



## **CURRICULUM VITAE**

### **DEEP CHANDRA SUYAL**

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“Suyal Niwas”, D-46, H.M.T.- Nelium Colony,  
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### **OBJECTIVE**

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To accept the challenges and achieves success in all sphere of the profession by holding a position with responsibility in an organization and explore efficient innovative ideas.

### **AREA OF INTEREST**

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Microbiology and Biotechnology, Microbial genomics and proteomics, Microbial ecology

### **EDUCATIONAL QUALIFICATIONS**

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<b>Qualification</b>	<b>Board/ University</b>	<b>Institution</b>	<b>Year of passing</b>	<b>Division</b>	<b>Percentage</b>
<b>Ph.D.</b> Microbiology (Major) Molecular Biology & Biotechnology (Minor)	GBPUAT Pantnagar	C.B.S.H.	2014	I <sup>st</sup>	83.10%
<b>M.Sc.</b> (Microbiology)	GBPUAT Pantnagar	C.B.S.H.	2010	I <sup>st</sup>	83.30%
<b>B. Sc.</b> (C.B.Z.)	Kumaun University Nainital	S.S.J. Campus, Almora	2008	I <sup>st</sup>	75.40 %
<b>12<sup>th</sup></b>	C.B.S.E.	PPJ Saraswati Vihar, Nainital	2005	I <sup>st</sup>	69.40 %
<b>10<sup>th</sup></b>	C.B.S.E.	PPJ Saraswati Vihar, Nainital	2003	I <sup>st</sup>	76.60 %

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## ADDITIONAL QUALIFICATIONS

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- **Certificate course in Organic Farming (2020)** from Uttarakhand Open University, Haldwani, Uttarakhand.
- **M.Sc. Botany (2019)** from Uttarakhand Open University, Haldwani, Uttarakhand with 68.9% marks.

## RESEARCH CURRICULUM

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- **Ph.D. Thesis (2014)** entitled, “**Molecular diversity of cold adapted diazotrophs from Indian Kumaun Himalayan agro-ecosystem and their characterization**” under the supervision of *Dr. Reeta Goel*, Prof. & Head, Department of Microbiology, CBSH, G. B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttarakhand.
- **M.Sc. Thesis (2010)** entitled, “**Isolation and characterization of intracellular phytase producing budding yeast**”, under the supervision of *Dr. Lakshmi Tewari*, Prof., Department of Microbiology, CBSH, G. B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttarakhand.

## PARTICULARS OF EXPERIENCES

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- **Assistant Professor**, at the Department of Microbiology, Eternal University, Baru Sahib, Sirmour-173001, Himachal Pradesh, INDIA. (16<sup>th</sup> Aug. 2019- continue)
- **Young Scientist in SERB funded**, a project entitled “**Proteome Analysis of Himalayan Cold Adaptive Diazotrophs**” at the Department of Microbiology, College of Basic Sciences & Humanities, G. B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttarakhand, INDIA. (7<sup>th</sup> Dec. 2015- 6<sup>th</sup> Dec. 2018)
- **Junior Research Fellow in DBT funded, an Indo-European collaborative research project** entitled, “**SAHYOG**” at the Department of Microbiology, College of Basic Sciences & Humanities, G. B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttarakhand, INDIA. (1<sup>st</sup> July 2014 - 31<sup>st</sup> March 2015)
- **Senior Research Fellow in ICAR funded, NBAIM project** entitled, “**Microbial Genomics**” at the Department of Microbiology, College of Basic Sciences & Humanities, G. B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttarakhand, INDIA. (26<sup>th</sup> Aug. 2010 – 3<sup>rd</sup> Jan.12)
- **Graduate Teaching Assistant for three courses “Microbiological Techniques (BBM-300); Introductory Microbiology (BBM-300) and Application of Microbial Methods (BBM-610)** at the Department of Microbiology, College of Basic Sciences & Humanities, G. B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttarakhand, INDIA. (IInd Semester, 2008-09 to IInd Semester, 2009-10)

