

Brief Bio-data

1. **Name:** Dr. Reginald Ebhin Masto

2. **Date of Birth:** 12 May 1977

3. Current Position and Address (Include Email ID and Contact Number):

Senior Principal Scientist

Head, Environment, Emission & CRM Section/ Head e-services,

CSIR- Central Institute of Mining and Fuel Research (Digwadih Campus),

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4. Educational qualifications: (Graduation and above)

Sl. No.	Degree	Year of Passing	University/Institute	Subject
1.	B.Sc	1998	Tamil Nadu Agricultural University, Coimbatore	Agriculture
2.	M.Sc	2000	Acharya NG Ranga Agricultural University, Hyderabad	Soil Science & Agricultural Chemistry
3.	PhD	2004	Indian Agricultural Research Institute, New Delhi	Soil Science & Agricultural Chemistry

5. Work experience:

Designation	Institute/company	From	To	Nature of Work
Lecturer	Birla Institute of Technology, Mesra, Ranchi	01/04/2004	06/01/2005	Research & Development
Scientist -B	CSIR-CIMFR(CFRI)	20/01/2005	19/01/2008	
Scientist- C	CSIR-CIMFR	20/01/2008	19/01/2011	
Senior Scientist	CSIR-CIMFR	20/01/2011	19/01/2015	
Principal Scientist	CSIR-CIMFR	20/01/2015	19/01/2019	
Senior Principal Scientist	CSIR-CIMFR	20/01/2019	continue	

6. Work Area(s)/ Specialization:

- ❖ Assessment of soil quality in the vicinity of coal based industries. Human health risks assessment from potentially toxic elements and PAHs.
- ❖ PAH emission from coal fired power plants.
- ❖ Preparation of potassium fertilizer from biomass combustion residues and spent wash incineration ash.
- ❖ Preparation of nitride based slow release fertilizers from coal ash, coal washery rejects and other industrial wastes.
- ❖ Biochar preparation from biomass wastes and their use for soil amendment.
- ❖ Fly ash use in agriculture.
- ❖ Soil quality and ecosystem development in post mining land.

7. Major contributions: (Max. 100 words):

Significant contributions are development of soil quality index and its application in post mining land, apparatus for biochar preparation from waste biomass and agricultural residues, studies on carbon storage in mine land, fly ash use for soil remediation, and development of novel fertilizers from coal and biomass ash. The process for preparation of potassium fertilizer is being upscaled at an industrial site. Current research interest are nitride based slow release fertilizer, preparation and adoption of standards for solid biofuels, exploration of lithium and other valuable elements, ecosystem development in post mining lands, development of certified reference materials for coal.

8. No. of Research Publications: 92

- **Papers in Journals: 80 (SCI) + 12 (National)**

- **In conference proceedings: About 100**

- **Invited lectures delivered:**

Abroad

1. Delivered an invited lecture on 'Soil Carbon Sequestration with Biochar' at the Department of Geological Sciences, University of Florida, USA, on 12 July 2017.

India

2. Invited lecture on 'Polycyclic aromatic hydrocarbons in coal and their emission during combustion' 'International Workshop on Tools and Techniques in Air Quality and Health Impacts Assessment' held at Visva-Bharati University, Santiniketan during 23-25 November, 2019.
3. Keynote address on 'Soil quality responses to anthropogenic interventions'. National Seminar on Environmental Issues: Protection, Conservation and Management, 22 – 23 November 2013. Visva-Bharati University, Santiniketan.
4. Invited lecture on "Heavy metals in fly ash: chemical fractionation, leaching and exposure risk from consumption of crop produce", Workshop on "Safe Utilization of Fly Ash in Agriculture" at ICAR-IISS, Bhopal on 31st August 2016, jointly organized by ICAR-IISS and NTPC Ltd, Noida.

