SHIVESH KARAN

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Work Experience

May 2023-Present **Research Scientist**
Geomatics, Norwegian Institute of Bioeconomy Research (NIBIO), Ås, Norway

April 2021-May 2023 **Postdoctoral researcher**
Energy & Technology, Swedish University of Agricultural Sciences, Uppsala, Sweden
- Developed a spatial dataset on global crop residue production and biochar carbon sequestration potential in collaboration with The Nature Conservancy and Cornell University.
- Led a study on biochar prioritization in the Swedish arable land.
- Performed life cycle analysis for deploying biochar in Swedish agriculture.

March 2019-October 2020 **Postdoctoral research engineer**
Toulouse Biotechnology Institute, Institut National des Sciences Appliquées de Toulouse, France
Responsible for research objective 1 of the *make our planet great again project* Cambioscop.
- Developed a method for spatial quantification of primary forestry residue at high resolution with uncertainty accounting.
- Tested the reliability of different crop residue estimation models.
- Quantified the potential and developed a spatial inventory of residual biomass in France.
- Performed environmental impact assessment using life cycle analysis of the current uses of residual biomass in France.

July 2014-January 2019 **Ph.D. student[1] and teaching assistant**
Environmental Science & Engineering, Indian Institute of Technology, Dhanbad, India
Dissertation title: *Development of a spatially explicit framework for vulnerability assessment of water resources due to coal mining in India*
- Developed a process-based multi-criteria spatial model for risk assessment of water resources due to coal mining.
- Nine first authored international publications from Ph.D. study.
- Developed teaching materials, laboratory practice materials, and problem sets for undergraduate and graduate students.
- Supervised six master's theses.
- Scientific consultancy work for companies.
- Instructor for remote sensing and GIS course.

Education

September 2019 **Ph.D.** *Environmental Science and Engineering*
Indian Institute of Technology (ISM), Dhanbad, India

June 2014 **Master of Technology,** *Environmental Science and Engineering* **First Class**
Indian School of Mines[2], Dhanbad, India

May 2012 **Bachelor of Engineering,** *Computer Science and Engineering* **First Class with Distinction**
Visvesvaraya Technological University, Belgaum, India

[1] Thesis submitted for evaluation in January 2019, Ph.D. defense in August 2019 and degree awarded in September 2019.

[2] Name changed to Indian Institute of Technology (Indian School of Mines), Dhanbad vide Government of India notification.

Professional Skills

GIS applications	ArcGIS Suite, QGIS, ERDAS, ENVI, Ecognition Developer
Programming	Python for spatial data analysis and LCA, Google Earth Engine, PostgreSQL/PostGIS
Others	Remote Sensing, SimaPro and activity browser for LCA, Microsoft office suite

Project Experience

Jan 2022-
Sep 2022

Project name: Mistra Food Futures https://mistrafoodfutures.se/ **Role:** Postdoctoral Researcher
Part of a team that produced a report providing insights into reducing the climate impacts of Swedish agriculture and food through biochar deployment. This was done through a life cycle assessment (LCA), where biochar was produced from straw and used in crop production. In addition, a discussion on the potential and sustainability of biochar in Swedish agriculture and food systems was also provided. Link to report.

Mar 2019-
Oct 2020

Project name: Cambioscop https://cambioscop.cnrs.fr/ **Role:** Postdoctoral Researcher
Developed baseline for French residual biomasses. The baseline included spatial quantification of residual resources and environmental impact assessment of their current use.

Scholarships

2014 – 2019

Junior Research Fellowship
Fellowship provided by the Ministry of Education of the Government of India to pursue a Ph.D. in Engineering in India. Ranked #1 for the fellowship in Environmental Science and Engineering discipline for the year 2014 at the Indian Institute of Technology, Dhanbad (Award# 2014DR0190). Total award during the period ₹ 1,662,000 ($ 26,806) [$1= ~₹62 in 2014].

2012 – 2014

Graduate Aptitude Test in Engineering (GATE) fellowship
Fellowship provided by the Ministry of Education of the Government of India to pursue a master's degree in engineering. (Award# 2012MT0140). Total award during the period ₹ 192,000 ($ 3490) [$1= ~₹55 in 2012].

Other information

Languages	Bilingual: English & Hindi, B2 (Oral) in Norwegian
ORCID	https://orcid.org/0000-0002-0037-6759
Google scholar	https://scholar.google.com/citations?user=WpCOF2oAAAAJ&hl=en&oi=ao
Reviewer for journals	Peer reviewed 69 articles (Web of science record)
Date of birth	24-March-1991
Nationality	Indian
Residency	Norway (May 23- Present), Sweden (Feb 21 – May 23), France (Mar 19 – Dec 20).

Publications (Peer-Reviewed)

To see the full list of publications please visit my google scholar profile or ResearchGate profile.

