DEPARTMENT OF SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

ANNUAL REPORT

(2016-17)

UTTAR BANGA KRISHI VISWAVIDYALAYA
PUNDIBARI, COOCHBEHAR

ANNUAL REPORT, 2016-17

Department of Soil Science and Agricultural chemistry at a glance

A. Background:

Soil Science is now considered as a fundamental subject with applications in agriculture, horticulture, engineering and environmental sciences. The department of Soil Science and Agricultural Chemistry comes into being in 1979 of the then North Bengal Campus of Bidhan Chandra Krishi Viswavidyalaya. The department catered the undergraduate needs and fulfil the research and extension mandate of Regional Research station of Terai zone in Pundibari. In the year 2001, the North Bengal campus (B.C.K.V.) emerged as a full fledged University by the name of Uttar Banga Krishi Viswa Vidyalaya (U.B.K.V.). The post graduate programme started in the new university of U.B.K.V. The department also caters the teaching needs of both the colleges of Horticulture and Agriculture. The Faculties of the department have been assigned three fold duties of teaching, research and extension education. The department besides having state and central government funded teaching and research schemes is also supported by different International and private funded adhoc projects to cater the research needs of the region. The department is involved in development/ extension programmes to provide services to the farmers/growers/Govt. and private agencies in the fields of water, soil, plant and fertilizer testing.

B. Mandate

- To impart teaching in Soil Science and Ag. Chemistry for BSc, MSc and Ph.D. students to develop understanding and ability to apply fundamental principles of soil science, environment, and natural resource management;
- To prepare post graduate students to conduct basic and applied research that will be used to solve issues relating to crop and soil management;
- To develop resource efficient and environmentally sound soil, plant, and environment management technologies;
- To provide expertise in trainings on soil test- based fertilizer recommendations;
- Undertaking consultancy services.

C. FACULTY AND STAFFS:

a) *Head of the Department :* Dr. A.K.Sinha

b) Faculty

Sl.No.	Name	Designation	Specialization	Contact address
1.	Dr. Prabir Mukhopadhyay	Professor	Soil Fertility, Soil Chemistry and Plant Nutrition	**9474146045 drprabir1993@gmail.com**
2.	Dr. Ashok Choudhury	Professor	Soil Microbiology	**9932395544 ashokc540@gmail.com**
3.	Dr. Dibyendu Mukhopadhyay	Professor	Soil Fertility, Soil Chemistry and Plant Nutrition	**9434197891 dibsm107@gmail.com**
4.	Dr. A. K. Sinha	Associate Professor	Soil-Plant Nutrition, Fertility and conservation agriculture	**9434197828 abskvk@yahoo.co.in**
5.	Dr. Ganesh Chandra Banik	Assistant Professor	Soil Physical Chemistry, Soil and Ground Water Pollution, Soil Fertility, Remote Sensing and GIS	**9475902914 gcbanik79@yahoo.co.in**
6.	Dr. Amrit Tamang	Assistant Professor	Soil Chemistry, Fertility and Nutrient Management, Plant Nutrition and Nutrient Physiology	**8100906370 tamang_amrit@rediffmail.com**
7.	**Dr. Shovik Deb**	**Assistant Professor**	**Soil Carbon, Remote Sensing and GIS, Soil Mineralogy**	**9434685382 shovikiitkgp@gmail.com; shovik@ubkv.ac.in**

***c)* FOREIGN VISITS BY THE FACULTY MEMBERS:**

1. University of Ruhuna, Faculty of Agriculture, SriLanka on 13.01.2016 (Prof. Dibyendu Mukhopadhyay)

***d)* AWARDS AND HONOURS:**

1.**Bharat Gaurav** award (2016) ,IIFS ,NewDelhi (Prof. D. Mukhopadhyay).

2. **Glory of India Gold medal** award (2016) IISA, NewDelhi (Prof. D. Mukhopadhyay)

***e)* FACULTY CREDENTIALS RECEIVED:** Nil

f) NON TEACHING STAFFS

Sl.No.	Name	Designation	Contact address
1.	Mr. Tapan Kumar Saha	Superintendent Technical Assistant	9474827839
2.	Mr. Sajal Barma	Superintendent Technical Assistant	9733353970
3.	Mr. Hasan Mirza	Jr. Store keeper	9002881648
4.	Mr. Madhusudhan Dey	Jr.Laboratory Attendant	9046419361
5.	Mrs. Sahana Banu	Jr.Laboratory Attendant	-

D. TEACHING:

The department of Soil Science and Agricultural chemistry caters different soil related courses for undergraduate (B.Sc.) students of both colleges of agriculture and horticulture of the university. The department also caters the soil science courses of both M.Sc. and Ph.D. students.

