GEOGRAPHY IN HONG KONG (2012-16)

A PROFILE OF GEOGRAPHY INSTITUTES, RESEARCHERS, KEY PUBLICATIONS AND OTHER GEOGRAPHY-RELATED ACTIVITIES

June 2016
EXECUTIVE SUMMARY

Hong Kong Geographical Association

The Hong Kong Geographical Association (HKGA) was founded in 1969 with the aims of promoting interest in, stimulating teaching of, and cultivating research about Geography. HKGA is led by an Executive Committee with honorary representatives from the tertiary institutions in Hong Kong. The Association is the Hong Kong Sectional member of the International Geographical Union.

Over the years, HKGA has been promoting geography education and research through a wide range of activities and services. Hong Kong Geography Day is the signature event for the Association, which aims to foster academic exchange and collaboration between geography-related faculty members and postgraduate students, and to promote geography education in secondary schools.

HKGA offers professional supports through a wide range of activities including fieldtrips, seminars, workshops, orientations for new teachers, and subject-related competitions for students. The Association has also been working closely with government departments including the Education Bureau and Hong Kong Examinations and Assessment Authority on curriculum development and teaching and learning assessment.

In addition, the Association owns an international academic journal Asian Geographer which is published by Taylor & Francis. It also publishes a professional newsletter, Hong Kong Geographers, for all teaching and research professionals in the community.

Institutes & People

There are currently three departmental units specialized in geography research and education in the tertiary institutes of Hong Kong. In total, our community has over 70 teaching and research staff. They are recruited locally and internationally with diverse backgrounds. They are fully committed to quality research and teaching, which are exemplified by their research outputs published in top ISI journals, professional services offered in different institutional positions, and awards received.

Research Excellence

Geographers in Hong Kong are pursuing high quality research in all directions and with local and international significance. In 2012-2016, we have published in over 1,000 indexed publications and being editorial board members in over 50 ISI-listed journals. These publications are distributed across subjects from urban planning, housing, transport, GIS and remote sensing technologies, environmental management, nature hazards, and climate change. Since 1956, geographers in Hong Kong have accumulated over 1,700 indexed publications and 23,000 times cited, with an average of 13 times cited per article. The most influential article amongst all is cited 868 times in total. Apart from contributing to innovation and knowledge worldwide, our members also use their professional knowledge to serve the society especially as the advisors of many governmental bodies in Hong Kong. Amongst all of our publications, 15% of them are specialized in Hong Kong as the study area and 32% concentrate in the greater China region.
Resources and Facilities

Hong Kong has excellent resources, infrastructure, services and facilities to support geographical research. We are accessible to highly competitive grants from the Hong Kong Research Grant Council and other local and overseas funding bodies. We are equipped with top-class libraries, laboratories, computer services and state-of-the-art technological. We also collaborate with many research centers that are working in cutting-edge, multi-disciplinary, and cross-country contexts. Most importantly, we provide a flexible, pluralistic and supportive environment for all research activities.

International Collaboration

We position ourselves as a research hub into one interwoven global village and maintain close collaboration with researchers from different places and across disciplines. Every year, we organize Hong Kong Geography Day and also other conferences and workshops to facilitate idea exchange and collaboration opportunities across countries and regions. Many of our research projects are associated with renowned institutes overseas and in Mainland China, including the University of Cambridge, National University of Singapore, Peking University and Chinese Academy of Sciences. In future, we look forward to establish further linkages with people and institutes from all parts of the world.
1. WELCOME MESSAGE

Welcome to the <Country Report: Geography in Hong Kong (2011-15)>, which is prepared and presented by the Hong Kong Geographical Association.

Hong Kong Geographical Association (HKGA, or the Association) was founded in 1969 with the aims of promoting interest in, stimulating teaching of, and cultivating research about Geography. HKGA is led by an Executive Committee (EXCO) which consists of the Officers, the Immediate Past Chairman, and honorary representatives from other institutions. The Association is the Hong Kong Sectional member of the International Geographical Union.

Over the years, HKGA has been promoting geography education and research through a wide range of activities and services including the Hong Kong Geography Day, fieldtrips, seminars, and professional supports to geography teachers; workshops and orientations for new teachers; and subject-related competitions for students. Hong Kong Geography Day is the signature event for the Association, which aims to foster academic exchange and collaboration between geography-related faculty members and postgraduate students, and to promote geography education in secondary schools. In addition, HKGA has been working closely with government departments including the Education Bureau and Hong Kong Examinations and Assessment Authority on curriculum development and teaching and learning assessment. It is our mission to strive for continuous improvement in our efforts dedicated to students and teachers in the field.

Geographers in Hong Kong are fully committed to quality research and teaching, which are exemplified by their research outputs published in top ISI journals, professional services offered in different institutional positions, and awards received. The Association owns an international academic journal Asian Geographer which is published by Taylor & Francis. It also publishes papers and newsletters, including a professional newsletter, Hong Kong Geographers, for all teaching and research professionals in the community.

We have also been actively participating in academic events across the globe. The Congress of the International Geographical Union (IGU) is one of the examples. This year, we would like to embrace the invaluable opportunity of such exposure to let you know more about our research and activities. The report would cover the profile of our institutes and people, research outputs, and education resources in the city.

We would like to express our deepest gratitude to all geography related departments in Hong Kong and their staff for their support in compiling this report. It is however solely the responsibility of the Association in case of any mistake arises from the content. Please feel free to contact us for any queries and feedbacks.

Professor XU Jiang
Chairperson (2013-), HKGA

2016.08
2. GEOGRAPHY IN HONG KONG

Hong Kong Geographical Association

The Hong Kong Geographical Association (HKGA) was founded in 1969 with the aims of promoting interest in, stimulating teaching of, and cultivating research about Geography. HKGA is the Hong Kong Sectional member of the International Geographical Union, and an Advisory Management Committee Member of Hong Kong Teachers’ Centre.

It is our mission to strive for continuous improvement in our efforts dedicated to students and teachers in the field. We are also fully committed to contribute our professional knowledge and passionate support for the wider community.

Organization Structure of HKGA

The Association is led by an Executive Committee which consists of the Officers, the Immediate Past Chairman, and honorary representatives from other institutions. Chart 2.1 illustrates the organization structure of HKGA. The Officers include the Chairperson, the Vice-Chairperson, the Honorary Secretary, the Honorary Treasurer, and other designated members. All officers of the Executive Committee are elected at the Annual General Meeting and hold office for two years.

Apart from the officers, one Representative from each of the geography departments of the University of Hong Kong, Chinese University of Hong Kong and Hong Kong Baptist University, and one Representative from the Hong Kong Institute of Education, shall be offered Honorary Membership to serve on the Executive Committee. The current and past profiles of the Executive Committee are shown in Chart 2.2 and Chart 2.3 respectively.

Full membership is open to any person who is interested in the aims of the Association. There shall be no entrance fee for membership of the Association. Members may be enrolled in any one of the following grades:

- Full Membership
- Life Membership
- Honorary Membership
- Student Membership

For details of appropriate subscription payment and the rights and privileges specified in each case, please check the membership guidelines and application form in our website.

Hong Kong Geography Day

Hong Kong Geography Day (HKGD) is the signature event for the Association. It is the most important date for the geography education and research community in Hong Kong. HKGD is held every other year and co-hosted on rotation by the three geography departments of The Chinese University of Hong Kong, the Hong Kong Baptist
University, and the University of Hong Kong. This biennial event aims to foster academic exchange and collaboration between geography-related faculty members and postgraduate students, and to promote geography education in secondary schools.

Our Hong Kong Geography Day 2014 was co-organized by the Department of Geography at the University of Hong Kong (HKU) and the Hong Kong Geographical Association on HKU Main Campus on 22 November, 2014. The main theme of this latest HKGD is “Bridging Conservation and Development: A Pathway to Sustainable Future”. A short summary of the event can be found in below.

The next HKGD, meanwhile, is scheduled to be held at the Chinese University of Hong Kong by the end of 2016.

Journal and Newsletter Publications

In addition to the HKGD activities, the Association also owns an international academic journal Asian Geographer which is published by Taylor & Francis. The Editorial Board of the journal is enlisted in Chart 2.4, whereas its overall aims and scope are provided below.

Asian Geographer disseminates knowledge about geographical problems and issues focusing on Asia and the Pacific Rim. Papers dealing with other regions should have a linkage to Asia and the Pacific Rim. Original and timely articles dealing with any field of physical or human geographical inquiries and methodologies will be considered for publication. We welcome, for example, submissions on people-environment interactions, urban and regional development, transport and large infrastructure, migration, natural disasters and their management, environment and energy issues. While the focus of the journal is placed on research articles, review papers, viewpoints and research notes are also considered. The journal will also publish special issues on particular themes or areas. Book reviews may be included from time to time.”

HKGA also publishes papers and newsletters, including a professional newsletter, Hong Kong Geographers, for all teaching and research professionals in the community. The latest issue of Hong Kong Geographers is highlighted by a feature article entitled “A bottom-up Approach to Introduce Geo-Informatics to Junior Geography Education in Hong Kong”.

Education and Training

HKGA provides a platform bridging secondary and tertiary geography education. We offer professional supports through a wide range of activities including fieldtrips, seminars, workshops, orientations for new teachers, and subject-related competitions for students. The Association has been working
closely with government departments including the Education Bureau and Hong Kong Examinations and Assessment Authority on curriculum development and teaching and learning assessment.

HKGA also promote different overseas activities to facilitate knowledge transfer and cross-cultural understanding. For instance, we host the Hong Kong Geography Olympiad for all secondary school students every year. Students from the winning teams will be selected to represent Hong Kong to participate in the International Geography Olympiad (iGeo). There are also other regular seminars and fieldtrips, including the latest Annual General Meeting of HKGA cum guided tour to the Jockey Club Museum of Climate Change (MoCC) at The Chinese University of Hong Kong dated in June 2016.

For more details about HKGA, please visit our website (www.hkga.org) or email us at enquiry@hkga.org
Hong Kong Geography Day 2014, co-organized by The Department of Geography at the University of Hong Kong (HKU) and the Hong Kong Geographical Association, was held on HKU Main Campus on 22 November, 2014. The main theme of this year is “Bridging Conservation and Development: A Pathway to Sustainable Future”. The event discussed the current situation, issues and opportunities of socio-economic development as well as environmental and cultural protection in Hong Kong and elsewhere. Various ways to achieve a sustainable future in Hong Kong have also been explored.

An opening ceremony was held in the Wang Gungwu Lecture Hall on HKU Main Campus. Two keynote speeches were given by Ms Christine LOH Kung-wai, Under Secretary for the Environment, HKSAR Government, and Professor JIM Chi Yung, Chair Professor, HKU Department of Geography. An award ceremony was also held for secondary school International Geography Olympiad winners in 2013 and 2014. After the opening ceremony, three universities in Hong Kong, including HKU, the Chinese University of Hong Kong and Baptist University, introduced their geography programmes, and a secondary school talk on “North East New Territories New Development Areas Planning: From a Geographical Perspective” was given by Dr. NG Cho Nam and Mr. Anthony YEUNG Kam Chuen. Various government departments, NGOs and private companies also set up booths to exhibit their geography-related work during the event. Facilities at the HKU Department of Geography were open to the public as well. It is estimated that about 450 people, including more than 260 secondary school teachers and students, participated in the event.
Photo Gallery

Ms. Christine Loh Kung-wai, Under Secretary for the Environment of HKSAR Environment Bureau gives a keynote speech on Hong Kong Geography Day 2014

Dr. Ng Cho-nam, Associate Professor in HKU Department of Geography gives a talk to secondary school teachers and students

Professor Jim Chi-yung, Chair Professor in HKU Department of Geography presents awards to International Geography Olympiad winners

Board exhibition of geography-related work by various government departments, NGOs and private companies
To carry out projects in various different fields, a number of working groups are formed which includes the Secondary Education Committee, Tertiary Education & Research Committee, Field Trip Committee, and Publicity & Membership Committee.
# Chart 2.2 HKGA Executive Committee 2015-2017

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Department/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairperson</td>
<td><strong>Prof. XU Jiang</strong></td>
<td>Department of Geography and Resource Management, The Chinese University of Hong Kong</td>
</tr>
<tr>
<td>Vice-chairperson (Administration)</td>
<td><strong>Dr. CHENG Nga Yee, Irene</strong></td>
<td>Department of Science and Environmental Studies, The Education University of Hong Kong</td>
</tr>
<tr>
<td>Vice-chairperson (Secondary Education Committee)</td>
<td><strong>Mr. LEUNG Wing Kin, Tony</strong></td>
<td>Po Leung Kuk Laws Foundation College</td>
</tr>
<tr>
<td>Honorary Secretary</td>
<td><strong>Dr. MAH Ngar Yin, Daphne</strong></td>
<td>Department of Geography, Hong Kong Baptist University</td>
</tr>
<tr>
<td>Honorary Treasurer</td>
<td><strong>Dr. CHOW Sin Yin, Alice</strong></td>
<td>Department of Social Sciences, The Education University of Hong Kong</td>
</tr>
<tr>
<td>Member (Secondary Education / Field Trip Committee)</td>
<td><strong>Mr. CHENG Kam Nam, Hugo</strong></td>
<td>Buddhist Fat Ho Memorial College</td>
</tr>
<tr>
<td>Member, HKIEd Representative</td>
<td><strong>Dr. CHEUNG Ting On, Lewis</strong></td>
<td>Department of Social Sciences, The Education University of Hong Kong</td>
</tr>
<tr>
<td>Member, CUHK Representative</td>
<td><strong>Dr. LEE Kai-wai, Joanna</strong></td>
<td>Department of Geography and Resource Management, The Chinese University of Hong Kong</td>
</tr>
<tr>
<td>Member (Secondary Education Committee)</td>
<td><strong>Dr. YEUNG Pui Ming</strong></td>
<td>SKH Kei Hau Secondary School</td>
</tr>
<tr>
<td>Member (Secondary Education Committee)</td>
<td><strong>Ms. LEE, Wing Yee</strong></td>
<td>Po Leung Kuk Yao Ling Sun College</td>
</tr>
<tr>
<td>Member (Secondary Education Committee)</td>
<td><strong>Ms. SO, Pui Kwan</strong></td>
<td>S.K.H. Lam Kau Mow Secodnary School</td>
</tr>
<tr>
<td>Member (Secondary Education Committee)</td>
<td><strong>Ms. LIU, Pui Ying</strong></td>
<td>Sing Yin Secondary School</td>
</tr>
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</table>
## Chart 2.3 Chairperson, Vice-Chairperson, Honorary Secretary and Honorary Treasurer of HKGA (1969-)