## RESEARCH PROJECTS

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- Recipient of SERB funded project entitled “**Proteome Analysis of Himalayan Cold Adaptive Diazotrophs**” (File N. YSS/2015/001214) as PI. (Duration: 2015-2018) (Total funding: 31.20 Lakh)

## AWARDS

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- Young Scientist award in 13<sup>th</sup> Uttarakhand State Science and Technology Congress 2018-19.
- Best oral presentation award in the 9<sup>th</sup> conference of Indian Science Congress Association (Haridwar Chapter)
- Uttarakhand Governor's best research award\*
- ARS NET (Agricultural Microbiology)
- CSIR NET (Life Science)
- U-SET (Life Science)
- CSIR Foreign Travel Grant No. "TG/8559/14-HRD and "CICS International Travel Support" No. DO/IR./TF-II/2014-15 for participating in International Microbiology Congresses-2014 of International Union of Microbiological Societies (IUMS).
- Kumaun University, SSJ Campus meritorious student award, and certificate (2007-08)

\* awarded to the research paper Suyal et al. 2017.

## PATENTS

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- **Suyal D.C.**, Joshi D., Kumar S., Soni R., Goel R (2019) CowN, Nitrogen fixation sustaining protein, as biomarker for screening of diazotrophic bacteria under nitrogen deficiency at low temperature conditions. **(Filed)**  
Application No. 201911037172, Dated- 16/09/2019
- Debarma P., Zaidi M.G.H, **Suyal D.C.**, Kumar S., Goel R (2018) Process of e-waste biodegradation in the presence of bacterial consortium. **(Published)**  
Application No. 201811049946, Dated- 31/12/2018  
Publication No. 27/2020; Dated- 03/07/2020
- Kumar S, **Suyal D.C.**, Goel R (2018) Polyvinylidene Fluoride (PVDF) membrane diffusion chamber for isolation of cold adapted bacterial species. **(Published)**  
Application No. 201811035410, Dated- 20/09/2018  
Publication No. 13/2020; Dated-27/03/2020

## COUNTRIES VISITED

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- Belgium
- Italy

## MEMBERSHIPS

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- Life membership of Association of Microbiologists of India; No. 2633/2010
- Life membership of Society of Biological Chemists, India; No. 3280/2014

## TECHNICAL EXPOSURE

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### Microbiology:

- All the basic techniques in microbiology including isolation, handling, and maintenance of bacterial and fungal strains.
- Aseptic techniques, sterilization, inoculation, and incubation.
- Colony counting, hemocytometer counting, Simple and differential staining, etc.

- Simple and Compound Microscopy, Electron Microscopy, Lyophilization, Sonication.
- UV-VIS Spectrophotometer, Centrifugation.
- ✚ **Biochemical Techniques**
  - Biochemical Characterization of microbial cultures, BIOLOG, FAME analysis.
  - Qualitative and quantitative estimation of carbohydrates, proteins and fats.
- ✚ **Molecular Biology & Biotechnology**
  - Genomic material isolation from Bacteria/Fungi (DNA, RNA or Plasmid)
  - Metagenomics, Metaproteomics
  - PCR, Real-Time PCR
  - Agarose gel electrophoresis and documentation,
  - Protein extraction & purification, Native & SDS PAGE, 2D-electrophoresis
  - Gene cloning and analysis
  - DGGE & TGGE
  - In silico analysis of nucleotide and amino acid sequences, database mining and phylogenetic analysis.
- ✚ **Chromatographic Techniques**
  - TLC, HPLC, Ion exchange chromatography
- ✚ **Statistical tools:**
  - ANOVA, Principal Component Analysis, t-test, chi-square test, RBD, Correlation and Regression coefficient, ORIGIN, SPSS, etc.