A) UNDERGRADUATE:

I) COMPULSORY COURSES:

Sl. No.	Course No.	Title	Credit Hours	Faculty	Semester
1.	SSC 101	Introduction to Soil Science	2+1	Agriculture	1st
2.	SSC-102	Fundamentals of Soil Science	2+1	Horticulrure	1st
3.	AG 101	Principles of Soil Science	2+1	B.Tech	1st
4.	SSC 151	Introductory Microbiology	1+1	Agriculture	2nd
5.	SSC 153	Agricultural Microbiology	1+1	Horticulture	2nd
6.	SSC-152	Soil Fertility and Nutrient Management	1+1	"	"
7.	SSC 251	Soil Science I (IVth Dean's Committee)	2+1	Agriculture/ Horticulture	4th
8.	SSC 351	Soil Science II	2+1	Agriculture/ Horticulture	6th
9.	**SSC-352**	**Remote Sensing, GPS & GIS**	**1+1**	**Agriculture / Horticulture**	**6th**

ii) Elective courses:

Sl.No.	Course No.	Title	Credit Hours	Semester
1.	SSC 401	Integrated Nutrient management	2+1	**7th**
2.	SSC 402	Remote Sensing and GIS for Natural Resource Management and Land Use Planning	1+2	**7th**
3.	**SSC 403**	**Soil management**	**2+1**	**7th**

b) POST GRADUATE:

i) FIELD OF SPECIALIZATION

M.Sc.: Soil Science and Agricultural Chemistry

Ph.D.: Soil Science and Agricultural Chemistry

II) ELIGIBILITY FOR ADMISSION TO POST GRADUATE DEGREE PROGRAMME:

i) *For M.Sc.(Ag) Degree:* Candidates who have passed in Bachelor's Degree in Agriculture and Horticulture from a recognized University with a minimum OGPA 6.5 in 10 point scale and at least 60% marks in Higher Secondary or equivalent examination are allowed for admission test. The minimum OGPA and marks for SC/ST/PWD candidates are 6.00 and 50% respectively.

ii) *Ph.D. Degree:* To appear in the entrance test for admission to Ph. D. degree course in a discipline of Soil Science and Agricultural Chemistry candidates with Master's Degree in Soil Science and / or Agricultural Chemistry / Agril. Physics/ Soil Microbiology having at least 6.5 OGPA(6.00 OGPA for SC, ST and PWD candidates) from any recognized Indian/Foreign University followed by Bachelors'Degree in Agricultural / Horticultural sciences are considered eligible.

III) MODE OF FOR ADMISSION TO POST GRADUATE DEGREE PROGRAMME: Entrance test conducted by the University.

IV) POST GRADUATE INTAKE:

a) M.Sc.: Total Seat- 08

b) Ph.D.: Total seat in a session decided on the basis of eligibility of the teachers in a particular session following the criteria laid down in P.G. regulations.

The M.Sc. & PhD seats in a particular session under different categories is distributed following the reservation rules of the West Bengal state.

V) POST GRADUATE COURSES:

Course No.	Course-Title	Credit Hour	Semester
Core-Courses			
Soils 501	Soil Physics	2+1	
Soils 502	Soil Fertility And Fertilizer Use	2+1	
Soils 503	Soil Chemistry	2+1	
Soils 504	Soil Mineralogy, Genesis, Classification and Survey	2+1	
Soils 507	Soil Biology and Biochemistry	2+1	
Minor/Supporting Courses			
Soils 505	Soil Erosion and Conservation	2+1	
Soils 506	Physical Chemistry	1+0	
Soils 507	Soil Biology and Biochemistry	2+1	
Soils 510	Soil, Water and Air Pollution	2+1	
Soils 511	Remote Sensing and GIS Techniques for Soil and Crop Studies	2+1	
Soils 512	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis	0+1	
Soils 514	Management of Problematic Soils and Water	2+1	
Soils 515	Fertilizer Technology	1+0	
Soils 516	Land Degradation and Restoration	1+0	
Soils 591	Master's seminar	1+0	
Soils 599	Master's research	20	
Doctoral Degree Courses			
Soils 601	Advances in soil physics	2+0	
Soils 602	Advance in soil fertility	2+0	
Soils 603	Physical chemistry of soil	2+1	
Soils 604	Soil Genesis and micropedology	2+0	
Soils 605	Biochemistry of Organic Matter	2+0	
Soils 606	**Land Use Planning and Watershed Management**	**2+0**	