<table>
<thead>
<tr>
<th>Year</th>
<th>Chairperson</th>
<th>Vice Chairperson</th>
<th>Hon. Secretary</th>
<th>Hon. Treasurer</th>
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</thead>
<tbody>
<tr>
<td>1969-1970</td>
<td>Mrs. C.M. Speak</td>
<td>-</td>
<td>Miss P. MacNeice</td>
<td>Mr. H.L. Law</td>
</tr>
<tr>
<td>1970-1971</td>
<td>Mr. K.N. Au</td>
<td>-</td>
<td>Miss M Moore</td>
<td>Mr. H.L. Law</td>
</tr>
<tr>
<td>1971-1972</td>
<td>Mr. K.N. Au</td>
<td>-</td>
<td>Miss S.L. Wong</td>
<td>Mr. KH Ho</td>
</tr>
<tr>
<td>1972-1973</td>
<td>Prof. C.K. Leung</td>
<td>-</td>
<td>Prof. K.C. Lam</td>
<td>Mr. W.M. Tam</td>
</tr>
<tr>
<td>1973-1974</td>
<td>Prof. C.K. Leung</td>
<td>Mrs. C.M. Speak</td>
<td>Miss Shirely Li</td>
<td>Mr. T.Y. Fok</td>
</tr>
<tr>
<td>1974-1975</td>
<td>Mr. K.H. Ho</td>
<td>Dr. Y.P. Chung</td>
<td>Mr. Andrew C.S. Poon</td>
<td>Mr. C.F. Chan</td>
</tr>
<tr>
<td>1975-1976</td>
<td>Mr. K.H. Ho</td>
<td>Mr. D.A. Shortle</td>
<td>Mr. Andrew C.S. Poon</td>
<td>Mr. C.F. Chan</td>
</tr>
<tr>
<td>1976-1977</td>
<td>Miss J.M. Bray</td>
<td>Mr. D.A. Shortle</td>
<td>Mr. Gilbert Leung</td>
<td>Miss O.L. Siu</td>
</tr>
<tr>
<td>1977-1978</td>
<td>Mrs. C.M. Speak</td>
<td>Mr. Andrew C.S. Poon</td>
<td>Mr. Bill K.P. Yeung</td>
<td>Miss O.L. Siu</td>
</tr>
<tr>
<td>1978-1979</td>
<td>Mrs. C.M. Speak</td>
<td>Mr. Andrew C.S. Poon</td>
<td>Mr. Edward S.W. Woo</td>
<td>Miss M. Mak</td>
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<tr>
<td>1979-1980</td>
<td>Mr. Andrew C.S. Poon</td>
<td>Mr. Bill K.P. Yeung</td>
<td>Mr. T.O. Chan</td>
<td>Mr. J. Chan</td>
</tr>
<tr>
<td>1980-1981</td>
<td>Mr. K.H. Ho</td>
<td>Prof. Victor Sit</td>
<td>Mr. K.C. Tam</td>
<td>Mr. Y.C. Chan</td>
</tr>
<tr>
<td>1981-1982</td>
<td>Prof. Victor Sit</td>
<td>Mr. P.K. Chan</td>
<td>Mr. Y.T. Ng</td>
<td>Mr. K.C. Tam</td>
</tr>
<tr>
<td>1982-1983</td>
<td>Prof. Victor Sit</td>
<td>Mr. P.K. Chan</td>
<td>Prof. David K.Y. Chu</td>
<td>Dr. S.I. Hsu</td>
</tr>
<tr>
<td>1983-1985</td>
<td>Prof. K.Y. Wong</td>
<td>Ms. Linda Li</td>
<td>Prof. David K.Y. Chu</td>
<td>Dr. S.I. Hsu</td>
</tr>
<tr>
<td>1985-1987</td>
<td>Prof. K.Y. Wong</td>
<td>Mr. Edward S.W. Woo</td>
<td>Dr. Bruce Taylor</td>
<td>Dr. Julian Wong</td>
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<tr>
<td>Year</td>
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<td>Vice Chairperson</td>
<td>Hon. Secretary</td>
<td>Hon. Treasurer</td>
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<tr>
<td>1987-1989</td>
<td>Prof. Anthony G.O. Yeh</td>
<td>Mr. Edward S.W. Woo</td>
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<td>Dr. P.M. Yeung</td>
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<td>1989-1991</td>
<td>Prof. Anthony G.O. Yeh</td>
<td>Mr. Y.W. Fung</td>
<td>Mr. C.L. Leung</td>
<td>Dr. P.M. Yeung</td>
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<td>1991-1993</td>
<td>Prof. S.M. Li</td>
<td>Mr. C.M. Luk</td>
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<td>黃耀生</td>
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<td>1993-1995</td>
<td>Prof. David K.Y. Chu</td>
<td>Mr. Anthony K.C. Yeung</td>
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<tr>
<td>1995-1997</td>
<td>Prof. David K.Y. Chu</td>
<td>Mr. Anthony K.C. Yeung</td>
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<td>Dr. Frederick Y.S. Lee</td>
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<td>1997-1999</td>
<td>Prof. David K.Y. Chu</td>
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<td>1999-2001</td>
<td>Dr. Roger C.K. Chan</td>
<td>Mr. Anthony K.C. Yeung</td>
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<td>Prof. George C.S. Lin</td>
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<td>2001-2003</td>
<td>Dr. Frederick Y.S. Lee</td>
<td>Mr. Victor P.K. Yeung</td>
<td>Dr. Frederick Y.S. Lee</td>
<td>Prof. Becky P.Y. Loo</td>
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<td>2003-2005</td>
<td>Dr. Frederick Y.S. Lee</td>
<td>Mr. Victor P.K. Yeung</td>
<td>Dr. Becky P.Y. Loo</td>
<td>Prof. C.C. Lam</td>
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<td>2007-2009</td>
<td>Dr. Becky P.Y. Loo</td>
<td>Mr. Anthony K.C. Yeung</td>
<td>Dr. Irene N.Y. Cheng</td>
<td>Prof. D.G. Wang</td>
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<td>2009-2011</td>
<td>Prof. D.G. Wang</td>
<td>Mr. Anthony K.C. Yeung</td>
<td>Dr. Irene N.Y. Cheng</td>
<td>Miss Alice Chow</td>
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<td>2011-2013</td>
<td>Prof. D.G. Wang</td>
<td>Mr. Tony W.K. Leung</td>
<td>Dr. Irene N.Y. Cheng</td>
<td>Miss Alice Chow</td>
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<td>王倩賢</td>
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<td>2013-2015</td>
<td>Prof. J. Xu</td>
<td>Dr. Irene N.Y. Cheng</td>
<td>Dr. Daphne N.Y. Mah</td>
<td>Miss Alice Chow</td>
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<td></td>
<td>徐江</td>
<td>鄭雅儀</td>
<td>馬雅燕</td>
<td>王倩賢</td>
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Chart 2.4 Editorial Board of Asian Geographer

Asian Geographer

Published on behalf of the Hong Kong Geographical Association
ISSN
1022-5706 (Print), 2158-1762 (Online)
Publication Frequency
2 issues per year

(source: http://www.tandfonline.com/action/journalInformation?show=editorialBoard&journalCode=rage20#.V2twmvl96Uk)

Editor-in-Chief
Donggen Wang, Hong Kong Baptist University

Editor (Human Geography)
Jiang Xu, The Chinese University of Hong Kong

Editor (Physical Geography)
Jinbao Li, The University of Hong Kong

Consulting Editors
Chi-Yung Jim, The University of Hong Kong
Yee Leung, The Chinese University of Hong Kong
Si-Ming Li, Hong Kong Baptist University
Victor Fung-Shuen Sit, Hong Kong Baptist University
Anthony Gar-On Yeh, The University of Hong Kong
Yue Man Yeung, The Chinese University of Hong Kong

Editorial Committee
Roger Chan, The University of Hong Kong
Becky Loo, The University of Hong Kong
David Chen, The Chinese University of Hong Kong
Bernie Owen, Hong Kong Baptist University
Tung Fung, The Chinese University of Hong Kong
Jianfa Shen , The Chinese University of Hong Kong
Yok-Shiu F. Lee, The University of Hong Kong
James Wang, The University of Hong Kong
George Lin, The University of Hong Kong
Kenneth Wong, Hong Kong Baptist University

International Editorial Advisory Board
Yoshio Arai, University of Tokyo, Japan
Adrian Bailey, Hong Kong Baptist University, HK
Yanwei Chai, Peking University, P. R. China
Kam Wing Chan, University of Washington, U.S.A.
Nora Chiang, National Taiwan University, Taiwan
Cindy Fan, University of California, Los Angeles, U.S.A.
Weidong Liu, Chinese Academy of Sciences, P.R. China
Mei-Po Kwan, University of Illinois at Urbana-Champaign, U.S.A.
Ngar-Cheung Lau, The Chinese University of Hong Kong, Hong Kong
Dennis Yehua Wei, University of Utah, U.S.A.
David Ley, University of British Columbia, Canada
Fulong Wu, University College London, U.K.
Jianfa Shen, The Chinese University of Hong Kong
Benjamin Zhan, Texas State University, U.S.A.

Jianfa Shen, The Chinese University of Hong Kong
3. INSTITUTES & PEOPLE

There are currently four departmental units specialized in geography research and education in the tertiary institutes of Hong Kong. In total, our community has over 70 teaching and research staff. Our community members are recruited internationally with diverse backgrounds. They are fully committed to quality research and teaching programs, which are exemplified by their research outputs published in top ISI journals, professional services offered in different institutional positions, and honorable awards received in numerous occasions.

To date, our community consists of many institutes and people specialized in geography research and education. Altogether they offer a comprehensive list of both undergraduate and postgraduate programs. It is reminded that as a limitation the report could not cover all relevant institutes and departments in Hong Kong. Therefore we have enlisted the full profiles of the three geography-concentrated institutes: the Department of Geography at the Hong Kong Baptist University; the Department of Geography at the University of Hong Kong; and the Department of Geography and Resource Management at the Chinese University of Hong Kong. Meanwhile, we also provide some short bios of other notable figures within the field of geography, for instance in the Department of Social Science at the Hong Kong Institute of Education.

Our institutes provide excellent resources, infrastructure, services and facilities to support academic studies. We attract highly competitive grants from the Hong Kong Research Grant Council and other local and overseas funding bodies. We are equipped with top-class libraries, laboratories, computer services and state-of-the-art technological resources for the best research environment. There are also several other affiliated research centers with high level of participation in geography research. Most importantly, we provide a flexible, pluralistic and supportive environment for all research activities. All these collaborations and contributions are highly appreciated.

Our community has over 70 faculty staff in total. They are recruited internationally with diverse background and experience. Their expertise and areas of interest range from climate change, development studies, environmental studies, energy, economic geography, GIS, geomorphology, hydrology, housing, migration, population, pollution, planning, regional studies, remote sensing, resource management, spatial modeling, transport, urban studies, and etic.

Geographers in Hong Kong are fully committed to quality research par excellence. In 2011-2015, they have aggregated an estimate of 1031 ISI-listed publications (see next section in details). Our people have also accumulated invaluable experience and networks in their specialized fields. Currently, they are serving as the editor-in-chief and editorial board in over 50 top ISI-listed journals (see Chart 3.1).

Our people also provide numerous professorship and consultancy at different academic institutes and governance bodies, in Hong Kong, mainland China and abroad. Whereas an exhaustive list of participation in policies and projects would be too lengthy for here, the dedicated contributions of our people should not be overlooked in knowledge transfer and policy practice across local, national and international levels.

The academic quality and achievement of our people are widely acknowledged. They have received honorable awards in numerous occasions recently (see Chart 3.2). These recipients include not only the established academicians but also many young scholars,
exemplifying a sustainable community in ourselves. In future, we will continue to perfect our cutting edge and explore every opportunity in research.

The followings highlight some of the key profile of our institutes and people. For more detailed descriptions, please also visit their own webpages respectively.
The Department of Geography can be traced back to the then History and Geography Department, established in 1960. In 1978, our predecessor, Hong Kong Baptist College, split it into two independent departments. The Department is now one of the seven academic departments that constitute the Faculty of Social Sciences. Currently we have eighteen full-time academic and teaching staff and a comparable number of support and research staff. All faculty members hold doctoral degrees from renowned universities around the world, and their research interests cover a wide range of specializations in human, physical and technological geography.

Three research centers are housed within the Department: the Centre for China Urban and Regional Studies (CURS); the Asian Energy Studies Centre (AESC) (formerly the Hong Kong Energy Studies Centre); and the Centre for Geo-computation Studies (CGS). The Department, though the youngest among the three geography departments in Hong Kong, has emerged as a significant scholastic centre in our discipline. Our faculty members’ research endeavors have gained widespread recognition, both locally and internationally.

The Department offers three undergraduate programmes: the Bachelor of Social Sciences (BSocSc) (Hons) in Geography; the BSocSc (Hons) in China Studies – Geography Concentration; and the BSocSc (Hons) in Geography and Bachelor of Education (Bed) (Hons) in Liberal Studies Teaching. In addition, we also offer a top-up degree jointly with the HKBU School of Continuing Education: the BSocSc (Hons) in Environment and Resources Management.

Our undergraduate curriculum reflects the University’s emphasis on the importance of “Whole Person Education” by providing students with a wide range of interactive learning experiences. Geography distinguishes itself by its integrated approach to studying the interactions between people and their physical and social environments. The existing geography curriculum at HKBU gives students rigorous training in geographical methodologies while fostering an understanding of the spatial order and interdependence of the world’s peoples and regions. The curriculum also promotes the application of relevant geographical concepts and the techniques needed to solve real-world problems.

At the postgraduate level, the Department offers research-focused studies, leading to the M.Phil and Ph.D degrees. Postgraduate students may specialize in methodological, physical, or human geography. Currently we participate, along with other departments, in offering
two coursework-based postgraduate programmes: the MSocSc in Contemporary China Studies, which offers a concentration in “urban development and environmental management”; and the newly-launched Master of Arts in Global Society.

Our department has always been proud of its ability to maintain a strong relationship with our students and alumni. Many of our students appreciate the friendliness of the department, and the many ways in which our highly experienced staff support student learning in the classroom and in the field. We have a proven record in training graduates with excellent work and research capabilities.