- **List of best 05 publications**

1. Reginald E. Masto*, Ankita Pandit, Sandeep Kumar, Sreemanta Datta, Sangeeta Mukhopadhyay, Vetrivel A. Selvi, Pashupati Dutta, Pinaki Sarkar, 2020. Comparative evaluation of aquatic biomass feedstocks for energy application and potential for extraction of plant nutrients from their ash, Biomass and Bioenergy, 142, 105783, <https://doi.org/10.1016/j.biombioe.2020.105783>
2. S Mukhopadhyay, RE Masto*, A Yadav, J George, LC Ram, SP Shukla. 2016. Soil quality index for evaluation of reclaimed coal mine spoil. Science of The Total Environment, 542, 540-550
3. Masto, R.E. *, Sarkar, E., George, J., Jyoti, K., Dutta, P. and Ram, L.C., 2015. PAHs and potentially toxic elements in the fly ash and bed ash of biomass fired power plants. Fuel Processing Technology, 132, pp.139-152.
4. Ram LC*, Masto RE* (2014) Fly ash for soil amelioration: A review on the influence of ash blending with inorganic and organic amendments. Earth Science Reviews, 128, 52-74
5. Sinha, S., Masto*, R.E., Ram, L.C., Selvi, V.A., Srivastava, N.K., Tripathi, R.C. and George, J., 2009. Rhizosphere soil microbial index of tree species in a coal mining ecosystem. Soil Biology and Biochemistry, 41(9), pp.1824-1832.

- **Books/Chapters authored/edited:**

- ❖ Ashok K. Singh, Reginald Ebin Masto, Bodhisatwa Hazra, Joan Esterle, Pradeep K. Singh. 2020. Ash from Coal and Biomass Combustion, 118 pages, Springer Nature (ISBN: 978-3-030-56980-8)

9. List of 5 Major Contract R&D Projects:

1. Ecosystem development in post mining site along climatic gradient across India (CSIR-Czech Academy of Sciences Bilateral Project, Rs. 28.0 lakhs).
2. Mission mode project on 'Lithium content in coal and biomass ash and its potential for extraction (CSIR, Rs. 100 lakhs).
3. Mission mode programme on commercial deployment of salt and potash technologies to augment national capability, CSIR mission project (Rs 350.0 lakhs)
4. Assessment of Risks to Human Health from Soil Contamination in Coalfields: Development of Soil Guidelines values, Indicators and Evaluation Framework (CSIR Network, Rs. 262.00 lakhs)
5. Bio-char from crop residues/ agro wastes, a novel material for long-term soil carbon sink: Assessment of carbon sequestration potential, its stability and impact on soil health and nutrient cycling. (DST Fast Track for young scientist, Rs. 15.48 lakhs)

10. (a) Name of Patents/Copyrights applied /granted/commercialized:

- 1) R E Masto, L C Ram, P Dutta, T B Das, A Mukherjee, V A Selvi, S K Takur, Joshy George. 2016. Slow release potassium fertilizer from combustion wastes of biomass based power plants (India Patent App no. 201611041058).
- 2) Vetrivel Anguselvi, Lal Chand Ram, R Ebin Masto, Parivesh Chugh, Renu Sinha. 2016. Process for sequestration of CO₂ and traces of hydrocarbon from natural gas processing industry by micro algae (Indian Patent Application No: 201611036660).
- 3) Vetrivel Anguselvi, Ashish Mukherjee, Ashok Kumar Singh, Pradeep Kumar Singh, Reginald Ebin Masto, Piyush Srivastava, Rajiv Satyakam, Pranay, Satya Prakash. A Process For The Preparation Of Bio-Methane And Value Added Products From Coal Mill Rejects By Rare Archaea (Indian Patent Filing no: 0149NF2019).

(b) Technologies/Products /knowhow/Services developed:

1. A process for sequestration of CO₂ and traces of hydrocarbon from natural gas processing industry using microalgae
2. Fly ash for reclamation of soil, mine spoil and degraded land.
3. Process for conversion of organic waste and coal mill rejects to methane.