VI) STUDENTS ENROLMENT FOR POST GRADUATE DEGREE PROGRAMME DURING THE YEAR: 2016-2017

Degree Programme	Department	Intake capacity	Total Enrolment	
			Male	**Female**
M. S. (Ag.)	SSAC	7	2	0
Ph. D.	SSAC	6*	2	1

* URS- University research scholarship -2; Self-supporting – 4.

VII) STUDENTS' ACHIEVEMENT: JRF: 7 SRF: nil ARS-NET: 2

Others (Specify):

VIII) SCHOLARSHIPS, STIPENDS AND FELLOWSHIPS: 1 (scholarship for PhD from Backward class department of A.P.)

IX) STUDENTS' PLACEMENT: *Govt:* 1* Coorporate: Bank:

NGO:

*IFFCO

E. RESEARCH ACTIVITY:

a) Areas of research :

i. Sustaining soil productivity through integrated nutrient management under different cropping systems and agro-climatic zones;
ii. Tillage and crop residue management in crop production;
iii. Impact of climate change on soil processes and water resources;
iv. carbon sequestration in the context of climate change;
v. Micronutrient management in soils for higher crop productivity;
vi. Site specific nutrient management in rice-wheat and rice-maize cropping system;
vii. Use of remote sensing and GIS technique to identify spatial and temporal variability in soils.

b) Research reports submitted :

i) Annual progress report of the project on 'Optimising NUE under ZT……..W.B.' funded by IPNI.
ii) Annual progress report of the project on 'Below-ground…….rice ecology.' funded by SERB, GOI.

c) On going research projects :

Sl. No.	Project	Funding agency
1.	Retrieval of Biophysical Parameters in Buxa Tiger Reserve using GISAT	SAC, ISRO
2.	Residual effect of Gluphosinate ammonium 13.5% SL on soil physico-chemical properties and microbial activities in tea and cotton	UPL, Pvt. Ltd
3.	To evaluate the bio-efficacy and phytoxicity of gluphosinate ammonium 13.5% SL against weed flora in tea	-
4.	Bio-Efficacy data generation of Clethodium 25% EC on Soyabean crops	Krishi Rasayan Exports Pvt. Ltd
5.	Enhancing Pulses Production for Food and Nutritional Security, Improved Livelihoods, and Sustainable Agriculture in West Bengal	ICARDA-GoWB
6.	To evaluate the bio-efficacy and phytoxicity of GPH-315 against weed flora in tea	-
7.	Optimising nutrient use efficiency under zero tillage operations in Rice - Maize cropping system in Coochbeharand Maldadistrict of West Bengal.	International Plant Nutrient Institute
8.	Sustainable and resilient farming systems intensification in the eastern Gangetic Plains	ACIAR

F. EXTENSION ACTIVITIES:

- Provide Resource Persons for Seminars, Symposia, Workshops / AIR / Doordarshan programmes;
- Provide Resource Persons for farmers training and trainers training for Government nodal department and NGOs'.
- Field visit to problem areas as a part of the Multi- Disciplinary Diagnostic Team for the Department of Agriculture, Government of West Bengal;
- Provide expertise trainings in soil testing and fertilizer recommendations.
- Provide expertise for the Disaster management team of the Terai region;
- Undertaking consultancy services in needed areas.

