

DEPARTMENT OF SOIL SCIENCE AND AGRICULTURAL CHEMISTRY



ANNUAL REPORT

(2017-18)

UTTAR BANGAKRISHIVISWAVIDYALAYA
PUNDIBARI, COOCH BEHAR,
WEST BENGAL-736165

ANNUAL REPORT, 2017-18

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	Specialisation	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 abskvik@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. 'Review and planning meeting' of **SRFSI** project on 10-13th September, 2017 RDRS Guest House, Rangpur, Bangladesh.
2. Funded by **DAAD** (German Academic Exchange Service) to attend seminar cum training in **Georg-August Universität, Göttingen** (2017) (Dr. S. Deb)

d) AWARDS AND HONOURS:

1. **Adarsh Vidya Saraswati Rashtriya Puraskar Gold Medal Award** (2018), GMC,Ahmedabad (Prof. Dibyendu 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	-

C. 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	1 st
2.	SSC-102	Fundamentals of Soil Science	2+1	Horticulture	1 st
3.	AG 101	Principles of Soil Science	2+1	B.Tech	1 st
4.	SSC 151	Introductory Microbiology	1+1	Agriculture	2 nd

Sl. No.	Course No.	Title	Credit Hours	Faculty	Semester
5.	SSC 153	Agricultural Microbiology	1+1	Horticulture	2 nd
6.	SSC-152	Soil Fertility and Nutrient Management	1+1	"	"
7.	SSC 251	Soil Science I (IVth Dean's Committee)	2+1	Agriculture/Horticulture	4 th
8.	SSC 351	Soil Science II	2+1	Agriculture/Horticulture	6 th
9.	SSC-352	Remote Sensing, GPS & GIS	1+1	Agriculture/Horticulture	6 th

II) ELECTIVE COURSES:

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

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 are 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: 2017-2018

Degree Programme	Department	Intake capacity	Total Enrolment	
			Male	Female
M. S. (Ag.)	SSAC	6	3	3
Ph. D.	SSAC	4*	2	2

* URS- University research scholarship -4.

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

Others (Specify):

VIII) SCHOLARSHIPS, STIPENDS AND FELLOWSHIPS: 1 (scholarship for PhD from International Plant Nutrition Institute).

ix) Students' Placement: Govt: 2* Cooperate: Bank: 1 NGO:

* Assitant Professor

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 : Nil

c) ONGOING RESEARCH PROJECTS :

Sl. No.	Project	Funding agency
1.	Retrieval of Biophysical Parameters in Buxa Tiger Reserve using GISAT	SAC, ISRO
2.	Enhancing Pulses Production for Food and Nutritional Security, Improved Livelihoods, and Sustainable Agriculture in West Bengal	ICARDA-GoWB
3.	Sustainable and resilient farming systems intensification in the eastern Gangetic Plains	ACIAR
4.	Optimising nutrient use efficiency under zero tillage operations in Rice - Maize cropping system in Coochbehar and Maldadistrict of West Bengal.	International Plant Nutrient Institute
5.	To evaluate the bio-efficacy and phytotoxicity of GPH-315 against weed flora in tea	-
6.	Efficacy of Superabsorbent (Zeba) and Zeba coated Urea and DAP on plant N & P contents, growth and yield traits & yield of Mustard crop under field conditions	UPL, Pvt. Ltd
7.	To evaluate the bio-efficacy and phytotoxicity of Iprodione 50% WP against sheeth blight disease in rice	-

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.	Nil			

I. MASTER DEGREE THESIS COMPLETED:

Sl.No.	Title	Year	Author	Chairman
1.	Dynamics of aggregate associated carbon in soils under three ecologies of Northern part of W.B.	2017	Parijat De	Prof. A. Chowdhury
2.	A study to quantify nitrogen response & nitrogen use efficiency in wheat crop under different water management & tillage practice.	"	Samaresh Sahoo	Prof P. Mukhopadhyay
3.	Sorption-desorption characteristics of phosphorus in some soils of West Bengal	"	Basabdutta Bhabai	Prof. D. Mukhopadhyay
4.	Site specific nutrient management impact on some chemical & biological properties of soils of Coochbehar.	"	Dibakar Ray	Dr A.K Sinha
5.	Dynamics of potassium in some soils of Coochbehar districts of West Bengal	"	Navneet Kr Singh	Dr G.C. Banik
6.	Changes in status & distribution of K in wheat soil response to tillage & management under rice - wheat cropping system.	"	Nirmal Barman	Prof P. Mukhopadhyay