Overall, the Department will continue to promote and sustain the value of geographical education, and to encourage the application of geographic theories and techniques in solving real-world problems, explicit in the mottoes that we have adopted for our Department:

- Building Theories and Practices
- Achieving Academic Excellence
- Promoting Scholarly Interactions

**Undergraduate Programmes**
- BSc in Geography
- BSc in China Studies-Geography Concentration
- BSc Geography and BEd Liberal Studies Teaching
- BSc in Environment and Resources Management

**Postgraduate Programmes**
- Research Degrees (MPhil/PhD)
- Joint PhD Programme in Geography (Collaboration with the Plymouth University)
- Master of Social Sciences (Contemporary China Studies)

**Affiliated Research Centres**
- Centre for China Urban and Regional Studies (CURS)
- Asian Energy Studies Centre (AESC)
- Centre for Geo-computation Studies (CGS)

**Contact**
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Tel: +852 3411 7129
Fax: +852 3411 5990
Email: geog@hkbu.edu.hk
Office hours: Monday to Friday 9:00am – 5:50pm (closed on Saturdays, Sundays and public holidays)

For more details, please visit the webpage at [http://geog.hkbu.edu.hk/](http://geog.hkbu.edu.hk/)
The history of geography teaching in the University of Hong Kong goes all the way back to 1915 when a course in Economic Geography (in combination with Economics) first entered the University curriculum that year. Geography became independent of Economics in 1931 with a two-year course and its own room. In 1939 the Sloss report recommended that Geography be taught over the full few years of the degree with Geology as a subsidiary subject. It was not until 1946 after the Second World War that Geography teaching resumed in the University. In 1954, the Department of Geography and Geology was established in the Faculty of Arts and S.G. Davis was appointed as the inaugural Chair Professor in 1955 to guide its teaching and research development. Following the end of civil war in China and the Korean conflict (mid 1950s to end 1960s), Hong Kong has undergone a period of rapid transformation and growth which has led to a big demand for teachers to meet the needs of a rapidly expanding population. Geography graduates at that time were given an education with such needs in mind. They received broad based human, physical and regional courses and carried out much fieldwork with particular emphasis on Geology, Physical Geography and even Archaeology. Although Archaeology was not included as a degree course, Geography students were encouraged to develop interests and expertise in it as well, following the staff at the time. The student society today is still called the Geographical, Geological and Archaeological Society.

Given the interests of Davis in geology, minerals and physical geography, the earliest research activities and output from the Department in the 1950s reflected these concerns. The emphasis within the Department changed following the appointment of D.J. Dwyer to the chair in 1967. New staff with expertise in the rapidly emerging field of Urban Geography were appointed to undertake new courses and research on the problems of urbanization. The Department’s human geography courses were admitted immediately to the new Faculty of Social Sciences when it was established in 1969, and by the mid-1970s physical geography courses were also admitted in the Science curriculum.

Specialist laboratories in aspects of physical geography, photogrammetry (later replaced by GIS) have been established at different time to support the specialist developments in the discipline. Through a very lengthy effort, the Department has also successfully built up a Map Library, which is one of the best equipped in the region, with a very sizeable collection of maps (with particular emphasis on Hong Kong and East and Southeast Asia) and air photos for supporting its extensive research and teaching activities.

Since its establishment in 1954, the Department has thus far produced over 3,100 bachelor degree graduates in Geography, and conferred 178 higher research degree awards [59 Ph.D., 16 M.A. (Research) and 103 M.Phil.] and 570 graduates in different taught postgraduate programmes. Many of
these graduates have now become distinguished academics in their own specialties, occupied
prominent positions in the Hong Kong civil service and other professions.

Research Themes

The Department strategically groups the research interests and expertise of its staff members under
three major research areas, namely ‘China Studies’, ‘Environment, Resources & Tourism’ and ‘Urban
& Transport Studies’, which are aligned with university-level strategic research themes respectively on
Contemporary China and Sustainable Environment. Capitalizing on its geographical location and
propinquity to China, the Department focuses on in-depth probing of fundamental issues with
applications and implications to China and Hong Kong. Emphasis is placed on obtaining peer-
reviewed competitive grants from the RGC and other government-external sources, supplemented
by other grants and donations. Besides contributing to knowledge, the studies aim at knowledge-
transfer to influence government policies and decisions and to improve community welfare. It strives
to recruit and retain research-capable staff and admit high-quality research students to expand the
capability and repertoire of the existing team. Its goal is to become a leading research centre on
contemporary China geography and sustainable urban development.

Undergraduate Programmes

Bachelor of Social Sciences in Geography
Bachelor of Arts (double major) in Geography plus one other arts discipline
Bachelor of Science (double major) in Geography plus one other science discipline
Second Major/Minor in Urban Governance

Postgraduate Programmes

Master of Arts in China Development Studies
Master of Arts in Transport Policy and Planning
MPhil/PhD research degree programmes

Contact

General Office
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The Jockey Club Tower, Centennial Campus
Pokfulam Road, Hong Kong
Tel: (852) 3917-2836
Fax: (852) 2559-8994
Email: geog@hku.hk

For more details, please visit the webpage at http://geog.hku.hk/index.html
The **Department of Geography and Resource Management** at the Chinese University of Hong Kong is one of the top geography departments at the forefront of geography education and research in Asia. We offer a wide range of programmes from bachelor to doctorate levels and have trained high calibre graduates contributing to society. Our departmental staff members also serve as directors of three research institutes in the University, namely the Institute of Environment, Energy and Sustainability, Institute of Future Cities, and Institute of Space and Earth Information Science.

**Concentration Areas**

The Department’s teaching and research are organized around four concentration areas, i.e., Urban and Regional Development, Physical and Environmental Systems, Geographical Information and Analysis, and Global Change and Resource Management. Students can pursue undergraduate and postgraduate studies leading to BSSc, MPhil and PhD degrees in Geography and Resource Management (GRM), MSc in Geoinformation Science and MSSc in Sustainable Tourism. GRM also organizes a joint BSSc in Urban Studies Programme with School of Architecture.

**Research**

Faculty members of the department are actively involved in research projects on issues of climate and environmental change, natural conservation and sustainable development, urban planning and regional development with the support of grants from various funding bodies such as Research Grant Council of Hong Kong. Research findings have been extensively published in leading international journals to advance scholarship. Faculty members have received various teaching and research awards from the university, and national and international organizations. Colleagues are also actively engaged in consultancy studies and play important roles in various government advisory committees and professional organizations to serve the society and academic community.
Facilities

The Department maintains seven well-equipped laboratories, as well as an extensive environmental monitoring network, including an atmospheric environment monitoring station, a weather station, a rainfall simulator and equipment for soil and hydrological studies which are housed in our Physical Geography Experimental Station. We also have our own reference library and a Map Room for student use.

Students

What do students do once they get their degrees? As many day-to-day problems have a geographic dimension, job opportunities for geographers are many and diverse. For example, many of our graduates have established rewarding careers in the business sector and with various government agencies. Many are also engaged in teaching at different levels of the educational system. Some pursue studies and specialize in town planning, soil science, and environmental management, for instance. Quite a number of them are involved in academic and research work.

Undergraduate Programmes

BSoSc (Hons) in Geography and Resource Management
BSoSc (Hons) in Urban Studies (jointly organized with School of Architecture)

Postgraduate Programmes

M.Phil.-Ph.D. in GRM (Master of Philosophy Stream)
M.Phil.-Ph.D. in GRM (Doctor of Philosophy Stream)
Master of Science in Geoinformation Science
Master of Social Science in Sustainable Tourism

Affiliated Research Centres

Institute of Environment, Energy and Sustainability
Institute of Future Cities
Institute of Space and Earth Information Science.

Contact

Department of Geography and Resource Management
2nd Floor, Wong Foo Yuan Building,
The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

Enquiry: geography@cuhk.edu.hk

For more details, please visit the webpage at http://www.grm.cuhk.edu.hk/eng/index.html
# Chart 3.1 Academic Services as Chief-Editor / Editorial Board in Research Journals (Selected)

<table>
<thead>
<tr>
<th>Journal Title</th>
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<tbody>
<tr>
<td>Acta Geographica Sinica (in Chinese)</td>
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<tr>
<td>Annals of Association of American Geographers</td>
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<tr>
<td>Annals of GIS</td>
</tr>
<tr>
<td>Arboricultural Journal</td>
</tr>
<tr>
<td>Arboriculture and Urban Forestry</td>
</tr>
<tr>
<td>Area Development and Policy</td>
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<tr>
<td>Asian Geographer</td>
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<tr>
<td>Business Strategy and the Environment</td>
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<tr>
<td>China Review</td>
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<tr>
<td>Chinese Geographical Science</td>
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<tr>
<td>Cities</td>
</tr>
<tr>
<td>City, Culture and Society</td>
</tr>
<tr>
<td>Comprehensive Geographic Information Systems</td>
</tr>
<tr>
<td>Computers, Environment and Urban System</td>
</tr>
<tr>
<td>disP—the Planning Review, Journal of the Association of European Schools of Planning Town Planning Review</td>
</tr>
<tr>
<td>Economic Geography</td>
</tr>
<tr>
<td>Environment and Planning A</td>
</tr>
<tr>
<td>Environment and Planning D</td>
</tr>
<tr>
<td>Eurasian Geography and Economics</td>
</tr>
<tr>
<td>Forest Ecology and Management</td>
</tr>
<tr>
<td>Geographical Analysis</td>
</tr>
<tr>
<td>Geoinformatica</td>
</tr>
<tr>
<td>GeoJournal</td>
</tr>
<tr>
<td>ICE Planning and Design</td>
</tr>
<tr>
<td>Interdisciplinary Environmental Review</td>
</tr>
<tr>
<td>International Journal of Cognitive Informatics and Natural Intelligence</td>
</tr>
<tr>
<td>International Journal of Software Science and Computational Intelligence</td>
</tr>
<tr>
<td>International Journal of Urban and Regional Research</td>
</tr>
<tr>
<td>International Planning Studies</td>
</tr>
<tr>
<td>Journal of Economic Geography</td>
</tr>
<tr>
<td>Journal of Geographical Science</td>
</tr>
<tr>
<td>Journal of Geographical Systems</td>
</tr>
<tr>
<td>Journal of Remote Sensing</td>
</tr>
<tr>
<td>Journal of Transport Geography</td>
</tr>
<tr>
<td>Landscape and Urban Planning</td>
</tr>
<tr>
<td>Pedosphere</td>
</tr>
<tr>
<td>Progress in Physical Geography</td>
</tr>
<tr>
<td>Progress in Planning</td>
</tr>
<tr>
<td>Review of Urban and Regional Development Studies</td>
</tr>
<tr>
<td>Sustainable Development</td>
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<tr>
<td>The Canadian Geographer</td>
</tr>
<tr>
<td>The China Review</td>
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<tr>
<td>Transactions in GIS</td>
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<tr>
<td>Transactions of the Institute of British Geographers</td>
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<tr>
<td>Transportmetrica A</td>
</tr>
<tr>
<td>Transportmetrica B</td>
</tr>
<tr>
<td>Urban Ecosystems</td>
</tr>
<tr>
<td>Urban Forestry and Urban Greening</td>
</tr>
<tr>
<td>Urban Geography</td>
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</tbody>
</table>

*Source: compiled by editor*
<table>
<thead>
<tr>
<th>Award &amp; Achievement</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 : The Keith Runcorn Travel Award for the European Geosciences Union (EGU) General Assembly</td>
<td>Chun, Kwok Pan</td>
</tr>
<tr>
<td>Outstanding Young Scholar Award by the National Science Foundation of China (2013)</td>
<td>He, Shenjing</td>
</tr>
<tr>
<td>Young Scientist Award in Geographical Sciences by the Chinese Geographical Society in 2013</td>
<td>He, Shenjing</td>
</tr>
<tr>
<td>John Dyckman Award for Best Dissertation in Planning, USC Sol Price School of Public Policy</td>
<td>He, Ying, Sylvia</td>
</tr>
<tr>
<td>Badge of Honour</td>
<td>Jim, C.Y.</td>
</tr>
<tr>
<td>Commonwealth Scholarship Award</td>
<td>Jim, C.Y.</td>
</tr>
<tr>
<td>Croucher Foundation Fellowship</td>
<td>Jim, C.Y.</td>
</tr>
<tr>
<td>ISA John Z Duling Research Award (International Society of Arboriculture)</td>
<td>Jim, C.Y.</td>
</tr>
<tr>
<td>Justice of the Peace</td>
<td>Jim, C.Y.</td>
</tr>
<tr>
<td>L.C. Chadwick Award for Arboriculture Research 2014, by the International Society of Arboriculture (ISA)</td>
<td>Jim, C.Y.</td>
</tr>
<tr>
<td>2014 US National Oceanic Atmospheric Administration (NOAA) Administrator’s Award</td>
<td>Lau, Ngar Cheung, Gabriel</td>
</tr>
</tbody>
</table>
### Chart 3.2 Award Profile of our Institutes and People (2011 – current) (selected)

<table>
<thead>
<tr>
<th>Award &amp; Achievement</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 US National Oceanic Atmospheric Administration (NOAA) Distinguished Career Award</td>
<td>Lau, Ngar Cheung, Gabriel</td>
</tr>
<tr>
<td>2015 American Meteorological Society Bernhard Haurwitz Memorial Lecturer.</td>
<td>Lau, Ngar Cheung, Gabriel</td>
</tr>
<tr>
<td>2011 China Geography Outstanding Service Award, China Geography Specialty Group, Association of American Geographers, 26 April 2012, New York City, USA.</td>
<td>Lin, George C.S.</td>
</tr>
<tr>
<td>Association of American Geographers (AAG)-Regional Development and Planning Specialty Group Emerging Scholar Award (2013)</td>
<td>Liu, Xingjian</td>
</tr>
<tr>
<td>First Place, Annual Research Award, AAG-Graduate Affinity Specialty Group (2012)</td>
<td>Liu, Xingjian</td>
</tr>
<tr>
<td>Regional Studies Association &amp; Routledge Early Career Award (2015)</td>
<td>Liu, Xingjian</td>
</tr>
<tr>
<td>Third Prize, Jin Jingchang China Urban Planning Excellent Papers Award (2015)</td>
<td>Liu, Xingjian</td>
</tr>
<tr>
<td>Distinguished Visiting Fellow (DVF), The University of Birmingham Institute of Advanced Study (IAS), 2015</td>
<td>Loo, Becky P.Y.</td>
</tr>
<tr>
<td>Griffith University Short Term Visiting Research Fellowship 2015, Griffith University, for the Urban Research program in 2015</td>
<td>Loo, Becky P.Y.</td>
</tr>
<tr>
<td>Outstanding Health Promotion Project Award (2015)</td>
<td>Loo, Becky P.Y.</td>
</tr>
<tr>
<td>2014 Annual Best Paper Award for International Development Planning Review</td>
<td>Xu, Jiang</td>
</tr>
<tr>
<td>Regional Plan Association and Lincoln Institute of Land Policy (USA) Research Paper Award</td>
<td>Xu, Jiang</td>
</tr>
</tbody>
</table>
### Chart 3.2 Award Profile of our Institutes and People (2011 – current) (selected)