G. INFRASTRUCTURAL AND SUPPORT FACILITIES AVAILABLE:

- Separate laboratories for U G and P G students
- Research Laboratory for doing independent research
- Full fledged computer room
- Central Instrumentation facility - CHNS analyser, AAS, Spectrophotometer, and instruments for routine analysis

H. DOCTORAL THESIS COMPLETED:

Sl.No.	Title	Year	Author	Chairman
1.	Distribution and transformation of zinc in soils of the *Terai* situation of West Bengal and reflection on boro rice under different methods of cultivation	2016	Sharme Gogoi	**Prof. D. Mukhopadhyay**
2.	**Evaluating soil organic C, particulate organic C and enzyme activities of soils under different land use system**	**2016**	**Bappa Paramanik**	**Prof. Ashok Choudhury**

I. MASTER DEGREE THESIS COMPLETED

Sl.No.	Title	Year	Author	Chairman
1.	Effect of lime & Boron on wheat.. under acid soil of West Bengal	2016	Princy thakur	**Prof. D. Mukhopadhyay**
2.	**Soil carbon and nitrogen status as influenced by different nutrient level in Rice- Maize cropping system.**	**2016**	**Jayanta Layek**	**Dr A. K.Sinha**

J. Seminar, Symposium, Conference, Training and Winter/Summer/Refresher course/short course, Workshop attended/organized

Sl.No.	Seminar, Symposium, Conference, Training and Winter/Summer/Refresher course/short course	Faculty associated	Date	Venue
1.	International Symposium on Agriculture and Environment (2016)	Prof. D. Mukhopadhyay	13.01.2016	University of Ruhuna, SriLanka
2.	National Conference on "Enhancing Nutritional Security through Climate Smart Farming Practices	Dr. G. C. Banik	March, 17-18, 2017	Regional Research Station (Hill Zone), UBKV, Kalimpong

3.	One day workshop on "Food Security and Climate Change in India" on 5th December, 2016 as an organizing secretary.	Dr. A. Tamang	05.12.2016	UBKV, Pundibari West Bengal
4.	Workshop on "Experimental learning, Entrepreneurship and needs of Agro-Industry"	Dr. A. Tamang	28th Feb to 1st March, 2017	UBKV, Pundibari West Bengal
5.	Workshop on "Soil Health and its Management"	Dr. A. Tamang	17-18th March, 2017	UBKV, Pundibari West Bengal
6.	National Conference on "Enhancing National Security through Climate Smart Farming Practices"	Dr. A. Tamang	March, 17-18, 2017	Regional Research Station (Hill Zone), UBKV, Kalimpong
7.	National Seminar on "Nutrients and pollutants in soil-plant-animal-human Continuum for sustaining soil, food and nutritional security – way forward",	Dr. S. Deb	-	BCKV Kalyani, India
8.	Indian Science Congress	Dr. S. Deb		Mysuru, India

K. ACADEMIC SOCIETY ASSOCIATION:

Sl.No.	Faculty	Association
1.	Prof. Dibyendu Mukhopadhyay	1.Indian Society of Soil Science 2.Indian Science Congress Association 3.Journal of Agriculture and Technology 4.Cooch Behar Association for Cultivation of Agricultural Sci.
2.	Prof. Ashok Choudhury	1.Indian Society of Soil Science 2.Cooch Behar Association for Cultivation of Agricultural Sci.
3.	Dr. A.K.Sinha	1. Cooch Behar Association for Cultivation of Agricultural Sci. 2. Indian Society of Soil Science
4.	Dr.G.C.banik	1.Indian Society of Soil Science 2.Cooch Behar Association for Cultivation of Agricultural

		Sci.
5.	Dr. Amrit Tamang	1.Indian Society of Soil Science 2.Indian Science Congress Association 3. Cooch Behar Association for Cultivation of Agricultural Sci.
6.	Dr. Shovik Deb	1.Indian Society of Remote Sensing 2.Cooch Behar Association for Cultivation of Agricultural Sci.