## PUBLICATIONS

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**Research Papers (International)– 25 (Cumulative impact factor: 41.459)**

**Book Chapters - 14**

**Edited book – 1**

### Research Papers

1. Kumar S., **Suyal D.C.**, Yadav A., Shouche Y., Goel R. (2020) Psychrophilic *Pseudomonas helmanticensis* proteome under simulated cold stress. Cell Stress and Chaperones. DOI: 10.1007/s12192-020-01139-4. **(I.F. 2.892) (NAAS rating 8.90)**
2. **Suyal D.C.**, Joshi D., Kumar S., Soni R., Goel R. (2019) Differential protein profiling of soil diazotroph *Rhodococcus qingshengii* S10107 towards low-temperature and nitrogen deficiency. *Scientific Reports*. 9(20378):1-9 DOI : 10.1038/s41598-019-56592-8. **(I.F. 3.998) (NAAS rating 10.01)**
3. **Suyal D.C.**, Kumar S., Joshi D., Yadav A., Shouche Y., Goel R. (2019) Comparative overview of red kidney bean (*Phaseolus vulgaris*) rhizospheric bacterial diversity in perspective of altitudinal variations. *Biologia*. 74(10):1405–1413. DOI:10.2478/s11756-019-00292-1 **(I.F. 0.811) (NAAS rating 6.73)**
4. Rawat N., Sharma M., **Suyal D.C.**, Singh D.K., Joshi D., Singh P., Goel R. (2019) Psychrotolerant bio-inoculants and their co-inoculation to improve *Cicer arietinum* growth and soil nutrient status for sustainable mountain agriculture. *Journal Of Soil Science And Plant Nutrition*. 19(3):639–647. DOI: 10.1007/s42729-019-00064-5 **(I.F. 2.156) (NAAS rating 8.01)**
5. Kumar S., **Suyal D.C.**, Yadav A., Shouche Y., Goel R. (2019) Microbial diversity and soil physiochemical characteristic of higher altitude. *PLOS ONE*. 14(3): e0213844. DOI: <https://doi.org/10.1371/journal.pone.0213844>. **(I.F. 2.740) (NAAS rating 8.74)**