<table>
<thead>
<tr>
<th>Award &amp; Achievement</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Environment and Planning A</em> Referee of the Year Award 2014 (Pion)</td>
<td>Yang, Chun</td>
</tr>
<tr>
<td>2012 Dr. Gill-Chin Lim Global Award presented in the 53rd Annual Conference of Association of Collegiate Schools of Planning, at Cincinnati, USA</td>
<td>Yeh, Anthony G.O.</td>
</tr>
<tr>
<td>Recipient of UN-HABITAT Lecture Award</td>
<td>Yeh, Anthony G.O.</td>
</tr>
<tr>
<td>Prestigious Fellow on Social Science and Humanity, Hong Kong Government 2012-2013</td>
<td>Zhang, David D.</td>
</tr>
<tr>
<td>Durham Doctoral Fellowship, Durham University, UK (Full scholarship awarded under the University's fast-track initiative), 2009-2012</td>
<td>Zhang, J.J.</td>
</tr>
<tr>
<td>Research Grant for Foreign Scholars in Chinese Studies, Centre for Chinese Studies, Taiwan, 2011</td>
<td>Zhang, J.J.</td>
</tr>
<tr>
<td>Terry G. Jordan-Bychkov Student Paper Award (Best paper in the PhD category), Association of American Geographers (AAG) Annual Meeting, Cultural Geography Specialty Group, 2012</td>
<td>Zhang, J.J.</td>
</tr>
</tbody>
</table>

*Source: compiled by editor*
4. RESEARCH OUTPUTS

Geographers in Hong Kong are pursuing high quality research in all directions and with local and international significance. Our research productivity is reckoned by the volume of publications we have accumulated over the years. These outputs have achieved significant impacts in their respective fields of knowledge, which also make great contributions upon the policy practice across local, national and international levels. For readers’ information, the data recorded in this section are mainly drawn from https://scopus.com

Research Productivity

Geographers in Hong Kong have been conducting high quality research with encouraging results in publication. According to the online database of Scopus and also our own estimates, they have accumulated over 2,500 indexed publications.

Our efforts have increased recently. We have produced the records of over 1,030 indexed publications in 2011-2015 and 241 just in 2015, an average of 3.5 articles published per researchers. Chart 4.1 summarize a descriptive profile of these publications.

We compile our research findings in a variety of publication types. As the majority, 847 out of 1031 pieces of publications in 2011-2015 are journal articles. Next, there are 72 conference papers published as the proceedings of internationally renowned congress meeting, symposium or workshop. The remaining includes 112 books, book chapters, and other types of output.

Significant Impact

Adding on the high productivity, our people have also accumulated a reputation of exerting significant academic influence as reflected in the popularity of their works. Our articles are so widely circulated that aggregate a record of over 23,000 times cited by other ISI-listed works, with an average of 13 times in the times cited per article. For all articles recorded in Scopus, we record an h-index of 63. The most outstanding work is acknowledged to be cited by others in at least 868 occasions. All these records reflect the quality contribution and conveying power of our research works.

Areas of Interest

We position ourselves as a research hub into one interwoven global village. With a flexible, pluralistic and supportive environment for all sorts of research activity in Hong Kong, we also maintain close collaboration with researchers from elsewhere and across disciplines.

Our publications focus on a wide range of subjects. There is a great diversity of subject areas where our publications belong to. The broader categories cover contemporary issues in urban planning, housing, transport, GIS and remote sensing technologies, environmental management, nature hazards, and climate change. We also conduct cutting-edge research with up-to-date knowledge and innovation such as the big data applications. Along with the latest trend in interdisciplinary studies, we often collaborate with researchers from other subjects, including biology, chemistry, communication, cultural studies, economics, engineering, physics, politics, sociology, and etc.

Our research interests are also widely distributed across country and region. Amongst all of our publications, 15% of them
are specialized in Hong Kong as the study area and 32% concentrate in the greater China region. Our collaborating partners come from more than 70 countries and regions around the world.
Chart 4.1 Number of Publications by Year

*Source: [http://www.scopus.com](http://www.scopus.com); only selected publications are included.
Summary report of activities to IGU General Assembly
over the inter-congress period 2012-16

Introductory information
Croatian Geographical Society (in Croatian officially Hrvatsko geografsko društvo (HGD), established in 1897) is a non-profit, non-government organization acting primarily as a national hub for professional geographers with its main goal of promoting geographic education, knowledge, skills and practices throughout the society. It is a member of Croatian natural science association (est. 1885), European Association of Geographers (EUROGEO) and of the International Geographical Union (IGU-UGI). The Croatian Geographical Society headquarters address is Marulićev trg 19, 10000 Zagreb, Croatia (Hrvatska). Its website URL is http://www.hagede.hr/. The current membership is around 300 members. Current president is Associate professor Danijel Orešić (5 year mandate 2013-2017)

General goals and activity
The Croatian Geographical Society was founded to encourage the dissemination of geographic research and knowledge, to cooperate with other similar societies in Croatia and abroad and to generally popularize geography. Improving geographic education and professionalization is among its mayor goals especially after WWII. Its members are mainly geography and geography education masters as well as alumni employed in business, government and nonprofit organizations in the Republic of Croatia.

The Society accomplishes its goals through its journals, one scientific (Hrvatski geografski glasnik, ISSN 1331-5854, since 1929, currently 2 issues annually) and one professional/popular (Geografski horizont, ISSN 0016-7266, since 1955, currently 2 issues
annually; occasional monographies/special editions; national congresses (every 4 years) and other scientific meetings; lifelong learning programs; national and international school geography competitions, web geography education and popularization. On many of its goals it cooperates with Ministry of science, education and sports, government educational agencies, university geographical institutions and regional geographic societies.

Major activities and projects in 2012-2016 IGU intercongress period

Administrative activities:
In January 2013 electorate assembly was held and according to the statute for the next mandate 2013-2017 period 13 member management board was elected, which elected the president of the society (Danijel Orešić), its vice-president (Ivan Čanjevac) and its secretary (Marin Cvitanović).
New editors in chief of Croatian Geographical Society publications was elected in 2013, Vuk Tvrtko Opačić for Hrvatski geografski glasnik and Vedran Prelogović for Geografski horizont.
In 2015 Croatian Geographical Society revised its statute according to the new law considering nonprofit organizations. Minor changes were made.

Scientific activities:
In the 2012-2016 period Croatian Geographical Society organized:
In August 2014 International scientific conference Water sustainability: new challenges and solutions hosted by Commission for Water Sustainability of the IGU in Dubrovnik, Croatia. There were 22 registered participants from 9 countries, 17 presentations and a book of abstract was published. A one day conference field trip was

Its 6th national congress, officially 6th geographical congress: Integrative and applied spatial research in Trogir, from September 29th till October 2nd 2015. There were 99 registered participants, including colleagues from Bosnia and Herzegovina and Slovenia. There were 62 presentations and a book of abstracts was published. A field excursion was held during October 1st and 2nd in the Split-Dalmatian County in Croatia and in the neighboring part of Bosnia and Herzegovina.
And co-organized (as one of the organizers):

**Lifelong education programs**
Croatian Geographical Society regularly holds its seminars for geography teachers, two every year: Winter Seminar for geography teachers (annually since 1955) and Summer Seminar for geography teachers (annually since 1951). Those are regularly organized during the 2012-2016 period, 2 days every winter with some 15 presentations gathering around 500 teachers from all over the country, and 1 day every summer with up to 10 presentations gathering around 300 teachers.

In the 2012-2016 period also several Geography workshops for smaller groups (up to 20) was held by the members of the Department of Geography, Faculty of science, Zagreb University, mainly about information technology in teaching geography.

**School geography education and competitions:**
Croatian Geographical Society in cooperation with State Agency for Education organizes National school geography competition (annually since 1994) as one of the largest school competition in Croatia. It is being organized on communes, county and state levels. From it selection is made for participation on IGEO - International Geography Olympiad (participation since 2009). Croatian Geographic Society is preparing the geography Olympiad team. In the period 2012-2016. Croatian team participated on every IGEO: Köln 2012, Kyoto 2013, Krakow 2014, Tver 2015 and they won 13 medals in total (6 gold, 5 silver and 2 bronze medals) showing excellent results.

**Popularization activities:**
In the 2012-2016 period Croatian Geographical Society continued hosting (a tradition since 1947) it's popular Geographic Monday Public Lectures with a dozen lectures annually. Society Web programs *E-school for young scientists* and *Educative portal www.geografija.hr* continued its work.
Publications:
In the period 2012-2016 Croatian Geographical Society continuously and regularly published its scientific publication Hrvatski geografski glasnik, 2 issues annually (http://hrcak.srce.hr/hrvatski-geografski-glasnik). The new editor in chief strengthened its international character, introducing new editorial members from abroad and since Vol.77, No.2 issue the publication is published in a revised format and bilingually, in both Croatian and English. The professional/popular publication Geografski horizont was also regularly and continuously published.

Conclusion remarks
Croatian Geographic Society in the 2012-2016 period remained the umbrella organization for all its geographers, though independent regional geographic societies are also active. The Society furthered its cooperation with the Ministry of Science, Education and Sports and with state educational agencies and worked with them on geography curriculum questions and state high school graduation exams. Most important it significantly contributed to the new project of the national curriculum in 2015 and 2016 especially in the geography curriculum, contributing to the new student-oriented and research-oriented curriculum. The future mission of Croatian Geographic Society is to remain on the path of advancement of geography education and of validation of geography as a modern science which in dealing with functional organization of geospatial systems can provide many answers to questions of our sustainable development.

In the name of the Croatian Geographic Society
Danijel Orešić, president
Czech Geographical Committee was transformed on 15th January 2014 from a small body consisting of three members only to more representative body by incorporating most of heads of geographical, cartographical, demographic geo-informatic, and geomatic departments at the Czech academic institutions. The number of members increased to about 25.

The head of Czech Geographical Committee is Vít Vilímek (Department of Physical Geography of Faculty of Science at Charles University in Prague), the deputy-head is Tadeusz Siwek (Department of Human Geography and Regional Development of Science Faculty at University of Ostrava), the secondary deputy-head is Jaromír Kolejka (Department of Environmental Geography of Institute of Geonics, Czech Academy of Sciences, Brno Branch), the secretary is Mrs. Dr. Dana Fialová (Department of Human Geography of Faculty of Science at Charles University in Prague).

The Committee are meeting once a year, usually on January.

Organizational aspects of geographical community in Czechia are managing by the Czech Geographical Society. The president of this nation-wide organization, established 1894, is Bohumír Janský (Department of Physical Geography of Faculty of Science at Charles University in Prague). Czech Geographical Society has 8 regional branches and 7 sections: Physical Geography section, Socio-economic Geography section, Regional Geography section, Cartography and Geoinformatics section, Geography Education section, Section for Historical Geography and Environmental History and Polar Section.

Number of members fluctuates between 450-480. Numbers of Czech geographers by education are several thousands. Many of them have jobs very far from studied discipline, some of them are even in the top of Czech policy. During period 2012-2016 three geographers occupied such top positions: first of them was Alexander Vondra, a Czech senator (2006-2012) and a minister of defence of the Czech Republic (2010-2012), the second was Tomáš Hudeček, a mayor of Prague, a Czech capital (2013-2014) and the third is Josef Postránecký, deputy minister of the interior for civil service, which is a head of all civil servants in Czechia (from 2015).

The publishing activity of Czech geographers deserves a positive assessment. Two Czech journals are now indexed in the database of Web of Knowledge: Geografie, journal of Czech Geographical Society (issued from 1896 in Czech, now in Czech and English) and Moravian Geographical Reports, a journal of Institute of Geonics, Czech Academy of Science (issued from 1991 only in English). Some other journals are indexed in database Scopus, for example Acta Geographica Universitatis Carolinae. A journal Geografické rozhledy (issued from 1991 in Czech), serves to teachers of geography. All these journals represent solid national level of quality and they are visible also at the international scene.
Czech geographers have quite good position in Czech universities. Their formal position is the best in some smaller Czech universities: see two rectors of University of Jan Evangelista Purkyně in Ústí nad Labem, first René Wokoun (2011-2015) and second Martin Balej (from 2015 till now), next a dean of the Faculty of Education at the University of Southern Bohemia in České Budějovice, Michal Vančura (from 2010 till now) and a dean of the Faculty of Science at the University of Ostrava, Jan Hradecký (from 2015 till now).

The position of Czech geography among other sciences in Czechia is not so strong as could be because of scientometric characteristics reached by many Czech geographers are not so high. Most of Czech geographers have been traditionally publishing predominantly books than papers in journals, especially in journals indexed at database Web of Knowledge. Structure of geographical publications is similar to publications in social sciences, but geography is placed among natural sciences in all Czech universities and it have to compete with chemistry, biology and physics. In spite of it there are emerging a positive turn in publication strategies of many younger geographers, because their results measured by scientometric tools are continually improving. We hope to decrease a gap between formal evaluation of Czech geography and other sciences in Czechia in a close future.

Czech geography is represented in the IGU structure by Ivan Bičík, former president of the Czech Geographical Society, which is a head of Commision 12.26 Land Use and Land Cover Change. The Czech representatives have been taking part in all events organized by IGU: 32nd geographical congress in Cologne (2012), regional conferences in Kyoto (2013), Kraków (2014) and Moscow (2015). They are regular attendants of events organized by association of European geographers EUGEO, like 5th EUGEO congress in Budapest (2015).

The Czech Geographical Committee bids a Czech capital Prague as a host city of IGU regional conference in 2018 but was beaten tightly by Québec. So Czech geographers decided to bid Prague as a host city of IGU congress in 2024.

Author of report: prof. Tadeusz Siwek
Deputy-head of the Czech Geographical Committee
and past-president of the Czech Geographical Society
Report from the IGU National Committee in Denmark 2012-2016

From The IGU Congress in Cologne, where we were participating, the main work in the National Committee have been to follow, how geography developed in educations at primary, secondary, high school and university level. We have had discussions how to use “learning outcome” as a basic tool in planning and developing the focus of the teaching. We have secured a better presentation in the National Committee from scholars specialized in the didactic of Geography

We have taking part in the discussion of how many hours a week should be allocated to geography in the High School. There has been a slight increase in the number of hours allocated to geography.