**J. SEMINAR, SYMPOSIUM, CONFERENCE, TRAINING AND WINTER/
SUMMER/ REFRESHER COURSE/SHORT COURSE ATTENDED/
ORGANIZED**

Sl.No.	Seminar, Symposium, Conference, Training and Winter/Summer/Refresher course/short course	Faculty associated	Date	Venue
1.	Annual convention of the Indian Society of Soil Science	Prof. D. Mukhopadhyay	December -, 2017	Amity university, Kolkata
2.	National workshop on Innovative Nutrient Stewardship: concept, principles and applications	Prof. D. Mukhopadhyay, Prof. A. Chowdhury Dr. A. K. Sinha, Dr. G.C. Banik, Dr. S. Deb, Dr. A. Tamang	26 - 28 March, 2018	UBKV, Pundibari
3.	CAFT training on Conservation Agriculture and Soil Health	Dr. G. C. Banik	November 1-21, 2017	PAU, Ludhiana
4.	International conference on "Contemporary Issues in Integrating Climate-The Emerging Areas of Agriculture, Horticulture, Biodiversity, Forestry; Engineering Technology, Fundamental/Applied Science and Business Management for Sustainable Development"	Dr. A. Tamang	11-12 th , May	Kalimpong, Darjeeling, West Bengal
5.	National Conference on "Nutrient and pollutants in soil-plant-animal human continuum for sustainable soil, food and nutritional security-way forward"	Dr. A. Tamang	9-10 th June	BCKV, Kalyani West Bengal

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. Roy, S.K. , Barman, K.K. and **Mukhopadhyay, D.** (2018). Stability of organo – zinc complex in application of inorganic and organic nutrients to rice (*Oryza sativa*) growing soils of West Bengal (India). ***International Journal of Chemical Studies***. 6(2):2157 – 2164
2. Development of Analytical Method for Soil Organic Carbon; Rapid, Reliable, user-Friendly and Economical for Remote Areas. **Amrit Tamang**, Partha Sarathi Patra, Parimal Panda, Manoj Kanti Debnath, Gobinda Mula and Ranjan Kumar Basak. *Asian Journal of Soil Science" Vol 13 No. 1*, (June, 2018).
3. Shovik Deb, Manoj K. Debnath, Somsubhra Chakraborty, David C. Weindorf, Deo Kumar, Dibyendu Deb and **Ashok Choudhury**. (2018). Anthropogenic impacts on forest land use and land cover change: Modelling future possibilities in the Himalayan Terai. *Anthropocene*. **21**: 32-41.
4. Partha Sarathi Patra, Shyamal Kheroar, **Ashok Choudhury**, and Rajesh Saha, (2017). Responses of split application of nitrogen on the performance of *Kharif* rice (*Oryza sativa* L.) in Terai zone of West

- Bengal. *Asian J. Soil Sci.*, **12** (2): 265-270: **DOI: 10.15740/HAS/AJSS/12.2/265-270.**
5. Partha Sarathi Patra, Md Aziz, Rajesh Saha and **A. Choudhury** (2017). Bio-efficacy of Bispyribac acid 40% SC against weed flora in Rice (*Oryza Sativa* L). *International journal of tropical Agriculture*. **35(2)**: 259-265. Bisweswar Mahato, Somsubhra Chakraborty, D.P. Ray, Parimal Panda, Bappa Paramanik, Naba Kishor Mahato, Arindam Kundu, Anarul Hoque and **Ashok Choudhury** (2017). Evaluation of chemical and biological indices for carbon and nitrogen mineralization of various organic matters used in tea garden. *International Journal of Bioresource Science*. **4 (1)**: 47-56. DOI : [10.5958/2454-9541.2017.00009.3](https://doi.org/10.5958/2454-9541.2017.00009.3)
 6. Parimal Panda, Bisweswar Mahato, Somsubhra Chakraborty, Bappa Paramanik, Ranajit Panda, Naba Kishor Mahato, Arindam Kundu, Abhijit Mahato and **Ashok Choudhury**(2017). Organic Phosphorus Mineralization by Isolated Phosphorus Solubilizing Fungi. *Journal of Agriculture and Technology*.
 7. Puspendu Bikash Bag, Parimal Panda, Bappa Paramanik, Bisweswar Mahato and **Ashok Choudhury**. (2017). Atmospheric nitrogen fixing capacity of Azotobacter isolate from Cooch Behar and Jalpaiguri Districts soil of West Bengal. *International Journal of Current Microbiology and Applied Sciences*.**6 (3)**: 1775-1788. DOI: <https://doi.org/10.20546/ijcmas.2017.603.204>
 8. Valeria Cardelli, David C. Weindorf, Somsubhra Chakraborty, Bin Li, Mauro De Feudis, Stefania Cocco, Alberto Agnelli, **Ashok Choudhury**, Deb Prasad Ray, Giuseppe Corti (2017). Non-saturated soil organic horizon characterization via advanced proximal sensors. *Geoderma*, **288**: 130-142. (Elsevier) <http://dx.doi.org/10.1016/j.geoderma.2016.10.036>.
 9. Panda Parimal, **Choudhury Ashok**, Chakraborty Somsubhra, Ray Deb Prasad, Deb Shovik, Patra ParthaSarathi, Mahato Bisweswar, Paramanik Bappa, Singh AnilKumar, Chauhan Rajesh Kumar. (2017). Phosphorus Solubilizing Bacteria from Tea Soils and their Phosphate Solubilizing Abilities. *International Journal of Bioresource Science*. **4 (2)**: 113-125. DOI : [10.5958/2454-9541.2017.00018.4](https://doi.org/10.5958/2454-9541.2017.00018.4)
 10. Somsubhra Chakraborty, David C. Weindorf, Shovik Deb, Bin Li, Sathi Paul, **Ashok Choudhury**, Deb Prasad Ray. (2017). Rapid assessment of regional soil arsenic pollution risk via diffuse reflectance