L. PUBLICATION

I) PAPERS PUBLISHED IN SCIENTIFIC JOURNALS

1. Kumar ,S.S., Deb, S. ,Bhadoria, P.B.S. , **Mukhopadhyay,D**., Choudhury,A. and Rakshit,A (2016). Impacts of *Pseudomonas putida* on available soil phosphorus dynamics and crop productivity under lowland rice ecology. ***Nature Environment and Pollution Technology***. 15(1) : 227-232. IF;1.953,
2. Mahato,A. and **Mukhopadhyay, D.** (2016). Effects of some primary and micronutrients on yield of rice (*Oryza sativa* L.) under Terai situation of West Bengal (India). ***An Asian Journal of Soil Science.*** 11(2):348-352.
3. Pati, R. and **Mukhopadhyay, D.** (2016). Arsenic sorption/desorption kinetics in some soils of West Bengal . ***J.Agric.Technol****.*3(2): 19-27.
4. Gogoi, S., Banik, G. C., Kundu, A., Mukhopadhyay, S. and Mukhopadhyay, D. (2017) . Status of zinc fractions in soils of Cooch Behar district, West Bengal, India. *Current Science.* 113(6):1173-1178.
5. Rakesh S**.** and **G. C. Banik** (2016)Effect of sulphur levels and sources on growth, yield and quality of mustard in terai region of West Bengal, India. *Annals of Plant and Soil Research.* **18:** 152-155
6. Rakesh, S., **Ganesh Chandra Banik**, Arunava Ghosh and Deepranjan Sarkar (2016) Effect of sulphur fertilization on different forms of sulphur under mustard cultivation in an acid soil of *terai* region of West Bengal. *Research on Crops*.**17 (2)**: 248-252
7. **G.C. Banik** and Shubhra Samat (2016) Effect of phosphorus and vermicompost on zinc availability in an acidic laterite soil of West Bengal, India. *International Journal of Science, Environment and Technology*. 5(4): 1903-1911
8. **G. C. Banik** and S. K. Sanyal (2016)Evaluation of inorganic fractions of arsenic in relation to soil properties in affected areas of West Bengal, India. *Current Science*. **111 (8):** 1371-1377

9. S. K. Ray and **G. C. Banik** (2016)Available Micronutrient Status in relation to Soil Properties in Some Villages under Four Agro-climatic Features of West Bengal. *Journal of the Indian Society of Soil Science.* **64(2):** 169-175
10. G.C. Banik and Shubhra Samat (2016) zinc-phosphorous interaction in presence of vermicompost on rice grown in an acid soil of Cooch Behar, West Bengal, India. *The Ecoscan.* 10(1&2). 385-391
11. Assessment of nutrient management technology for Brocolli to improve productivity and quality, and soil resources in the subtropics by **Amrit Tamang**, Ipsita Das, Kaushik Batabyal, Dibyendu Sarkar, Sidhu Murmu, Biswapati Mandal, Gora Chand Hazra and Ranjan Bhattacharyya. *International Journal of Vegetable Sciences*. Vol. 23, No. 2, 102-124 (2017)
12. Direct and residual effect of organics on groundnut – maize cropping sequence by Partha Sarathi Patra, Pabitra Adhikary, Shyamal Kheroar, **Amrit Tamang**, Ashim Chandra Sinha and Debasis Mahato. *Research Journal of Agricultural Sciences.* Vol. **8**(2): 411-416, (2017)
13. Comprehensive assessment of nutrient management technologies for cauliflower production under subtropical conditions by Kaushik Batabyal, Biswapati Mandal, Dibyendu Sarkar, Sidhu Murmu, **Amrit Tamang**, Ipsita Das, Gora Chand Hazra and Partha Sarathi Chattopadhyay. *European Journal of Agronomy.* Vol. 79, 1-13, (2016).
14. Evaluation of bio-efficacy and phytotoxicity of glufosinate ammonium 13.5% SL in tea (camellia sinensis l.) by P. S. Patra, T. Paul, **A. Tamang**, A. Choudhury and Milan Biswas. *American Journal of Research Communication.* Vol. 4(9) (2016).
15. Assessment of Hydro-chemical Characteristics of Groundwater Collected from the villages of Coastal Sundarbans by Tarik Mitran, Pabitra Kumar Mani, Durgesh Kumar Singh, **Amrit Tamang**, Nirmalendu Basak and Biswapati Mandal. *Journal of Soil Salinity and Water Quality* 8(1), 51-58, (2016)
16. P. S. Patra, T. Paul, A. Tamang, **A. Choudhury** and Milan Biswas. (2016) Evaluation of bio-efficacy and phytotoxicity of glufosinate ammonium 13.5% SL in tea (*Camellia Sinensis* L.). *American Journal of Research Communication*, **4(9)**: 103-115, www.usa-journals.com, ISSN: 2325-4076.
17. Shankar Ram, Shis Ram, Jitendra Kumar Maurya, **Ashok Choudhury** and A. K. Ghosh (2016). Removal of Malachite Green From Aqueous Solution Using Activated Charcoal. *The Ecoscan*, **11(1&2)**: 45-49.
18. D. C. Weindorf, S. Chakraborty, J. Herrero, B. Li, C. Castañeda and **A. Choudhury** (2016). Simultaneous assessment of key properties of arid soil by combined PXRF and Vis–NIR data. *European Journal of Soil Science*, **67:** 173–183.