We have followed the research development at the universities.

We attended the regional meeting in Krakow.

We have together with Royal Danish Geographical Society planned some of the lectures at the member meeting in the Geographical Society.

We have discussed and planned how to engage proffessors at the universities more in the Olympiad of Geography.

We have taken part in meetings where the promotion of cultural collaboration between India and Denmark was at the agenda. In this connection one of the deputy chairs of IGU Prof. Sing visited Roskilde University and got information of the focus of Danish geography, and how it was developing. Mr. Sing accepted a chapter on sustainability from one of staff members at Roskilde University to one of his readers publicized by Springer Verlag.

Henrik Toft Jensen

Chair of the Danish National Committee of Geography.
1. NATIONAL ACTIVITIES

1.1. Events and Projects


* **Organization of common seminars by CNFG and AGF (Association of French Geographers)**
  - NOVEMBER, 2014. In the context of UNESCO’s international year on Family Farming, a seminar was held to discuss family farming in all its diversity, and through cross-disciplinary perspectives.
  - IN PROGRESS, 2017. A seminar on "Geography of Retail and Entertainment" will be organized with the collaboration of the Geography of the retail commission.

* **Activities of the CNFG commissions**

  **More than one hundred events and fieldtrips were organized.** Among the most recent, we can mention the seminar on “How teachers of the future can take advantage of the design of Master’s degree for a better teaching of geography and history in the secondary”, organized by the Epistemology, History and Teaching of the geography commission; the seminar on “The first suburbs in the reorganization of metropolitan area: the case of Paris”, by Towns and Metropolitan regions commission; the seminar “Crises and Changes” organized by the Economic Geography commission. Note that the Rural Geography commission celebrated its 50th anniversary in 2016.

* **The Night of Geography** (to be organized)

  The CNFG has decided to organize a public event, called “The night of geography”, whose aim is to explore and discover unusual geographies. An entertaining event for everybody, in two steps: 1- animations and geographical conferences in the evening at various locations; 2-Night walks in the city. The goal is to make better known scientific researches in geography, and to discover places through geographers’ eyes.

1.2. Enhancing institutional links

The CNFG has continued its collaboration with the FIG for the presentation of the Geography Thesis Awards. In addition, greater collaborations between CNFG and other national geographic associations have been realized, most notably: the Société de Géographie, the Association of French geographers (AGF). The CNFG has also been getting closer to other scientific committees (geology, cartography, history of science), especially when they all meet at the coordination of French scientific committees meetings (COFUSI). The CNFG was asked by the latter to present the IYGU and Paris 2022 projects at its general assembly. As part the Paris 2022 meeting, a Path to Paris 2022 will start with the bicentenary of the Société de Géographie (founded in 1821) and lead to the extraordinary congress celebrating IGU’s 100 anniversary. National Committees have expressed interest in participating to the event.

1.3. New responsibilities to the Board, more visibility

Considering the need to strengthen some missions, three new functions were created and approved at the 2015 executive meeting: 1-Deputy treasurer, in charge of subsidies and sponsorship; 2-Deputy president, in charge of communication, and of the CNFG Facebook; 3-Deputy president for digital communication, such as the “Recruitment wiki” which tracks the auditions and hiring for the Assistant and Full Professors’ positions. By creating a Facebook page and a newsletter, the CNFG wants to expand the diffusion of Geographic news to geographers and to the larger interested public.
2. INTERNATIONAL ACTIVITIES

2.1 Events and projects

* International symposiums of commissions, organized with the CNFG collaboration:
- NOVEMBER 2014: 14th symposium BRIT (Border Regions in Transition) held in Arras, Lille (France) and Mons (Belgium) on "The border, source of innovation";
- NOVEMBER 2014: Conference on "Environment and Geomatics, comparative approaches France - Brazil", organized by the commissions of Geomatics and Climate and Society, Rennes (France);
- MAY 2016: Symposium organized by the Department of Geography at the University of Lomé (Togo) and CNFG’s Commission on Geography of Retail on :"The retail market transformations facing the urban dynamics: Perspectives South-North". The idea of creating a Francophone Research Network on retail geography, based on the Department of Geography of Lomé emerged. A newsletter should be published twice a year to inform on new publications, Ph.D., ongoing or completed seminars, etc.
- IN PROGRESS, JULY 2017: the 17th symposium IMGS (International Medical Geography Symposium), organized by the Geography of Health commission, Angers (France).

* Organized by the CNFG
- JULY 2014: Francophone Forum on Language, and scientific production and diffusion in the context of globalization: a question for geographies and geographers. Colleagues at all academic positions, (Professors at all levels, Teaching Assistant, Ph. D. students) of Belgium, Canada, UK, Germany and Russia ...), came to express their diverse experiences with languages. IGU President Vladimir Kolosov and Dieter Soyez of the IGU Executive Board participated. The account is available on the CNFG Facebook page: http://cnfg.fr/index.php?option=comcontent&view=article&id=327&Itemid=354

As a follow-up, Antoine Le Blanc and Nathalie Lemarchand, vice presidents of CNFG, organized a bilingual session during IGU Krakow meeting (2014), French and English, on the importance of multilingualism and the specificities of geographical science in globalization. Likewise, the main conclusions of the Forum were presented at the AAG conference in Chicago (2015).

* IGU Meeting, Paris 2022
The CNFG will organize in Paris the extraordinary Congress celebrating IGU’s 100th anniversary. The conference theme is: Le temps des géographes /Time for geographers. Significant support has been obtained: Société de Géographie (SDG), Association of French Geographers, Geographical Society of Liège, Paris 1-Institute of Geography, the Paris Region, the International University City, the Royal Society of Belgian geography, the Belgian National Committee of Geography. The latter has agreed to participate at various events (Commission’s meetings in Belgium; an exposition on the evolution of geography in France, Belgium and the Netherlands; the organization of geography Olympics).

2.2 Institutional reach
The Franco-Polish and Franco-Spanish scientific meetings have been taking place in 2016. The Franco-Polish Meeting was organized on the occasion of the 100th anniversary of the Polish Society of Geography. It took place in June at the Polish Library of Paris and at the Scientific Centre of the Polish Academy of Sciences of Paris. More information: http://academie-polonaise.org/assisesgeo2016/

The Franco-Spanish First Days of Geography, co-organized by the CNFG and the Association of Spanish Geographers and the University of Granada, will be held in Granada in October. At both meetings, bilateral agreements are to be signed between the CNFG and the National Committees of Geography, of Poland in May and of Spain in October.

EUGEO 2017, Brussels, September: Antoine Le Blanc and Nathalie Lemarchand, two CNFG Vice-Presidents, are involved in the event. A. Le Blanc as a member of the organizing committee, and N. Lemarchand, as a member of the scientific committee.
1. LES ACTIVITES NATIONALES

1.1 Manifestations et projets

* **Table ronde sur les docteurs et doctorants** (Avril 2014)

* **Organisation de journées d'études thématiques CNFG-AGF (Association des Géographes Français)**
  - NOVEMBRE 2014 :Dans le cadre de l’année internationale de l’UNESCO sur l’agriculture familiale, une journée d’étude a été organisée en s’appuyant sur les commissions du CNFG. Interrogeant l’agriculture familiale dans une diversité de lieux et de systèmes, elle a été l’occasion de regards disciplinaires croisés.

* **Vie des commissions**

* **Projets (en préparation)** : *La nuit de la Géographie*
  Le CNFG propose un événement ouvert au public permettant de découvrir la géographie dans certaines de ses facettes inhabituelles. Une découverte ludique et accessible en deux temps : 1) une soirée d’animation et de conférences géographiques ; 2) des promenades géographiques nocturnes. L’objectif de cette manifestation est de rendre accessible la recherche universitaire en découvrant le monde du quotidien et d’ailleurs au travers d’un regard de géographe.

1.2 Liens institutionnels


1.3 Développement structurel et ouverture

Prenant acte de la nécessité de renforcer plusieurs missions du bureau, trois nouvelles charges ont été créées et approuvées lors de la réunion du Conseil de 2015 : 1- trésorier-adjoint en charge des subventions et du « sponsoring » ; 2- communication, en charge de la page Facebook du CNFG ; 3- outils numériques (exemple : suivi des auditions pour le recrutement de MCF / PU). De même, le CNFG souhaite contribuer à la diffusion d’informations géographiques et d’informations scientifiques et professionnelles auprès des géographes et plus largement auprès d’un public intéressé à suivre l’actualité de la Géographie. Dans ce but, une page Facebook du CNFG a été créée et une newsletter diffusée. Deux des charges de missions sont spécifiquement dévolues à cet objectif, la 3ème visant à favoriser le soutien financier au CNFG, devrait bénéficier de ces outils.
2. LES ACTIVITÉS INTERNATIONALES

2.1 Manifestations et projets

* Colloques internationaux des commissions avec soutien financier du CNFG
- NOVEMBRE 2014 : le 14ème colloque BRIT (Border Regions In Transition) organisé à Arras, Lille (France) et Mons (Belgique) sur le thème « La frontière, source d’innovation ».

* Manifestations organisées par le CNFG :


* Congrès de l’UGI : Paris 2022

2.2 Liens institutionnels


PROGRESS IN INDIAN GEOGRAPHY

A COUNTRY REPORT
2012-2016

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33rd International Geographical Congress
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August 21-25, 2016

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Progress in Indian Geography

A Country Report

2012-2016

Editor
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33rd International Geographical Congress
Beijing, China
August 21-25, 2016

Indian National Science Academy
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Foreword

The Progress of Indian Geography (2012-16) is a noteworthy publication under auspices of Indian National Science Academy (INSA) to be presented in 33rd International Geographical Congress at Beijing, China. The responsibility to compile and publish this report was assigned to Prof. R.B. Singh by IGU National Committee. He has accomplished the task zealously and his contribution is commendable. India has been in phase of transformation from a long time. It has some serious implications on its economy, society and environment. Geography as a discipline encompasses all of the three dimensions of human society and contributes to human wellbeing. A number of studies have been done by Indian geographers to identify and resolve various contemporary issues. The Indian geographers have been increasingly using the field based techniques together with application of Remote Sensing and GIS as part of the curriculum and research. The report highlights relevant contributions by Indian geographers to various branches of Geography during the period of 2012-16.

The editor has thoughtfully divided the report into 14 sections pertaining to various branches of Geography viz. Geographical Mosaic of Incredible India, Status of Geography in Indian Universities, Environment and Resource, Geomorphology, Population Geography, Urban Geography, Cultural Geography, Geography of Gender, Political Geography, Rural and Regional Development, Land Use and Agriculture, Geography of Himalaya and Remote Sensing and GIS. The various sections of this report have been authored by experts from various branches of Geography. The authors have made extensive efforts to present all the significant studies. The authors are optimistic about the future of the discipline in India. Many researchers have established new frontiers in the field of Geography and explored the unexplored territories enriching the discipline with new experiences and knowledge. Determined efforts have been made by Indian geographers to bring the discipline to desired level of international standard.

Professor Harsh Gupta
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Curiosity about various places and people led to the development of geography. The knowledge of geography existed since the establishment of earliest civilisation on the earth. Geography is not just about memorizing place names, it is much beyond that. Geography answers the questions like where the things, activities or phenomena are located, why those are located there, how the features and activities interact, and what factors cause this distribution. Geographers exercise both scientific and social analytical skills. Geography has been called as bridge between human and physical sciences. In the beginning, geography focussed on physical aspects of the earth but the modern geography is an all-encompassing discipline that seeks to understand the Earth and all of its human and natural complexities.

History of geography in India dates back to the Vedic period. The people have been using the concepts of geography knowingly or unknowingly in their everyday life. Geography as a discipline in modern India was established with the opening of Geography Departments at various Universities in the early 20th century, since then there has been no looking back for Geographers of India. Today almost every Indian university has a Geography Department enriched with good academicians. The Geography Departments are well equipped with all traditional geographical tools as well as modern equipments like Computers, Remote Sensing and GIS softwares and GPS. Thousands of students in India are getting their post-graduate degree in Geography every year along with hundreds of Ph.D. scholars. Great number of research papers are being published in national and international journals pertaining to the discipline of geography.

Indian Geographers have been working on varied themes like History of Geography in India, Environment and Resource, Geomorphology, Land Use and Agriculture, Rural and Regional Development, Urban Geography, Population Geography, Cultural Geography, Political Geography, Geography of Gender and Geography of Himalaya. Geomatics has also emerged as a new branch of geography and involves the use of traditional spatial techniques used in cartography and topography and their application to computers. Geomatics has become a widespread field with many other disciplines, using techniques such as GIS and remote sensing.

The progress of Indian Geographers in last four years viz. 2012-2016 has been creditable. The focus of Indian geographers has shifted towards the contemporary global issues and initiatives like Disaster Risk Reduction by UNISDR, Sustainable Development Goals, Habitat III by UN, COP21 by UNFCCC, Urban Health and Wellbeing, Future Earth Initiative by ICSU and International Year of Global Understanding by ICSU, ISSC and CIPSH. The environmental geographers made much of the contribution in the field of climate change, urban environment, land use change, forest and biodiversity. The themes like water resource, wetlands, mountains, resource conservation and management are other research areas. Under the theme of regional planning and
development, geographers have focussed on issues like urban and industrial development, resource scarcity, education, health and service area based regional planning. The issues which dominated the theme of population geography were population composition, fertility trends, migration, health and gender.

The processes and patterns of agricultural development continue to attract attention of the agricultural geographers. The sub-discipline was dominated by issues like agricultural development, productivity, cropping pattern, impact of modern technology, sustainability of agriculture, food security, agricultural marketing, etc. The topic of land use/land cover continues to be of importance for geographers but the approach has changed due to increased knowledge of Remote Sensing and GIS. The work done in geomorphology mainly relates to the fluvial geomorphology and soils. The studies in climatology were related to temperature variability, Indian Summer Monsoon, aerosols, climate change modelling and forecasting.

Most urban studies have been related to evolution of urban settlements, land use and internal structure of towns, demographic profile of urban centres, rural–urban migration, urbanization, urban growth, city-hinterland relations, urban fringe, size and spacing of urban settlements, urban informal sector, functional classification of towns, urban environment, slums etc. The publications in Political geography were not very high in number but the issues were multi-dimensional in nature.

