0.074	0.572	0.785
Lucknow	0.615	0.58	0.681	0.806	0.484	0.064	0	0	0.032	0.645	0.871	0.839
Mumbai	1	0.994	1	1	0.844	0	0	0	0	0.222	0.691	0.913
Nagpur	0.546	0.575	0.597	0.71	0.536	0	0	0	0.033	0.352	0.71	0.785
New Delhi	0.512	0.494	0.499	0.75	0.337	0.061	0	0	0.093	0.687	0.875	0.75
Palam	0.398	0.415	0.667	0.628	0.419	0.212	0.03	0	0.062	0.697	0.875	0.937
Panjim	0.366	1	1	0.9	0.367	0	0	0	0	1	0.534	0.934
Patiala	0.391	0.272	0.478	0.739	0.455	0.136	0.046	0	0.137	0.852	0.913	0.546
Patna	0.9	0.689	0.758	0.714	0.267	0.067	0	0	0	0.206	0.9	0.933
Pondicherry	0.7	0.933	0.867	0.867	0.66	0.334	0.134	0	0.067	0	0	0
Port Blair	0.567	0.429	0.693	0.329	0	0	0	0	0	0	0	0.226
Pune	1	0.97	0.939	0.757	0.424	0	0	0	0	0.242	0.612	0.888
Shilong	0.535	0.357	0.179	0	0	0	0	0	0	0	0.385	0.616
Silchar	0.75	0.25	0	0	0	0	0	0	0	0	0.384	0.727
Simla	0.15	0.15	0.098	0.25	0.095	0	0	0	0	0.313	0.638	0.516
Srinagar	0.048	0.095	0.046	0	0.059	0.156	0.1	0.161	0.143	0.428	0.478	0.35
Tezpur	0.592	0.422	0.213	0	0	0	0	0	0	0.035	0.25	0.703
Trivandrum	0.8	0.6	0.367	0.007	0	0	0	0	0.033	0.033	0	0.134
Udaipur	0.967	0.939	0.967	0.839	0.633	0.1	0.035	0	0.138	0.689	0.862	0.965
Varanasi	0.5	0.647	0.938	0.852	0.615	0.151	0	0	0	0.231	0.846	0.792



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AUTHOR'S BIOGRAPHY

Dr. Dhritikesh Chakrabarty passed B.Sc. (with Honours in Statistics) Examination from Darrang College, Gauhati University, in 1981 securing 1st class & 1st position. He passed M.Sc. Examination (in Statistics) from the same university in the year 1983 securing 1st class & 1st position and successively passed M.Sc. Examination (in Mathematics) from the same university in 1987 securing 1st class (5th position). He obtained the degree of Ph.D. (in Statistics) in the year 1993 from Gauhati University. Later on, he obtained the degree of Sangeet Visharad (in Vocal Music) in the year 2000 from Bhatkhande Sangeet vidyapith securing 1st class, the degree of Sangeet Visharad (in Tabla) from Pracheen Kala Kendra in 2010 securing 2nd class, the degree of Sangeet Pravakar (in Tabla) from Prayag Sangeet Samiti in 2012 securing 1st class, the degree of Sangeet Bhaskar (in Tabla) from Pracheen Kala Kendra in 2014 securing 1st class and Sangeet Pravakar (in Guitar) from Prayag Sangeet Samiti in 2021 securing 1st class. He obtained Jawaharlal Nehru Award for securing 1st position in Degree Examination in the year 1981. He also obtained Academic Gold Medal of Gauhati University and Prof. V. D. Thawani Academic Award for securing 1st position in Post Graduate Examination in the year 1983.

Dr. Dhritikesh Chakrabarty also did post doctoral research under the Post Doctoral Research Award by the University Grants Commission for the period 2002 – 05.

He attended five of orientation/refresher course held in Gauhati University, Indian Statistical Institute, University of Calicut and Cochin University of Science & Technology sponsored/organized by University Grants Commission/Indian Academy of Science. He also attended/participated eleven workshops/training programmes of different fields at various institutes.



(Dr. Dhritikesh Chakrabarty presenting invited talk in NaSAEAST-2017 on June 28, 2017)

Dr. Dhritikesh Chakrabarty, currently an independent researcher, served Handique Girls' College, Gauhati University, during the period of 34 years from December 09, 1987 to December 31, 2021, as Professor (first Assistant and then Associate) in the Department of Statistics along with Head of the Department for 9 years and also as Vice Principal of the college. He also served the National Institute of Pharmaceutical Education & Research (NIPER) Guwahati, as guest faculty (teacher cum research guide), during the period from May, 2010 to December, 2016. Moreover, he is a Research Guide (Ph.D. Guide) in the Department of Statistics of Gauhati University and also a Research Guide (Ph.D. Guide) in the Department of Statistics of Assam Down Town University. He has been guiding a number of Ph.D. students in the two universities. He acted as Guest Faculty in the Department of Statistics and also in the Department of Physics of Gauhati University. He also acted as Guest Faculty cum Resource Person in the Ph.D. Course work Programme in the Department of Computer Science and also in the Department of Biotechnology of the same University for the last six years. Dr. Chakrabarty has been working as an independent researcher for the last more than thirty years. He has already been an author of 260 published research items namely research papers, chapter in books / conference proceedings, books etc. He visited U.S.A. in 2007, Canada in 2011, U.K. in 2014 and Taiwan in 2017. He has already completed one post doctoral research project (2002 – 05) and one minor research project (2010 – 11). He is an active life member of the academic cum research organizations namely (1) Assam Science Society (ASS), (2) Assam Statistical Review (ASR), (3) Indian Statistical Association (ISA), (4) Indian Society for Probability & Statistics (ISPS), (5) Forum for Interdisciplinary Mathematics (FIM), (6) Electronics Scientists & Engineers Society (ESES) and (7) International Association of Engineers (IAENG). Moreover, he is a Reviewer/Referee of (1) Journal of Assam Science Society (JASS) & (2) Biometrics & Biostatistics International Journal (BBIJ); a member of the executive committee of Electronic Scientists and Engineers Society (ESES); and a Member of the Editorial Board of (1) Journal of Environmental Science, Computer Science and Engineering & Technology (JECET), (2) Journal of Mathematics and System Science (JMSS) & (3) Partners Universal International Research Journal (PUIRJ). Dr. Chakrabarty acted as members (at various capacities) of the organizing committees of a number of conferences/seminars already held.

Dr. Chakrabarty was awarded with the prestigious SAS Eminent Fellow Membership (SEFM) with membership ID No. SAS/SEFM/132/2022 by Scholars Academic and Scientific Society (SAS Society) on March 27, 2022.