19. Shiv Shankar Kumar, Shovik Deb, P.B.S. Bhadoria, Dibyendu Mukhopadhya[y,] Amitava Rakshit and **Ashok Choudhury** (2016). Impact of *Pseudomonas putida* on Available Soil Phosphorus Dynamics and Crop Productivity under Lowland Rice Ecology. *Nature Environment and Pollution Technology*, **15(1)**: 227-232. ISSN: 0972-6268.
20. Somsubhra Chakraborty, David C. Weindorf, Gary J. Michaelson, Chien Lu Ping, **Ashok Choudhury**, Tarek Kandakji, Autumn Acree, Akriti Sharma and Wang Dandan (2016)*. In-Situ* Differentiation of Acidic and Non-Acidic Tundra *via* Portable X-ray Fluorescence (PXRF) Spectrometry.*Pedosphere,***26(4)**: 549–560. doi:10.1016/S1002-0160(15)60064-9.**(NAAS Score: 7.73**).
21. Bisweswar Mahato, Parimal Panda, Bappa Paramanik, Parijat De, Ranajit Panda, Anarul Hoque, **Ashok Choudhury**, Naba Kishore Mahato, Arindam Kundu, Rajib Karmakar, Indranil Das and Abhijit Mahato. (2016). Studies on *In situ* Net N Mineralization in Soils from Mathura Tea Garden and Cultivated Land of North Bengal.*International Journal of Agriculture, Environment and Biotechnology*. **9(6)**: 1023-1029
22. Parimal Panda, Somsubhra Chakraborty, D.P. Ray, Bisweswar Mahato, Bappa Paramanik, **Ashok Choudhur[y]**(2016). Screening of phosphorus solubilizing bacteria from tea rhizosphere soil based on growth performances under different stress conditions.*International Journal of Bioresource Science*. **3(1)**: 39-56
23. Deb, D., Singh, J. P., **Deb, S.*,** Datta, D., Ghosh, A., Chaurasia, R.S. (2017) An alternative approach for estimating above ground biomass using Resourcesat-2 satellite data and artificial neural network in Bundelkhand region of India. *Environmental Monitoring and Assessment* 189: 576.
24. Chakraborty, S., Man, T., Paulette, L., **Deb, S.,** Li, B., Weindorf, D.C.*, Frazier, M. (2017) Rapid assessment of smelter/mining soil contamination via portable X-ray fluorescence spectrometry and indicator kriging. *Geoderma* 306: 108-119.
25. Datta, D.*, **Deb, S.** (2017) Forest structure and soil properties of mangrove ecosystems under different management scenarios: Experiences from the intensely humanized landscape of Indian Sunderbans. *Ocean and Coastal Management* 140: 22-33.
26. Chakraborty, S.*, Li, B., **Deb, S.,**Paul, S., Weindorf, D.C., Das, B.S. (2017) Predicting soil arsenic pools by visible near infrared diffuse reflectance spectroscopy. *Geoderma* 296: 30-37.
27. Chakraborty, S., Weindorf, D.C.*, **Deb, S.,** Li, B., Paul, S., Choudhury, A., Ray, D.P. (2017) Rapid assessment of regional soil arsenic pollution risk via diffuse reflectance spectroscopy. *Geoderma* 289: 72-81.

28. Duda, B.M., Weindorf, D.C.*, Chakraborty, S., Li, B, Man, T., Paulette, L., **Deb, S.** (2017) Soil characterization across catenas via advanced proximal sensors. *Geoderma* 298: 78-91.
29. Pearson, D., Chakraborty, S., Duda, B., Li, B., Weindorf, D.C.*, **Deb, S.,** Brevik, E., Ray, D.P. (2017) Water analysis via portable x-ray fluorescence spectrometry. *Journal of Hydrology* 544: 172-179.
30. **Deb, S.,** Chakraborty, S.*, Weindorf, D.C., Murmu, A., Banik, P., Debnath, M.K., Choudhury, A. (2016) Dynamics of organic carbon in deep soils under rice and non-rice cropping systems. *Geoderma Regional* 7: 388-394.
31. P, Mukhopadhyay and A. K.Sinha(2016) Patterns of nitrogen mineralization under two water regimes in an acidic Entisol as influenced by chemical composition of plant residues.Comm. Soil Sci. and Plant Analysis, 47(7), 851-862.

ii) Papers Presented In Symposia, Conference, etc.