In Indian geography a bulk of work has been done in new sub-disciplines of cultural and gender geography. Disparities and distinctness of ‘cultural landscape’ has been a core concern of studies by cultural geographers and they still emphasize on the descriptive-narrative and ethnological interpretation. Presently in the arena of cultural studies in India, the issues of conversation and contestation have received more attention. Most of the gender geographers place themselves at the intersection of geography, population and development studies.

Besides this, number of seminars and conferences have been organised by the Indian Geographical Societies to highlight the various issues and to provide the Indian geographers a platform to present their findings and nurture the budding geographers. In this regard, the role of National Association of Geographers in India (NAGI) has been praiseworthy. Apart from above, several International and National IGU seminars/conferences were organised in different parts of the country in order to promote IGU activities in India. IGU office bearers visited IGU, Rohtak India in March, 2013 and IGU, Delhi in March, 2016.

I would like to express my sincere thanks and gratitude to all contributors Prof. Sudesh Nangia, Dr. N.C. Jana, Prof. Kalpana Markandey, Prof. Rana P.B. Singh, Prof. N.Nagabhushanam, Prof. Vishwas S. Kale, Prof. Sudeepta Adhikari, Prof. R.B. Bhagat, Prof. Krishna Mohan, Dr. Vishwambhar Prasad Sati, Dr. Anindita Datta, Dr. Ajay Kumar, Mr. Senaul Haque and Ms. Aarti for successful completion of their respective chapters.

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International Geographical Union (IGU) Activities in India and National Committee Report (2012-2016)

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Introduction

The Indian geographical communities, organisations and departments have organised a number of seminars, conferences and workshops during 2012-2016 in different parts of country. Some of the events were organised in collaboration with several IGU Commissions and had been successful in their aim of disseminating geographical knowledge across different sections of academics. The various IGU activities in India during 2012-2016 include the following:

International Conference on Geoinformatics for Biodiversity and Climate Change, 14-16 March, 2013

The conference was participated by 5 IGU Commissions including Biogeography and Biodiversity (R. Hietala), Land Use and Cover Change (E. Milanova and G.S. Chauhan), Hazard and Risk (S. Haruyama), Local Development (Michael Sofer), and Geoparks (Subhash Anand). Participants include two chair of National Committees (Japan - S. Haruyama and South Africa - Brij Maharaj) and by K. Kimoto of India-Japan Research Programme, while IGU-IUGS Collaboration was discussed with Dr. Eduardo de Mulder on Geoparks and Mega Cities.

Inaugural Function

The conference was inaugurated by Honorable Chief Minister of Haryana Shri Bhupinder Singh Hooda. Prof. R.P. Hooda, Vice-Chancellor, MD University, Rohtak presided over the session. Other dignitaries include Vladimir Kolossov from Russia.
(IGU President), Ronald F. Abler from U.S.A. (IGU Past President), D. Soyez from Germany (IGU Vice President), R.B. Singh from India (IGU Vice President). From the organizing committee M.I. Hassan (Head and Convener), Mehtab Singh (Organizing Secretary) and Inderjeet Singh welcomed the delegates and briefed them about the conference.

**Plenary talks**

1. Chairman IGU Vice President Giuliano Bellezza, Professor Ed de Mulder (Earth Science Matters): bottom-up vision of modern cities Professor Michael Sofer (Local Development): Rural-Urban Fringe between Tel Aviv and Haifa

2. Chairman Professor Shigeko Haruyama (Chair, Japan National Committee: Hazards and risks)

**Special Session**

Research Project between University of Delhi and University of Turku (Finland) collaboration has been working on the research project entitled “Livelihood Security in the Changing Socio-Economic Environment in Himachal Pradesh”. This special session includes preliminary findings of research results of the project. The session was jointly...
chaired by V. Kolossov, President, IGU and Ronald F. Abler, Past President, IGU. Prof K. Kimoto (Hiroshima Jogakuin University, Japan) co-chaired the session. Keynote address was delivered by R.B. Singh and R. Heitala. The presenters include Pankaj Kumar, Ajay Kumar, Nitu, Sandeep Jha, Swarnima Singh, Abhay Shankar Prsasad, Ashok Kumar, Manjit Singh.

**IGU Executive Committee Meeting**

During March 15-16, IGU Executive Committee Meeting was held at Rohtak after 1968. The meeting was participated by 8 IGU Office Bearers including President, Past President, Vice Presidents, Secretary General and Treasurer. Special visitors of the Executive Committee include Dr. Eduardo de Mulder (Ex IUGS President, The Netherlands) Prof. S.Haruyama (Chair, Japan National Committee). Professor Krishan Lal (President-Indian National Science Academy (INSA) has also interacted with IGU Office Bearers in the Executive Committee meeting on 16th March, 2013 in order to strengthen collaboration between IGU and INSA. He elaborated various steps taken by INSA for developing scientific temper in the country.

In the Vivekananda Library, the Indian National Science Academy (INSA) President meets President and IGU Office Bearers at IGU Executive Committee meeting

**Scientific-Technical Sessions**

About 20 foreigners from USA, Russia, Japan, Australia, South Africa, Finland, The Netherlands, Germany, Nigeria and Italy and more than 500 Indian participants participated and presented their papers in the conference. 468 abstracts were received and included in the pre-proceedings. The Technical sessions included:

- Biogeography and Land Information System
- Land Use Land Cover Change and Biodiversity
- Climate Change and Extremes
- Natural Resource Management
- Urban Health and Well-being
Coastal Zone Management
Population-Development-Environment Interface
Integration of Remote Sensing, GIS and GPS for Geospatial Applications

Valedictory Session

Prof. Krishan Lal, President, Indian National Science Academy was the Chief Guest of the valedictory session. The session was presided by Prof. R.P. Hooda, Vice-Chancellor, MD University, Rohtak. Other dignitaries include Vladimir Kolossov from Russia (IGU President), R.B. Singh from India (IGU Vice President), M.I. Hassan (Head and Convener), Mehtab Singh (Organizing Secretary) and Pramod Bhardwaj from MDU.

Major Discussions

The over-exploitation of some of the important earth resources like land and water has led to a number of environment related problems world over. At the same time, land use change supplemented by various human activities has led to extinction of many plant and animal habitats and species. In this context, the relevance of biodiversity for human survival is becoming a major international political issue as scientific evidence builds on the global health implications of biodiversity loss. These issues are closely linked with the issue of climate change, as many of the health risks due to climate change are associated with fast degradation of biodiversity. The presentations during various sessions emphasized on holistic natural resource based spatio-temporal planning, development and management and considered them as essential to save the degraded ecosystem for sustainable resource management.

This International Conference aimed to highlight the various environmental problems associated with development and changing climatic scenarios. The presentations agreed that the problem of climate change and ensuing transformations that are manifest in various sectors of human life on the earth is an important area where the geoinformatics can play a vital role. Environmental perspectives and the
scientific approaches including modern technologies are bringing spatial solutions to environmental and societal problems. Geoinformatics along with its accessories like Remote Sensing and GIS help in assessing the results of various environmental problems both physical and social. This conference welcomed geographers, scientists, hydrologists, academicians, researchers, technologists, environmentalists, engineers, planners, policy makers, social workers, research students and other interested professionals from geography and its allied fields in order to share their research experiences. They committed to collaborate further through various IGU Commissions to improve knowledge and communicating geographical researches to policy makers.

**Scientific Field Visit to Jind, Rohtak and Sonepat District**

On 17th March, 2013 a scientific field trip for foreign participants was organized in the rural Haryana area, visiting the Lakshya Dairy Farm and Bibipur Village in Jind district and the Dagan Organic Farming near Narela. The Lakshya dairy provides livestock based livelihood opportunities to more than 10,000 households, using Netherland milk cows and Murrah breed of buffaloes. The products include more than 20 types of dairy items.

![Lakshya: Friesians milk Cows, Murrah buffaloes, yoghurt packaging](image1)

In Bibipur village the Panchayat (local Government) has taken several initiatives for balancing sex ratio and women empowerment. One of the unique examples of women empowerment can be seen through total management of village dairy by women.

![Greetings reception of women; the woman “Alfa” has a seriously injured leg](image2)
After passing through agricultural and industrial landscape the delegates visited the Dagar Agricultural Farm, using holistic organic farming system, with several types of non-conventional energy sources:

- Cow dung for biogas and small solar thermic panel on the roof;
- stubble mulching to renew soil.

International Conference on Mountain Response to Global Change, 4-5 June 2014 (University of Srinagar (Jammu-Kashmir))

**IGU Commission and Task Force Liaison**

Actively involved with the IGU Commissions on Biogeography and Biodiversity and helped in organising IGU India Conference on Geohazards, Biodiversity, Resource sustainability and Mountain response to Global Change at Srinagar, Kashmir during June 4-5, 2014 at University of Kashmir, India where representatives from IGU Commission on Biogeography and Biodiversity, Land Use and Cover Change, Hazard and Risks and Geoparks participated including Vice Presidents Himiyama, IGU Commission Chair Udo Schckhoff and Marek Degórski, Director, Institute of Geography and Spatial Organization, Polish Academy of Sciences and several others.

Inaugural session at IGU, Srinagar
Assisted to organise another IGU Conference on Re-Orienting Gender: Geographies of Resistance, Agency, Violence and Desire at the Department of Geography, University of Delhi in November 19-21, 2014 where Chair of IGU Commission Gender and Geography and around 200 delegates participated.

**International Conference on Re-Orienting Gender: Geographies of Resistance, Agency, Violence and Desire in Asia November 19-21, 2014**

The Conference were supported and endorsed by the IGU Commission on Gender and Geography, The Indian Council of Social Science Research (ICSSR), The Swedish South Asian Studies Network (SASNET), The Indian National Science Academy (INSA) and the SAP programme, Department of Geography.

The international conference Re-Orienting Gender: Geographies of Resistance, Agency, Violence and Desire in Asia was organized by the Department of Geography, Delhi School Of Economics, University of Delhi. Convened by Dr. Anindita Datta and supported and endorsed by the IGU Commission on Gender and Geography, the conference is the second major conference convened by Dr. Datta and organized by the Dept. of Geography, University of Delhi on the theme of Gender and Geography with a focus on Asia. The earlier conference- ‘Contextualizing Geographical Approaches to the Study of Gender in Asia’ was organized in 2010 in collaboration with the Australian National University and also endorsed by the Commission. The present conference began on a warm informal note with a meet and greet on the evening of the 18th of November. Delegates from 9 countries had already arrived and got the opportunity to meet fellow delegates over a light informal dinner sponsored by the INSA (Indian National Science Academy) at the International Guest House University of Delhi.

A formal inaugural session on the morning of the 19th of November saw the convener, Dr. Datta along with Prof. R.B. Singh Head of the Dept. welcome delegates in their opening addresses. Vibha Parthasarathi, Eminent Educationist, Social Worker and former Chairperson, National Commission for Women inaugurated the conference.
Prof Tovi Fenster, member of the steering Committee of the IGU Commission on Gender and Geography represented the Commission and formally endorsed the event. Chief Guest Vibha Parthasarathi released the proceedings at the end of the inaugural session and commended the organizers for their efforts in making the same available expeditiously to a wider audience.

Inaugural session. Seen (from L to R) are Prof. Saraswati Raju, keynote speaker, Dr. Anindita Datta, Convener, Prof. R.B. Singh Head of the Dept, Prof. Tovi Fenster, member Steering Committee of the IGU Commission on Gender and Geography, Prof. Helle Rydstrom Keynote speaker and Vibha Parthasarathi, Chief Guest.

The conference saw a total of 26 papers being presented in 9 technical sessions, 6 of them were parallel sessions. In addition there were two keynote speeches delivered by Prof. Saraswati Raju and Prof. Helle Rydstrom. The conference also saw the screening of a National Award winning documentary on the resilience of farm widows of the Punjab as well as conference workshop on feminist methodologies and emerging research on gender targeted at early career researchers. The plenary presentations were made By Prof. Anna Lindberg and Prof. Catarina Kinvall of the Lund University Sweden and supported by the Swedish South Asian Studies Network along with Dr. Anindita Datta. The discussion was moderated by Prof. Sachidanand Sinha of the Jawaharlal Nehru University.

Eighth India International Geographical Union (IGU) Conference Report Landuse, Water, Climate and Urban Health in Changing Urban Environments, 4-6 November, 2015

The Eighth India International Geographical Union (IGU) Conference was organized by the Department of Geography, SNDT Women's University, Pune campus, Pune in collaboration with International Geographical Union (IGU) during 4th to 6th November, 2015. The theme of the conference was “Landuse, Water, Climate and Urban Health in Changing Urban Environments”. The theme was chosen to identify the socio-cultural, economic, institutional, political barriers, opportunities and mechanisms to promote the balance between needs, desires, growth, development and planning. Thus the omphalos of the conference was on the fundamental environmental, social and economic problems faced by our planet in the 21st Century. The conference highlighted
the various environmental problems associated with development and changing climatic
scenarios concerned with the urban environment. It provided a platform for
multidisciplinary researchers, geographers, planners and policy makers to share their
research experiences.

Inauguration Programme (4th November 2015)

The conference was inaugurated with the lightening of the lamp, followed by paying
homage to Maharshi Dr. Dhondo Keshav Karve which was succeeded by the singing
of SNDT Women's University song “Sanskrita Stree Parashkta”. The conference was
inaugurated in the esteemed presence of the Hon’ble Chief Guest Shri. Pramod Kale,
Ex-Director, Space Application Centre, ISRO, Past President, Indian Society of Remote
Sensing, Hon’ble Prof. Vasudha Kamat, Vice Chancellor, SNDT Women’s
University. The inaugural function was attended by various eminent dignitaries such as
Prof. Yukio Himiyama (Emeritus Professor, Hokkaido University of Education, Japan,
Vice President, IGU), Prof. K. R. Dikshit (Emeritus Geographer, Pune University),
Prof. R. B. Singh, Delhi (Vice President, IGU) and various researchers and participants
from all over the world. Prof. Virendra Nagarale, Convener and Head, Department of
Geography, SNDT Women’s University, Pune Campus welcomed all the dignitaries
and the participants to the conference and wished them a fruitful three days meet. This
was followed by the addresses of IGU officials. Prof. R.B. Singh commenced the
addresses in which he riveted the role of IGU in the spread of the research in geography.
This was succeeded by Prof. Yukio Himiyama, Vice President IGU, International
Scientific Advisory Committee of the Conference. Prof. Himiyama focused on the role
of IGU for the development of the subject through organization of international
conferences and providing a platform for young and budding scholars. Hon’ble Shri.
Pramod Kale, Chief Guest, Ex-Director, Space Application Centre (ISRO) discussed
the current major problems like the access of safe drinking water, excessive use of water
in agriculture, river linking, problems of rural and urban environment, urban health
and the Global Climate Change. Shri. Pramod Kale also explained the application of
Remote Sensing and Geographical Information System in the mitigation of above
problems.