6. Joshi D., Chandra R., **Suyal D.C.**, Kumar S., **Goel R.** (2019) Impact of bioinoculants *Pseudomonas jesenii* MP1 and *Rhodococcus qingshengii* S10107 on *Cicer arietinum* yield and soil nitrogen status. *Pedosphere*. 29(3): 388–399. [https://doi.org/10.1016/S1002-0160\(19\)60807-6](https://doi.org/10.1016/S1002-0160(19)60807-6) (I.F. 3.736) (NAAS rating 9.19)
7. **\*\*Suyal D.C.**, Kumar S., Joshi D., Soni R., Goel R. (2018) Quantitative proteomics of psychrotrophic diazotroph in response to nitrogen deficiency and cold stress. *Journal of Proteomics*. 187:235-242. DOI: <https://doi.org/10.1016/j.jprot.2018.08.005>. (I.F. 3.509) (NAAS rating 9.54)
8. Rajwar J., Chandra R., **Suyal D.C.**, Tomer S., Kumar S., Goel R. (2018) Comparative phosphate solubilizing efficiency of psychrotolerant *Pseudomonas jesenii* MP1 and *Acinetobacter* sp. ST02 against chickpea for sustainable hill agriculture. *Biologia*. 73(8): 793–802. DOI: 10.2478/s11756-018-0089-3 (I.F. 0.811) (NAAS rating 6.73)
9. Kumar S., **Suyal D.C.**, Bhoriyal M., Goel R. (2018) Plant growth promoting potential of psychrotolerant *Dyadobacter* sp. for pulses and finger millet and impact of inoculation on soil chemical properties and diazotrophic abundance. *Journal of Plant Nutrition*. 41(8):1035-1046. <https://doi.org/10.1080/01904167.2018.1433211> (I.F. 1.132) (NAAS rating 6.75)
10. Giri K, Rai J.P.N., Pandey S., Mishra G., Kumar R., **Suyal D.C.** (2017) Performance evaluation of isoproturon-degrading indigenous bacterial isolates in soil microcosm. *Chemistry and Ecology*. 33(9):817-825 DOI: <http://dx.doi.org/10.1080/02757540.2017.1393535>. (I.F. 1.400) (NAAS rating 7.21)
11. Giri K., **Suyal D.C.**, Mishra G., Pandey S., Kumar R., Meena D.K., Rai J.P.N. (2017) Biodegradation of Isoproturon by *Bacillus pumilus* K1 Isolated from Foothill Agroecosystem of North West Himalaya. *Proceedings of The National Academy of Sciences India Section B-Biological Sciences*. 87(3):839–848. DOI: 10.1007/s40011-015-0667-x. (I.F. 0.00) (NAAS rating 0.00)
12. Debbarma P., Raghuwanshi S., Singh J., **Suyal D.C.**, Zaidi M. G. H., Goel R. (2017) Comparative in situ biodegradation studies of polyhydroxybutyrate film composites. *3Biotech*. 7(178):1-9. DOI:10.1007/s13205-017-0789-3 (I.F. 1.798) (NAAS rating 7.79)
13. Kumar N., **Suyal D.C.**, Sharma I.P., Verma A., Singh H. (2017) Elucidating stress proteins in rice (*Oryza sativa* L.) genotype under elevated temperature: a proteomic approach to understand heat stress response. *3Biotech*. 7(205):1-8 DOI: 10.1007/s13205-017-0856-9 (I.F. 1.798) (NAAS rating 7.79)
14. Tomer S., **Suyal D.C.**, Rajwar J., Yadav A., Shouche Y., Goel R. (2017) Isolation and characterization of Phosphate solubilizing bacteria from Western Indian Himalayan soils. *3Biotech*. 7(2): 1-8. doi:10.1007/s13205-017-0738-1 (I.F. 1.798) (NAAS rating 7.79)
15. **\*Suyal D.C.**, Kumar S., Yadav A., Shouche Y., Goel R. (2017) Cold stress and nitrogen deficiency affected protein expression of psychrotrophic *Dyadobacter psychrophilus* B2 and *Pseudomonas jessenii* MP1. *Frontiers in Microbiology*. 8 (430): 1-6. doi:10.3389/fmicb.2017.00430 (I.F. 4.235) (NAAS rating 10.26)
16. Soni R., **Suyal D.C.**, Sai S., Goel R. (2016) Exploration of *nifH* gene through soil metagenomes of the western Indian Himalayas. *3Biotech* 6(1):1-4. DOI: 10.1007/s13205-015-0324-3 (I.F. 1.798) (NAAS rating 7.79)