1. Paper on , ' Effects of inorganic phosphorus fractions under different tillage practices on wheat (*Triticum aestivum L*) in an acid soil of West Bengal (India),' has been accepted for presentation at the University of Ruhuna, Faculty of Agriculture, SriLanka on 13.01.2016.
2. Parijat De[1]*, Shovik Deb[1], Somsubhra Chakraborty[2], Parimal Panda[1], Deo Kumar[1], Arjun Murmu[1] and **Ashok Choudhury[1]**(2017). Protection of organic carbon within aggregates in soils under three distinct ecologies in northern part of West Bengal, India. On completion of 91st birth anniversary of Professor L.N. Mandal. National Seminar on "Nutrients and pollutants in soil-plant-animal-human Continuum for sustaining soil, food and nutritional security –way forward" Organized by Bidhan Chandra Krishi Viswavidyalaya in collaboration with National Academy of Agricultural Sciences, June 9-10, 2017, Lake Hall, BCKV, Kalyani.
3. Arjun Murmu[1*], Shovik Deb[1], Deo Kumar[1], Parijat De[1], Somsubhra Chakraborty[2] and **Ashok Choudhury** (2017). Comparative study of microbial dynamics in relation to organic carbon in surface and below ground subsurface soils.On completion of 91st birth anniversary of Professor L.N. Mandal. National Seminar on "Nutrients and pollutants in soil-plant-animal-human Continuum for sustaining soil, food and nutritional security –way forward" Organized by Bidhan Chandra Krishi Viswavidyalaya in collaboration with National Academy of Agricultural Sciences, June 9-10, 2017, Lake Hall, BCKV, Kalyani.
4. P. Jogarao*, P.R.K. Prasad, A. Tamang and **Ashok Choudhury** ((2017). Effect of long-term use of manures and fertilizers on soil carbon pools in

rainfed cotton in *Vertisols*.On completion of 91st birth anniversary of Professor L.N. Mandal. National Seminar on "Nutrients and pollutants in soil-plant-animal-human Continuum for sustaining soil, food and nutritional security – way forward" Organized by Bidhan Chandra Krishi Viswavidyalaya in collaboration with National Academy of Agricultural Sciences, June 9-10, 2017, Lake Hall, BCKV, Kalyani.

5. Shovik Deb[1*], Somsubhra Chakraborty[2], Arjun Murmu[1], Parijat De[1], Deo Kumar[1] and **Ashok Choudhury** (2017). Carbon dynamics in deep soils under rice and non-rice ecology: the new ways to look at it. On completion of 91st birth anniversary of Professor L.N. Mandal. National Seminar on "Nutrients and pollutants in soil-plant-animal-human Continuum for sustaining soil, food and nutritional security –way forward" Organized by Bidhan Chandra Krishi Viswavidyalaya in collaboration with National Academy of Agricultural Sciences, June 9-10, 2017, Lake Hall, BCKV, Kalyani.
6. B.Mahato[1], P. Panda[2*], B. Paramanik[2], P. De[2], R. Panda[2], A. Hoque[2], **A.Choudhury[2]**, N. K. Mahato[2], A. Mahato[3], A. Kundu[4], M. K. Kundu[4], R.Karmakar[4], A.Ghosh[4] and I. Das[5] (2017). Studies on *In Situ* Net N Mineralization in Soils from Mathura Tea Garden and Cultivated Land of North Bengal. International symposium on "eco – efficiency in agriculture & allied research" Organized by Crop and Weed Science Society (CWSS), Bidhan Chandra Krishi Viswavidyalaya (BCKV) AT Farmers' Academy & Convention Centre (FACC), BCKV, Kalyani, Nadia, West Bengal, India on 20-23 January, 2017. Pp 321-322.
7. Kumar, D.†, **Deb, S.,** De, P., Murmu, A., Saha, S. (2017) Assessing the quality of soil organic carbon in surface and subsoil under rice and non-rice crop ecologies using ultraviolet spectrophotometry. National Seminar on Nutrients and pollutants in soil-plant-animal-human Continuum for sustaining soil, food and nutritional security – way forward, Kalyani, India.
8. De, P.†, **Deb, S.,** Chakraborty, S., Panda, P., Kumar, D., Murmu, A., Choudhury, A. (2017) Protection of Organic carbon within aggregates in soils under three distinct ecologies in Northern part of West Bengal, India. National Seminar on Nutrients and pollutants in soil-plant-animal-human Continuum for sustaining soil, food and nutritional security – way forward, Kalyani, India.
9. De, P.†, **Deb, S.**, Chakraborty, S., Kumar, D., Choudhury, A. (2017) Dynamics of Soil Carbon and Soil Aggregation under three Distinct Ecologies of Northern Part of Indian State West Bengal. National Seminar on Enhancing Nutritional Security through Climate Smart Farming Practices, Kalimpong, India.