spectroscopy. *Geoderma*, **289**: 72–81. (Elsevier)
<http://dx.doi.org/10.1016/j.geoderma.2016.11.024>

11. **Deb, S.***, Mandal, B., Bhadoria, P.B.S., Schulz, E., Ghosh, S., Debnath, M.K. (2018) Microbial biomass and activity in relation to accessibility of organic carbon in saline soils of coastal agro-Ecosystem. *Proceedings of the National Academy of Sciences India Section B: Biological Sciences* 88: 633-643. [Springer]
12. Deepranjan Sarkar, S. Rakesh, **A. K. Sinha** and **P. Mukhopadhyay**. Forms of Phosphorus in Some Acidic Entisols of Subtropical Eastern India.(2017). *International Journal of Plant & Soil Science*. 19(3): 1-9.
13. A Patra, **AK Sinha**, Rakesh S, S Biswas and **P Mukhopadhyay**.2018. Different fractions of boron in soils of Alfisol and Entisol of West Bengal. *Journal of Pharmacognosy and Phytochemistry*. 7(1): 510-513.
14. N. Sathi Babu¹, **A.K. Sinha**, P.S. Medda and A. Ghosh.2017. Impact of Potassium-Boron Interaction on Leaf Nutrient Content and Nut Setting of Coconut. *Int.J.Curr.Microbiol.App.Sci*. 6(12): 4025-4037

Papers Presented In Symposia, Conference, etc.

1. Parijat De^{1*}, Shovik Deb¹, Somsubhra Chakraborty², Parimal Panda¹, Deo Kumar¹, Arjun Murmu¹ 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.
2. Arjun Murmu^{1*}, Shovik Deb¹, Deo Kumar¹, Parijat De¹, Somsubhra Chakraborty² 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.
3. 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.
4. Shovik Deb^{1*}, Somsubhra Chakraborty², Arjun Murmu¹, Parijat De¹, Deo Kumar¹ 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.
 5. 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.
 6. 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.
 7. Rakesh S, A.K. Sinha, P Mukhopadhyay and S Biswas. Partial nutrient balance in rice-wheat cropping sequence under the influence of tillage, residue and bio fertilizer. 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.

ii) POPULAR ARTICLES- Nil

iii) BOOK CHAPTERS-

- a) Rakesh S and A.K.Sinha.2017. 'Dynamics of Carbon fractions & their behavior in soil system as influenced by tillage & cropping sequence.' In *Innovative approach of Integrated Resource management*. Pg. 138-141.

iv) BOOKLETS- NIL

L. ANY OTHER (ACHIEVEMENT)

Department of Soil Science and Agriculture Chemistry under the faculty of Agriculture of Uttar Banga Krishi Viswavidyalaya in collaboration with International Plant Nutrition Institute, Canada organised a National workshop at UBKV main campus in Pundibari, W.B. during 26th - 28th March, 2018. Eminent speakers in the field of Soil Science and Agronomy delivered lecture to the scientists, P.G. students and industry persons.