Products

1. Slow release potassium fertilizer from combustion wastes of biomass based power plants
2. An apparatus for preparation of biochar from agricultural residues and organic wastes.
3. Rural mobile gasification plant for conversion of coal fines, washery effluents and animal wastes to biogas for domestic cooking.

11. Honors/Awards/Recognitions/Fellowships/Scholarships/Professional Memberships received:

1. National Geoscience Award, 2016, Ministry of Mines, Government of India. (awarded on 12 April 2017).
2. CSIR Raman Research Fellowship (2017) for deputation to Pacific Northwest National Laboratory (US Department of Energy), USA for development and evaluation of nitride based slow release fertilizer from fly ash.
3. NAAS Associates (2016), National Academy of Agricultural Sciences, New Delhi.

4. Established Scientists Travel Award for participation in European Geosciences Union, 2016.
5. CSIR Young Scientist Award 2012 for outstanding contributions to the study of soil quality in coal industrial areas, fly ash and soil carbon sequestration through biochar.
6. CSIR International Travel support for attending conference 'ISES 2009 Annual Conference: Transforming Exposure Science in the 21st Century" Minneapolis, USA, 5 days (1-5 Nov, 2009).
7. DST travel support for attending conference 'ISES 2009 Annual Conference: Transforming Exposure Science in the 21st Century" Minneapolis, USA, 5 days (1-5 Nov, 2009).SERB Travel Support for participation in the European Geosciences Union General Assembly to be held at Vienna, Austria from 17 – 22 April 2016.
8. DST Young Scientist – Project proposal on 'Soil Carbon Sequestration" submitted under the Fast Track Scheme for Young Scientists, Department of Science & Technology, New Delhi 2008.
9. Junior Research Fellowship (JRF)- ICAR (11th Rank).
10. Senior Research Fellowship (SRF) – ICAR (1st Rank).
11. Best outgoing student of Indian Agricultural Research Institute (2004) for overall outstanding performance in PhD programme from IARI, New Delhi, awarded at the 43rd Convocation held on February 11, 2005.
12. Suniti Bala Raichaudhuri Medal (2004-05) for academic excellence in PhD programme awarded by IARI, New Delhi.
13. Dr. S. P. Raichaudhuri Gold Medal- 2004-05, awarded by the Indian Society of Soil Science, New Delhi.
14. Best Doctoral Research Presentation Award (Indian Society of Soil Science- North zone)- 2004, second prize- awarded by HISAR Chapter of the Indian Society of Soil Science.
15. Prof. V.V Kumara Sastry Memorial Gold Medal- (2000-02) for securing the highest OGPA awarded by Acharya N. G. Ranga Agricultural university, Hyderabad, at the 34th Annual convocation held on 3rd April 2002.
16. FACT Medal- (1994-2000) for securing the highest OGPA in Soil Science courses awarded by Tamil Nadu Agricultural University.
17. International Society for Exposure Science (ISES) Travel Award (2200 USD), for attending the conference "21st Annual ISES conference: Advancing Exposure Science for Environmental Health" held at Baltimore, Maryland, USA, from 23-27 October, 2011, International Society for Exposure Science (ISES), USA, 2011.
18. Associate Editor, Land Degradation and Development, Wiley (NAAS Rating 10.28).
19. Best paper award- for the paper 'Phosphorus adsorption, fixation and fractions in fly ash and ash amended acid soil', presented in the 'Fly Ash India-2005, International Congress' held at New Delhi during Dec.4-7, 2005.
20. Best Poster Presentation Award-2002, - Indian Society of Soil Science for the paper on "Molybdenum in soils of high altitude areas of Andhra Pradesh", awarded at the 67th annual Convention of the Society, on 14th November 2002.

12. Societal Contributions

- ❖ The process for conversion of agricultural wastes into biochar and preparation of potassium fertilizer from biomass ash will be helpful to the farmers.
- ❖ Installed a biogas plant at Gaurigram Village (near CSIR-CIMFR). This reactor uses low grade coal, washery effluent/wastes and biomass as feed.