iii) Popular Articles

1. Ranjan Bhattacharyya , Birendra Nath Ghosh , Pradeep Dogra , Prasanta Kumar Mishra , Priyabrata Santra , Suresh Kumar , Michael Augustine Fullen , Uttam Kumar Mandal , Kokkuvayil Sankaranarayanan Anil , Manickam Lalitha , Dibyendu Sarkar , **Dibyendu Mukhopadhyay** , Krishnendu Das , Madan Pal , Rajbir Yadav , Ved Prakash Chaudhary and Brajendra Parmar ;***Sustainability (2016)****, 8,565;1-37,doi:10.3390/su8060565*
2. **G. C. Banik** (2016) Wood Ash: an Alternative of Inorganic Lime to Ameliorate Soil Acidity. *Indian Farmer* (ISSN No. 2394-1227) **3(3):** 176-179

iv) Book chapters

1. **A. Tamang**, A. Choudhury, S. Tamang, S. Kheroer, S. Pradhan and I. Das (2016). "Nutrient and water management of ornamental crops under protected cultivation" ISBN 978-81-7910-532-0
2. **A. Tamang,** A. Choudhury, S. Tamang, P. S. Patra, N. Basak and T. Mitran (2016). "Growing media and its use under protected cultivation for ornamental crops" ISBN 978-81-7910-532-0.
3. Bholanath Saha, Sushanta Saha, Arpita Das,Prabir Kumar Bhattacharyya, Nirmalendu Basak, Abhas Kumar Sinha, and Parthendu Poddar (2017). 'Biological Nitrogen Fixation for Sustainable Agriculture'. ISBN 978-981-10-5343-6.

v) Booklets

1. **Tamang A,** Batabyal K, Das I, Murmu S, Saha S, Ghorai D, Pradhan D, Chakraborty M, Hazra GC and Mandal B (2017). Nutrient Management Practices for Common Vegetables Crops (Brinjal, Tomato and Pointed gourd) of West Bengal. Published by *Directorate of Research, Bidhan Chandra Krishi Viswavidhyalaya, Kalyani, West Bengal, pages. 32.*

2. Batabyal K, Murmu S, **Tamang A,** Das I, Saha S, Sarkar D, Saha S, Pradhan D, Chakraborty M, Hazra GC, Chattopadhyay A, Dutta S and Mandal B (2017). Nutrient Management Practices for Cole Crops (Cauliflower, Broccoli and Cabbage) of West Bengal. Published by *Directorate of Research, Bidhan Chandra Krishi Viswavidhyalaya, Kalyani, West Bengal, pages. 32.*

3. Batabyal K, Murmu S, **Tamang A,** Das I, Saha S, Rahman FH, Pradhan D, Chakraborty M, Hazra GC and Mandal B (2017). Nutrient Management Practices for Common Root and Tuber Crops (Carrot, Radish and Elephant Foot Yam) of West Bengal. Published by *Directorate of Research, Bidhan Chandra Krishi Viswavidhyalaya, Kalyani, West Bengal, pages. 32.*

vi) Bulletins-

Hazra, G., Saha, S., **Deb, S.,** Pal, B., Pati, S., Batabyal, K., Murmu, S., Saha, B., Mandal, B., Shukla, A.K. (2017) Delineation and mapping of micronutrients status in different districts of West Bengal and remediation of their deficiencies (*in Bengali*). Bidhan Chandra Krishi Viswavidyalaya and All India Coordinated Research Project on Micro and Secondary Nutrients and Pollutant Elements in Soils and Plants.