1. **Karan, S. K.,** Pedersen, C., Sickel, H. and Dramstad, W. E. (**2025**). Semi-natural habitats, red-listed plants and abandonment in Norway: patterns and a screening approach for prioritization. **Ecological Indicators** (Elsevier), 180:114324. https://doi.org/10.1016/j.ecolind.2025.114324
2. **Karan, S. K.,** Borchsenius, B. T., Debella-Gilo, M. and Rizzi, J. (**2025**). Mapping urban green structures using object-based analysis of satellite imagery: a review. **Ecological Indicators** (Elsevier), 170:113027. https://doi.org/10.1016/j.ecolind.2024.113027
3. Javourez, U., **Karan, S. K.,** and Hamelin, L. (**2024**). Residual biomasses at scale: Ensuring future bioeconomy uses outperform current baseline. **Science of the Total Environment** (Elsevier), 949:174481. https://doi.org/10.1016/j.scitotenv.2024.174481
4. **Karan, S. K.,** Woolf, D., Azzi, E. S., Sundberg, C., and Wood, S. A. (**2023**). Potential for biochar carbon sequestration from crop residues: a global spatially explicit assessment. **Global Change Biology Bioenergy** (Wiley), 15(12), 13102. https://doi.org/10.1111/gcbb.13102

5. Singh, V., **Karan, S. K.,** Singh, C., and Samadder, S. R., (**2023**). Assessment of SWAT model to predict surface runoff in open cast coal mining areas. **Environmental Science and Pollution Research** (Springer Nature). https://doi.org/10.1007/s11356-022-25032-y
6. **Karan, S. K.**, Osslund, F., Azzi, E.S., Karltun, E. and Sundberg, C., (**2023**). A spatial framework for prioritizing biochar application to arable land: a case study for Sweden. **Resources, Conservation & Recycling** (Elsevier). 189:106769 https://doi.org/10.1016/j.resconrec.2022.106769
7. Shen, Z., Tiruta-Barna, L., **Karan, S. K.**, and Hamelin, L. (**2022**). Simultaneous Carbon Storage in Arable land and Anthropogenic Products (CSAAP): demonstrating an integrated concept towards well below 2°C. **Resources, Conservation & Recycling** (Elsevier). 182:106293 https://doi.org/10.1016/j.resconrec.2022.106293
8. Singh, C., **Karan, S. K.,** Sardar, P., and Samadder, S. R. (**2022**). Remote sensing-based biomass estimation of dry deciduous tropical forest using machine learning and ensemble analysis. **Journal of Environmental Management** (Elsevier). 308:114639 https://doi.org/10.1016/j.jenvman.2022.114639
9. **Karan, S.K.,** and Hamelin, L. (**2021**). Crop residues may be a key feedstock to bioeconomy but how reliable are current estimation methods? **Resources, Conservation & Recycling** (Elsevier), 164:105211 https://doi.org/10.1016/j.resconrec.2020.105211
10. **Karan, S. K.,** and Hamelin, L. (**2020**). Towards local bioeconomy: A stepwise framework for high-resolution spatial quantification of forestry residues. **Renewable and Sustainable Energy Reviews** (Elsevier), 134:110350 https://doi.org/10.1016/j.rser.2020.110350
11. **Karan, S. K.,** and Ghosh, S., and Samadder, S. R. (**2019**). Identification of spatially distributed hotspots for soil loss and erosion potential in mining areas of Upper Damodar basin-India. **Catena (**Elsevier**)**, 182:104144 https://doi.org/10.1016/j.catena.2019.104144
12. **Karan, S. K.,** and Samadder, S. R. (**2018**). A comparison of different land-use classification techniques for accurate monitoring of degraded coal-mining areas. **Environmental Earth Sciences** (Springer Nature)**,** 77:713. https://doi.org/10.1007/s12665-018-7893-5
13. **Karan, S. K.,** Singh, V., and Samadder, S. R. (**2018**). Groundwater vulnerability assessment in degraded coal mining areas using AHP-Modified DRASTIC model. **Land Degradation and Development** (Wiley), 29: 2351-2365 https://doi.org/10.1002/ldr.2990
14. **Karan, S. K.,** and Samadder, S. R. (**2018**). Improving accuracy of long term land use change in coal mining areas using wavelets and support vector machines. **International Journal of Remote Sensing** (Taylor & Francis), 39: 84-100. https://doi.org/10.1080/01431161.2017.1381355
15. **Karan, S. K.,** and Samadder, S. R. (**2018**). Dual-Tree Complex Wavelet Transform based image enhancement for accurate long term change assessment in coal mining areas. **Geocarto International** (Taylor & Francis), 33: 1084-1094 https://doi.org/10.1080/10106049.2017.1333534
16. **Karan, S. K.,** Kumar, A., and Samadder, S. R. (**2017**). Evaluation of geotechnical properties of overburden dump for better reclamation success in mining areas. **Environmental Earth Sciences** (Springer Nature), 76:770. https://doi.org/10.1007/s12665-017-7116-5
17. **Karan, S. K.**, Samadder, S. R., and Maiti, S. K. (**2016**). Assessment of the Capability of Remote Sensing and GIS Techniques for Monitoring Reclamation Success in Coal Mine Degraded Lands. **Journal of Environmental Management** (Elsevier), 182: 272-283. https://doi.org/10.1016/j.jenvman.2016.07.070
18. **Karan, S. K.,** and Samadder, S. R. (**2016**). Accuracy of Land use Change Detection using Support Vector Machine and Maximum Likelihood Techniques for Open Cast Coal Mining Areas. **Environmental Monitoring and Assessment** (Springer Nature), 188:486. https://doi.org/10.1007/s10661-016-5494-x
19. **Karan, S. K.,** and Samadder, S. R. (**2016**). Reduction of the spatial distribution of risk factors for the transportation of contaminants released by coal mining activities. **Journal of Environmental Management** (Elsevier), 180: 280-290. https://doi.org/10.1016/j.jenvman.2016.05.042