The keynote address was delivered by eminent geographer Prof. K. R. Dikshit, Pune
on “Urbanization and Sustainable Development” in which he shared his views on the
economic base of urbanization and Inter-linkages, the contemporary level of global
urbanization, sustainability of the Urban systems vis-a-vis land, air and water and the
role of geographers in the city planning.

The Presidential chair of the conference was graced by Hon'ble Prof. Vasudha
Kamat, Vice Chancellor, SNDT Women's University. VC stressed on the purpose of
the conference and also mooted on the impact of urbanization on human being. VC
congratulated Department of Geography on organization of International Conference
in the centennial year of SNDT Women's University and the Silver Jubilee of the
Geography Department. In her presidential speech VC advised that present research
approaches should have multidisciplinary and interdisciplinary approaches to face the
challenges of urban health.
Themes, Sub themes, Special Sessions and Plenary Sessions of the conference: The focal theme of the conference was “Landuse, Water, Climate and Urban Health in Changing Urban Environment”. The conference has organized two special sessions on ‘Urban Health and Wellbeing’ and ‘Future Earth initiative in South Asia’ which were discussed by various scholars. Urbanisation and Urban Sprawl, Urban Land Use Land Cover Change, Global Climate Change and Extremes, Population-Development-Environment Interface in urban Health and well-being, Integration of Remote Sensing, GIS and GPS in Urban Well-being and Development and Sustainable Urban Environment had the various sub-themes of this international conference.

Plenary Sessions

The conference had five Plenary Sessions. Each session had two outstanding resource persons of international and national repute. Thus a total of 10 resource persons interacted with the delegates and delivered their outstanding lecture on their research topics during the plenary sessions.

Plenary Sessions I (4th November 2015)

Prof. Bellezza (Italy) presented a research work on “Today Threats to the Environmental and Human Health in the European Union”. In his speech he highlighted on the unstoppable flow of refugees from Africa and Asia, the economic crisis of Greece, the growing power of the ISIS in the near East, the nearly war situation between Russia and Ukraine etc. Based on these geo political events he discussed on the role of these events on the political-economic situation of European Union and said that the major health problem in the EU cities today is not air pollution, but the mental insecurity due to fear of terrorism, anytime, anywhere. Prof. Debendrakumar Nayak, Shillong NEHU presented his plenary speech on “Assessment of Vulnerability to HIV/AIDS in Mizoram: A Study of Groups-at-risk”. Mizoram is perceived to be highly vulnerable to HIV / AIDS owing largely to its geographical location in relation to its neighboring states and countries. The fact that the state is already experiencing a spurt in HIV positive cases and the vulnerability to HIV/AIDS has been probed in his paper.
Plenary Sessions II (4th November 2015)

Prof. M. Sofer (Israel): His plenary speech was on “The urbanization Process and Land Use changing in Arab settlements in Israel”. He investigated the land use changes resulting through the spread of urban functions- residential areas, commercial and industrial functions and their related activities during the period 1940 to 2013. Prof. R. B. Singh, Vice President, IGU, Head of the Department of Geography, Delhi School of Economics, Delhi spoke on the role of IGU, Urban environmental degradation, Economic efficiency, social equity, environmental protection and institutional effectiveness are the four dimensions of sustainable development. According to him the innovative geospatial techniques are applied in the various fields like urban zonation, urban heat island mapping and vulnerability analysis.

Plenary Sessions III (5th November 2015)

Dr. Nitin Dalaya, Eminent Psychiatric, Pune in his plenary speech voiced on “Urbanization and Mental Health. The urban issues like Urban Mental Health, Depression, Positive and negative impacts of urbanization, physical stress, psychological disorders and consequences of urbanization on human health were discussed in detail. Dr. Dalaya also highlights about to overcome strategies of urbanization oriented mental problems. A plenary speech by Dr. M. Nandeshwar, Kozikode (Retd Scientist, Chief scientist of CWRDM) on “Emerging Trends in Water Crisis and Possible Management Practices : Geographical Perspectives with Special Reference to Indian Context” was delivered in this session. Dr. Nandeshwar discussed the various issues on water crisis like over-extraction of ground water by farmers and urban cities and over extraction of ground water by urban city. He also suggested water conservation methods to deal with these crisis situation through Integration and sustainability, Integrated Water Resource Management and rain water harvesting.

Plenary Sessions IV (5th November 2015)

Prof. Brij Maharaj, School of Agricultural, Earth and Environmental Science, University South Africa of KwaZulu-Natal, Durban, South Africa, presented his thought
on Mega event impact in the Global South: Comparative experiences of India, Brazil and South Africa with special reference to the event of Commonwealth Games in Delhi, the FIFA 2010 World Cup in South Africa, and the FIFA 2014 World Cup Brazil. Prof. Shahab Fazal, Department of Geography, Faculty of Sciences, Aligarh Muslim University presented his view on “Urban expansion and Agricultural Land Fragmentation: A Case study Using Geo-Spatial Techniques, where he highlighted the landuse land cover changes of Aligarh city from 1970 to 2014. Plenary Sessions V (6th Nov 2015): Prof. Yukio Himiyama (Japan), Emeritus Professor, Hokkaido University of Education delivered a plenary speech on “Global Land Project (GLP) for Future Earth and International Year of Global Understanding (IYGU) in Asian Context”. He pointed out that the GLP contributed to Future Earth not only directly through its research activities, but also indirectly by acting as a model of transformation to Future Earth. Prof. Pravin Saptarshi, Emeritus Professor, University of Pune, Salisbury University presented his ideas of Urbanization in Pune city, the role of Development of IT Sector and its impact on social and cultural fields. He discussed the overall changes in Pune city and pointed out the traffic problem and its solution in Pune city.

Cultural event, performed by students of the PG Studies

Technical Sessions

IGU conference received response of 197 delegates encompassing from a galaxy of researchers, academicians, planners not only from geography but also from allied disciplines like economics and psychology. The total research paper presentation was divided into 19 technical sessions. In these technical sessions, six to seven participants in the 90 minutes span was discussed in the presence of chairperson and co-chairperson of the particular session followed by reporter. The presented works were divided into urbanization and urban sprawl, urban health, climatic change and extremes, RS and GIS, Regional Governance of forest and its fringe, Land use land cover, water resources, urban psychological problems, population and development, Human aspect and changing environment, urban problems: Prevention and intervention, Agriculture and tourism parallel sessions for the ease of presentation. Thus a total of 132 participants presented their paper on the various subthemes of the conference during these three days meet.

The conference attracted the fascination of research and academic community worldwide which was evident from the huge number of dignitaries and delegates from various
parts of the world -Israel, Italy, Japan, South Africa. Seven international delegates were participated in this conference. The delegates from the other states viz. Assam, Chandigarh, Delhi, Goa, Karnataka, Kerala, Meghalaya, Rajasthan, Tamil Nadu, Telangana, UP and West Bengal were major representatives from all over India, Prof. Sachin Deore, Organizing Secretary of the conference, Dr. G. Y. Shitole, Campus Incharge and Principal, SNDT Arts, Commerce and BCA College, Pune.

The welcoming address of the valedictory programme was given by Dr. G. Y. Shitole, Campus Incharge and Principal, SNDT Arts, Commerce and BCA College, Pune. Dr. G. Y. Shitole also encouraged and congratulated the department of geography for hosting the conference and also applauded the other departments for their whole hearted support to make this event a grand success. Organizing Secretary of Eighth India IGU Conference Dr. Sachin Deore Prof. Department of Geography, SNDT Women's University, Pune presented the three days conference report.

The Valedictory function was graced by the presence of the Chief Guest Shri Kunal Kumar, Municipal Commissioner, Pune Municipal Corporation, Pune. In his address, he discussed the problems faced by the city of Pune due to rampant Urbanization. He also urged researchers and academicians to work in a co-ordinated way to find geographical solution to various problems which are being faced by the city in particular and the world in general.

Presidential address was given by Prof. Vandana Chakrabarti, Pro-Vice Chancellor, SNDT Women's University. She congratulated the organizers of the conference for the successful organization of the international conference. PVC also stressed the importance of the theme of the conference. The Vote of Thanks was given by Prof. Virendra Nagarale, Prof. and Head, Department of Geography, Convener of Eighth India IGU Conference.

**Valedictory Programme (6th November 2015)**

The Valedictory programme was started with the singing of SNDT University song “Sanskrita Stree Parashkta”. The valedictory programme was commenced with
A cultural programme was well organized by Dr. Shital More, Department of Music, SNDT University on 4th November 2015 which was well attended and appreciated by the delegates and dignitaries.

The media responsibility for the event was taken up by Communication Media for Children Department. The interview of the dignitaries, the audio-visual recording of the conference and other activities related to media was completed by the same department.

The programme was anchored by Dr. Tapkir Dattatray, SNDT College of Education, Pune. He anchored inaugural and valedictory programme, his anchoring won various accolades from the dignitaries and delegates of the conference. All the above plenary sessions were anchored by Ms. Vrushali Nagarale (SNDT College of Home Science), Ms. Prajakta Chavhan of SNDT Arts, Commerce and BCA College, Pune.

**Brief Note about the Conference**

The over-exploitation of some of the important earth resources like land and water has led to a number of environment related problems world over. At the same time, the natural and anthropogenic activities have led to increase of urbanization around the globe. In this context, the relevance of sustainability of earth resources for human survival has become a major international issue. This issue is closely linked with the issue of climate change and risks due to climate change are associated with changing urban environment. Holistic natural resource based spatio-temporal planning, development and management is essential for the urban development. This International Conference aims to highlight the various environmental problems associated with development and changing climatic scenarios concerned with the urban environment. The problem of Landuse, Water and Climate in Changing Urban Environments that are to manifest in various sectors of human life on the earth is an important area where the Geo-spatial tools can play a vital role. Environmental perspectives and the scientific approaches including modern technologies are bringing spatial solutions to environmental and societal problems. Different geo-spatial tools like Remote Sensing, Geographical Information System and Global Positioning System help in assessing the results of various environmental problems both physical and social. This conference welcomes all geographers, health professionals, scientists, hydrologists, academicians, researchers, technologists, environmentalists, engineers, planners, policy makers, social workers, research scholars and other interested professionals from geography and its allied fields to share their research experiences.

The focal theme of the conference is ‘Landuse, Water, Climate and Urban Health in changing Urban Environments’ which has sub-themes such as Urbanization and
Urban Sprawl, Urban Land Use/Land Cover Change, Global Climate Change and Extremes, Population-Development-Environment, Interface in Urban Health and Wellbeing and Integration of Remote Sensing, GIS and GPS in Urban Wellbeing and Development Sustainable Urban Environment. Along this special session on ‘Urban Health and Wellbeing’ and ‘Future Earth Initiative in South Asia’ are also organized.

**Note on the Contribution of the Conference**

The focal theme of the conference is ‘Landuse, Water, Climate and Urban Health in Changing Urban Environments’. Urbanisation and Urban Sprawl, Urban Land Use Land Cover Change, Global Climate Change and Extremes, Population-Development-Environment Interface in Urban Health and Wellbeing, Integration of Remote Sensing, GIS and GPS in Urban Wellbeing and Development and Sustainable Urban Environment are the various sub-themes of this international conference. This International Conference aims to highlight the various environmental problems associated with development and changing climatic scenarios concerned with the urban environment.

The theme is chosen to identify the socio-cultural, economic, institutional, political barriers, opportunities and mechanisms to promote the balance between needs, desires, growth, development and planning. Thus the omphalos of the conference is on the fundamental environmental, social and economic problems faced by our planet in the 21st Century. Pressure of growing population, rapid urbanization and industrial development have resulted in over-exploitation of some of the important earth resources like land and water leading to a number of environment problems world over. At the same time, the natural and anthropogenic activities have led to increase of urbanization around the globe. In this context, the relevance of sustainability of earth resources for human survival has become a major international issue. This issue is closely linked with the issue of climate change and risks due to climate change are associated with changing urban environment. Holistic natural resource based spatio-temporal planning, development and management is essential for the urban development.

**International Mountain Day, Delhi, 11th December 2015**

On 11th December, 2015 at Parliament House Annexe, New Delhi, a Conference on International Mountain Day Programme has been held. It has been organised in collaboration with IGU-IYGU, CSR Research Foundation (Regional IYGU Centre), Intellectual Federation in India. The conference was attended by Indian law Makers, Chair ICSU Programme on Health and wellbeing, Representatives from Int. Water Association, UN Youth Platform, and Young researchers and media.
Disaster Risk Reduction in Himalaya, Delhi, 23rd December 2015

The conference on “Disaster Risk Reduction in Himalaya is necessary to save Cities and livelihood Security in the Indian Plains” was chaired by Padamshri Prof. Indira Nath, Chair, ICSU Programme on Health and Well being as chief guest, Guest of honor Dr M. R. Bhutiyani, Director, DTRL-DRDO, Prof. S.K. De, Sectary General, IAG; Dr. R. B. Singh, Head and Vice-President, International Geographical Union (IGU), Department of Geography; Prof. Pami Dua, Dean (Research) Humanities and Social Science, DU was chief guest in the valedictory session and Prof. P.C. Joshi, Department of Anthropology, DU was guest of honor. R.B. Singh discussed four important international initiatives on Health & Well Being, Future Earth, Sendai Framework on DRR, Sustainable Development Goals and UNFCC Climate Change and asked to contribute towards all these four initiatives at local level and to find the local solutions. He emphasized that the sustainable future earth can be achieved through co-design and co-production process and mentioned that traditional knowledge integrated with newer technologies can play very significantly role in achieving the sustainable future earth. Talking about the Glacier lake outburst flood in Himalaya in context of accelerating climate change he said that these events can bring havoc in the Indian plains and large scale damage to big cities therefore an effective DRR strategy is need of the hour. Dr. M.R. Bhutiyani, showed concerns about the many impeding changes in the Himalaya in the form of climate change and resource depletion and said that the issues should not be left with policy makers only but should also be taken up by the researchers and community. Talking about the hazards he made note that the hazards are not uncommon in Himalaya but have been there since its origin. Talking about the zonation map prepared by researchers he suggested that the maps should be easy to understand by community. He further emphasized on effective pre and post disaster management strategies in order to make Himalaya livable.
Padamshri Prof. Indira Nath holds the view that increasing population and tourism activities are responsible for environmental deterioration in Himalaya. Prof. Nath emphasized on the regional cooperation for sustainable management of Himalaya as the Himalaya range passes across many countries. Due to the multidimensional nature of problem, it is necessary to use Integrated Disaster Risk Reduction strategies. She praised the efforts by the government during recent disasters as there were no diarrhea case has been registered during Srinagar flood and very few illness were registered due to Chennai floods. Emphasizing on exploring the use of traditional knowledge in DRR, suggested that community participation should be promoted as there is lot of functional literacy in our country.