17. Suyal D.C., Yadav A., Shouche Y., Goel R. (2015) Bacterial diversity and community structure of Western Indian Himalayan red kidney bean (*Phaseolus vulgaris* L.) rhizosphere as revealed by 16S rRNA gene sequences. *Biologia*. 70/3: 305—313. (I.F. 0.811) (NAAS rating 6.73)
18. Suyal D.C., Yadav A., Shouche Y., Goel R. (2015) Diversified diazotrophs associated with the rhizosphere of Western Indian Himalayan native red kidney beans (*Phaseolus vulgaris* L.). *3Biotech*. 5(4):433–441. DOI: 10.1007/s13205-014-0238-5 (I.F. 1.798) (NAAS rating 7.79)
19. Soni R., Suyal D.C., Agrawal K., Yadav A., Souche Y., Goel R. (2015) Differential proteomic analysis of Himalayan psychrotolerant diazotroph *Pseudomonas palleroniana* N26 Strain under low temperature diazotrophic conditions. *CryoLetters*. 36 (2):74-82. (I.F. 0.694) (NAAS rating 6.69)
20. Shukla A., Dhauni N., Suyal D.C., Kumar S., Goel R. (2015) Comparative plant growth promoting potential of psychrotolerant diazotrophs *Pseudomonas* sp. JJS2 and *Enterobacter* sp. AAB8 against native *Cajanus cajan* (L.) and *Eleusine coracana* (L.). *Afri. J. Microbiol. Res.* 9(20): 1371-1375. (I.F. 0.0) (NAAS rating 0.00)
21. Suyal D.C., Shukla A., Goel R. (2014) Growth promotory potential of the psychrophilic diazotroph *Pseudomonas migulae* S10724 against Native *Vigna radiata* (L.) Wilczek. *3Biotech*. 4(6):665–668. (I.F. 1.798) (NAAS rating 7.79)
22. Suyal D.C., Yadav A., Shouche Y., Goel R. (2014) Differential proteomics in response to low temperature diazotrophy of Himalayan psychrophilic nitrogen fixing *Pseudomonas migulae* S10724 strain. *Curr. Microbiol.* 68(4):543–550. DOI: 10.1007/s00284-013-0508-1. (I.F. 1.746) (NAAS rating 7.60)
23. Kumar S., Suyal DC, Dhauni N, Bhoriyal M, Goel R (2014) Relative plant growth promoting potential of Himalayan psychrotolerant *Pseudomonas jesenii* Strain MP1 against Native *Cicer arietinum* L., *Vigna mungo* (L.) Hepper; *Vigna radiata* (L.) Wilczek., *Cajanus cajan* (L.) Millsp. and *Eleusine coracana* (L.) Gaertn. *Afri. J. Microbiol. Res.* 8(50):3931-3943. (I.F. 0.0) (NAAS rating 0.00)
24. Suyal D.C. and Tewari L. (2013) *In vitro* degradation of natural animal feed substrates by intracellular phytase producing Shiwalik Himalayan budding yeasts. *Afri. J. Microbiol. Res.* 7(47):5374-5383. (I.F. 0.0) (NAAS rating 0.00)
25. Suyal D.C. and Tewari L. (2013) Phytase and its Applications. *Int. J. Curr. Res.* 5(10):3042-3043. (I.F. 0.0) (NAAS rating 0.00)

\* Got Uttarakhand Governor's Best Research Award - 2017

\*\* Got U-COST's Young scientist award – 2019

### **Book Chapters**

1. Dubey P., Kumar V., Ponnusamy K., Sonwani R., Singh A.K., Suyal D.C., Soni R (2020) Microbe assisted plant stress management. In: Mandal S.D., Bhatt P. (eds) Recent advancements in microbial diversity. Academic press, Elsevier, Nondon Pp: 351-365
2. Jeyakumar S.P., Dash B., Singh A.K., Suyal D.C., Soni R. (2020) Nutrient Cycling at Higher Altitudes. In: Goel R., Soni R., Suyal D.C. (eds) Microbiological

Advancements for Higher Altitude Agro-Ecosystems & Sustainability. Springer Nature Singapore Pvt Ltd Singapore Pp 293-305

3. **Suyal D.C.**, Joshi D., Debbarma P., Soni R., Dash B., Goel; R. (2019) Soil Metagenomics: Unculturable Microbial Diversity and Its Function. In: Varma A., Choudhary D. (eds) Mycorrhizosphere and Pedogenesis. Springer, Singapore. pp 355-362
4. Dash B., Soni R., Kumar V., **Suyal D.C.**, Dash D., Goel R. (2019) Mycorrhizosphere: Microbial Interactions for Sustainable Agricultural Production. In: Varma A., Choudhary D. (eds) Mycorrhizosphere and Pedogenesis. Springer, Singapore. pp 321-338
5. Goel R., **Suyal D.C.**, Kumar V., Jain L., Soni R. (2018) Stress-Tolerant Beneficial Microbes for Sustainable Agricultural Production. In: Panpatte et al. (eds.), Microorganisms for Green Revolution, Microorganisms for Sustainability 7, Springer Nature Singapore Pte Ltd. Pp 141-159. [https://doi.org/10.1007/978-981-10-7146-1\\_8](https://doi.org/10.1007/978-981-10-7146-1_8)
6. Goel R., Kumar V., **Suyal D.C.**, Narayan D.B., Soni R. (2018) Toward the Unculturable Microbes for Sustainable Agricultural Production. In: Meena V. S. (ed.), Role of Rhizospheric Microbes in Soil. Springer Nature Singapore. pp 107-123. [https://doi.org/10.1007/978-981-10-8402-7\\_4](https://doi.org/10.1007/978-981-10-8402-7_4)
7. Goel R., **Suyal D.C.**, Narayan D.B., Soni R. (2017) Soil Metagenomics: A Tool for Sustainable Agriculture. In: Kalia V., Shouche Y., Purohit H., Rahi P. (eds) Mining of Microbial Wealth and MetaGenomics. Springer Nature Singapore pp 217-225. DOI: [https://doi.org/10.1007/978-981-10-5708-3\\_13](https://doi.org/10.1007/978-981-10-5708-3_13)
8. Joshi D., Kumar S., **Suyal D.C.**, Goel R. (2017) The Microbiome of the Himalayan Ecosystem. In: Kalia V., Shouche Y., Purohit H., Rahi P. (eds) Mining of Microbial Wealth and MetaGenomics. Springer, Singapore. Pp 101-116. DOI: [https://doi.org/10.1007/978-981-10-5708-3\\_6](https://doi.org/10.1007/978-981-10-5708-3_6)
9. Goel R., Kumar V., **Suyal D.C.**, Dash B., Kumar P., Soni R. (2017) Root-Associated Bacteria: Rhizoplane and Endosphere. In: Singh D., Singh H., Prabha R. (eds) Plant-Microbe Interactions in Agro-Ecological Perspectives. Springer, Singapore. Pp 161-176. DOI: [https://doi.org/10.1007/978-981-10-5813-4\\_9](https://doi.org/10.1007/978-981-10-5813-4_9)
10. Soni R., Kumar V., **Suyal D.C.**, Jain L., Goel R. (2017) Metagenomics of Plant Rhizosphere Microbiome. In: Singh R., Kothari R., Koringa P., Singh S. (eds) Understanding Host-Microbiome Interactions - An Omics Approach. Springer, Singapore. pp 193-205
11. Tomer S., **Suyal D.C.**, Goel R. (2016) Biofertilizers: A Timely Approach for Sustainable Agriculture. In: Choudhary D.K., Varma A., Tuteja N. (eds.) Plant-Microbe Interaction: An Approach to Sustainable Agriculture. Springer Nature Singapore Pte Ltd. Singapore. Pp 375-395
12. **Suyal D.C.**, Soni R., Sai S., Goel R. (2016) Microbial Inoculants as Biofertilizer. In: Singh D.P. et al. (eds.) Microbial Inoculants in Sustainable Agricultural Productivity. Springer-Verlag. Berlin Heidelberg. Pp 311-318
13. Giri K., Paliwal R., **Suyal D.C.**, Mishra G., Pandey S., Rai J.P.N., Verma P.K. (2015) Potential application of plant-microbe interaction for restoration of degraded ecosystems. In: Singh S., Srivastava K. (eds) Handbook of Research on Uncovering

New Methods for Ecosystem Management through Bioremediation. IGI Global, Hershey PA, USA, pp 255-285.

14. **Suyal D.C.**, Agrawal K., Goel R. (2014) Identification of soil microbial communities: Approaches and Methodologies. In: Singh D.P., Singh H.B. (eds) Trends in Soil Ecology. Studium Press LLC, Houston, pp 93-114.

### **Edited book**

1. Goel R., Soni R., **Suyal D.C.**, (Editors) Microbiological advancements for higher altitude agro-ecosystems & sustainability. Springer Singapore. ISBN 978-981-15-1901-7

### **PERSONAL DETAILS**

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<b>Father's name</b>	:	Chandra Shekhar Suyal
<b>Mother's name</b>	:	Tulsi Suyal
<b>Date of Birth</b>	:	05 Jan. 1989
<b>Sex</b>	:	Male
<b>Marital status</b>	:	Married
<b>Languages known</b>	:	Hindi, English
<b>Permanent Address</b>	:	Village: Pakhuda, PO: Uprari Distt: Almora, Pin Code- 263645 Uttarakhand, India

**Date: 22 August, 2020**

**(Deep Chandra Suyal)**