The conference had three sessions. The introductory session on DRR in the Himalayan Environment had a combination of macro and micro studies to highlight changing climate dynamics in Himalayan ecosystems and related challenges. Results from different sets of climate models predicting long term scenarios from 1970 to 2100 suggested further rise in extreme weather events in the region. In view of these climate changes in Himalaya, micro level studies produced evidence to strengthen the case for community’s adaptive capacities and resilience to combat the menace of climate change. Emphasis was laid on the fact that local communities need to be mobilized and capacity building must be initiated urgently to generate alternative modes of livelihood for sustainable progress of societies. Studies from Kangra, Lahul-Spiti (Himachal Himalaya) and Pindari Glacier (Uttarakhand Himalaya) confirmed the evidence of climate change at micro level. These studies found that climatic stress on agriculture/horticulture related livelihood practices (smaller duration of cropping season and fall in yields per hectare) in the region have increased. Furthermore, role of anthropogenic activities resulting into unscrupulous exploitation of natural ecosystem services in HP were also cautioned.
The group discussion session brought important inputs to be incorporated in the policies and disseminated to the community in order reduce the disaster vulnerability and enhance the livelihood options. The first group had discussion on exposure, vulnerability and risk. They emphasized on the identification of exposure, vulnerability and risk at local level taking in consideration the social structure. Special attention need to be taken for women, children, elderly, differently abled people and animals. Urban centers in mountain areas due to expansion on unstable land and increasing density are considered to be more vulnerable. Resource inventory at local level should be promoted along with mapping of resources, zonation of vulnerable areas at micro level viz. panchayat or ward level. The group discussion emphasized on strengthening the local level decision making institution and decisions should be based on local knowledge, local resources and technology. Most importantly the there should be uniformity of indicators in preparation of vulnerability index in order to have better comparison among regions.

The second group on science advice in emergency situation deliberated on various scientific measures that can be taken pre, post and during emergency situations such as use of GPS and GIS during pre-emergency situations for assessing vulnerabilities of various groups and during the emergency for locating important centers and institutions responding to the situation and also locating important and alternate routes etc. seems inevitable. Citing example of successful management story of 'hudhud Cyclone' in Orissa the group members asserted the need to have an early warning system in disaster prone areas. The group also emphasized the use of information and communication technology for swift response during emergency situation like use of community radios, use of mobile applications, satellite phones etc. These technologies could also be harnessed to ensure effective co-ordination between agencies and organizations dealing with an emergency. The role, media can play during emergency situations was also discussed. Adopting global best practices in the field of emergency situations was also emphasized. These practices should be learnt and adapted to suit the local conditions.

The third group on social science advice in emergency situation identified the major factors responsible for the damage during the disasters like the developmental activities, which cannot be avoided as they have emerged in response to the preferences of elegant life over simple life. The preferences for house and households, better means of communications, urban settlements, search of need jobs and infrastructural development are among the driving factors. Changes occurring in personal relation are key points that have held responsible for the present scenario. In this context it is important to attach people with nature create awareness through Panchayat raj institutions. Better forward and backward linkages need to be established to facilitate entrepreneurial development. Efforts and initiatives should be taken to promote traditional knowledge and wisdom. The group discussed the importance of Flax seed oil which is proved scientifically to combat triglyceride diseases (irregular increase of fat in liver leading to heart disease) commonly known as Linseeds. Similarly Anakara spice garden in Kerala
(Mannar) is the famous destination for showcasing farm fresh organic produce and sold to tourists along with demonstration of spice plants. Such initiatives due care should be taken to preserve tribal tradition and culture. Institutions of social sector like health and education should be qualitatively developed and proper awareness on health and hygiene among the people living in remote area.

The fourth group on Livelihood Security emphasized on regional dimension of livelihood security with spatial diversity or regional diversity in Himalaya. The questions brought forward in the process were that what regional part one wants to get as each area is having different kind of environment. The basic question comes with what is livelihood? and how are they related meaning thereby, how disaster or hazard is impacting livelihood? Are they showings any general trend. It is not livelihood security of human being but food to livelihood. To increase resilience is very important, where alternative livelihood will strengthen their community security. Livelihood in Himalaya is based on livestock, farming and tourism. The local people work on their land resources and never leave the area. As you go on north to south Himalaya the security differs. The education, language and go simultaneously, out migration should be stopped, and how their original livelihood can be strengthened. The group summarized that regional dimension on disaster occurrence from East to west and north to south need to be considered for livelihood security. The fifth group on health and well-being in mountainous regions observed that health is a very dynamic phenomenon where it varies from person to person and from region to region. That’s why it is very subjective and difficult to generalize. The problem regarding health varies to those of the plain areas while comparing with mountainous areas. Well-being is a combination of all sort of requirement that a person is needed in terms of basic needs, housing, livelihood sources, availability of water sources at their vicinities, source of education and many more. The issues and challenges for the researchers are to study the health problems separately at the lower part of the mountains in comparison to that of the upper parts. Youth should be guided properly and to provide them carrier opportunities so the male out migration could get controlled. Traditional medicine and related industries should be promoted where participation of local communities is required. Indicator of health and well-being should be matched or collaborated with those of the social and economic indicator so that better management could be practiced. Better waste management practices should be practiced where more focus is needed to those of the tourist behavior. Air lifting and implementation of some technologies should be used as secure measures to those of the more vulnerable areas.

International Geographical Union (IGU) EC Meeting (17th March, 2016) and 9th India IGU Conference, New Delhi (18-20 March, 2016)

IGU Executive Committee (EC) Meeting on 17th March, INSA, Delhi, India

Indian National Science Academy, Delhi, India hosted IGU EC Meeting on 17th March 2016. The meeting was chaired by President Kolosov (Russia) who welcomed
Secretary-General Mike Meadows (South Africa) and Vice Presidents Ron Abler (USA), Dieter Soyez (Germany), Jarkko Saarinen (Finland), Iain Hay (Australia), Yukio Himiyama (Japan), R.B. Singh (India) and Zhou Chenghu (China). Former Vice-President Bellezza (Italy) and Ma Xiaoyi (Beijing LOC) were invited to attend. Decisions have taken related to future EC Meeting Calendar, IGU Finance, IGU Commission and Task Force Reports 2012-16, IGU Strategy, IYGU, Young and Early Career Geographers Task Force, Sesquicentennial and Centennial Task Force, IGU Journals Project, IGU eNewsletter, OurSus Project, Geographer’s Bio-bibliographic Studies, Africa Initiative, IGU Thematic Conferences. IGU Representatives on International Bodies and future IGU Congresses and Regional Conf. The ‘Urbanisation: Health and Wellbeing’ conference in Osmania University, Hyderabad, India, in March 2017 will have another opportunity to promote the ‘Thematic Conference’ concept and it was agreed to label this officially as an ‘IGU Thematic Conference’.

ICSU/ISSC/CIPSH Joint IYGU Initiative South Asia Conference, IIPA, New Delhi

Initiated jointly by International Council of Science (ICSU), International Social Science Council (ISSC), and International Council for Philosophy and Human Sciences (CIPSH), IYGU (2016) is actively supported by IGU. A South Asia Centre-CSR Foundation organised Conference in the evening of 17th March at IIPA, New Delhi and participated by Chair IUGG-IGU joint National Committee Dr. Harsh Gupta, Ms. Anisa from UN Major Group of Children and Youth, IGU EC Members and about 200 participants from different parts of the world.

IGU India Conference, March 18-20, 2016, University of Delhi

9th India International Geographical Union (IGU) Conference on Land Use Change, Climate Extremes and Disaster Risk Reduction on March 18-20 March 2016 was organised at the University of Delhi. SBS College hosted the conference supported by four of the IGU Commissions – Commission on Biogeography and Biodiversity, Commission on Land Use and Land Cover Change, Commission on Hazards and Risk,
Commission on Geopark—collaborated in this conference. A total of 35 oral presentation sessions and 2 poster sessions were organized. Besides, more than 40 international delegates (including IGU Executive members) from about 20 countries and more than 350 Indian delegates representing 27 states and UTs attended the conference. The conference had the representation of major science and research academies of India and abroad, including 1) International Geographical Union (IGU), 2) International Union of Geodesy and Geophysics (IUGG), 3) International Academic Partnership (IAP) - Global Network of Science Academies, 4) Commonwealth Scientific and Industrial Research Organization (CSIRO-Australia), 5) Chinese Academy of Sciences, 6) Polish Academy of Sciences, 7) Russian Academy of Sciences, 8) National Geophysical Research Institute, Hyderabad, 9) Indian National Science Academy, 10) Defense Research and Development Organization and 11) Geological Survey of India etc.

The dignitaries for the inaugural session were Dr. Krishan Lal, Co-Chair, International Academic Partnership (IAP) - Global Network of Science Academies and Ex-President, Indian National Science Academy (INSA) as Chief Guest; Dr. Harsh Gupta, President, Geological Society of India and Ex-President, IUGG; Prof. Vladimir Kolossov, President, IGU; Prof. R.B. Singh, Vice-President, IGU as Guest of Honour and Prof. Tom Beer, Ex IGU President as Keynote Speaker; Dr. P.K. Khurana, Patron and Dr. Suraj Mal, Convener. Dr. Krishan Lal quoting the present climate change and impending problems where it asked for an interdisciplinary platform to mitigate these problems. Dr. Harsh Gupta in his address emphasized on role of geography in reducing the risk of disasters. Prof. Vladimir Kolossov talking about IYGU emphasized on bridging the gap in awareness between local actions and global effects. Prof. Tom Beer delivered the keynote address on the Impact of Extreme Weather Events on Food Security. Prof. Beer examined the historical link between weather, food supplies, and food distribution; examine the Asian and international situation; summarise the response of the scientific community and point out the direction for future research. Prof. R.B. Singh and Prof. Michael Meadows were two keynote speakers in the plenary session. Presided by Prof. D. Soyez, Vice-President, IGU. Prof. R.B. Singh focussed on various recent global initiatives like Sendai Framework of Disaster Risk Reduction, Sustainable
Development Goals, UNFCC COP21, Future Earth, Habitat III and about the role geographers can perform to contribute to these initiatives. Prof. Michael Meadows in his key note addressed the Global Environments in the Anthropocene: Challenges for Future Earth.

The valedictory session was graced by Dr. M.R. Bhutiyani, Director, DTRL, DRDO as the Chief Guest, Prof. Iain Hay, Vice-President IGU and Prof. R.B. Singh, Vice-President, IGU as Guest of Honour and Presided by Prof. Tom Beer. Dr. Bhutiyani cited the examples from Himalaya emphasized on promoting research on Climate Change. Prof. Iain Hay emphasized on the need of geographical education as a solution to various global problems. Prof R.B. Singh and Dr P.K. Khurana released Delhi Declaration, 20 March, 2016. A post conference field visit was organised to Uttarakhand (Haridwar-Dehradun-Mussorie-Dhanaulti-Tehri Dam-Rishikesh) during 21-24 March, 2016.
Resolved unanimously that 9th IGU three day Regional Conference on “Land Use Change, Climate Extremes and Disaster Risk Reduction” being organized by the Department of Geography, Shaheed Bhagat Singh College, University of Delhi, makes the following policy recommendations for the consideration of various stakeholders.

1. Land use study is emerging interface of biophysical and human environment which requires careful geographical and geospatial inquiry.

2. Geo-spatial technology should be disseminated to deal with emergency situations particularly identification of safer areas special needs of vulnerable groups like children, old people, women and disabled.

3. Food and water availability is threatened by extreme climate and we need to take all possible steps to ensure food, water-energy security within the framework of sustainable of future earth.

4. Geospatial technology based environment education should be promoted to find appropriate local solutions to regional imbalances and diverse issues.

5. The return period, as a tool to forecast earthquake, has been effective at the medium and long term. Mock frills at various levels should be considered as an effective tool for disaster mitigation.

6. Human health and wellbeing should be continued to be the focal point of research for sustainable future.

7. Geoheritage sites are neglected in India and other developing countries. This should be linked to the tourism development and community empowerment.

8. Earth science governance needs to be promoted among community stake holders though better information and amalgamation using spatial and temporal scales.

9. IGU India Foundation, an academic body was initiated in the Inaugural Function on 18th march 2016. This foundation will be responsible for planning, organization, execution and implementation of workshops and conferences as well as publications, as part of IGU India Series.
A Geographical Mosaic of Incredible India: Introducing Natural and Cultural Heritage

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Introduction

India is a country with amazing geographical diversity together with plurality in language, religion, culture and ethnicity. It is a country of second largest human resources of the world with a population of more than 1210 million (2011) people supporting nearly 17.5 per cent of world’s population. From the mountains of the Himalaya in Kashmir to the sea coasts of Kanyakumari and from the Thar deserts of Rajasthan to the humid forests of the north-east, India displays her wealth of diversity in cultures, religions fairs and festivals. Indeed, India is a unity in diversity. The country extends up to 3200 km from south to north and 3000km from east to west covering 32,87,263 sq.km.

Historical Development and Civilization

The name ‘India’ is derived from Sindhu (Indus), the great river in the north-west. In traditional and legendary Hindu literature, India is called Bharatkhanda; and sometimes called Jambudvipa– one of the seven concentric legendary islands comprising the earth. The earliest traces of history in India, so far discovered, go to the second Inter-Glacial period between 400,000 B.C. and 200,000 B.C. and there followed a long period of slow evolution, which gathered momentum during the spectacular Indus Valley Civilization excavated in the sites of Harappa and Mohenjo-Daro. These two sites bear testimony to the magnificent urban development dating back to 3000 B.C. The Harappan culture had declined by about 1700 B.C. and a vigorous incursion of the Indo-Aryan speaking people from the Middle East in about 1500 B.C. transformed the cultural landscape of the north-western India. The great Hindu epics, the Ramayana and the Mahabharata depict these historical events that took place between 1000-700 B.C. The Aryavarta –the homeland of the Aryans- was ruled by the Mauryan Kings and others in
the Ancient period (321-185 B.C.) and the Mughals in the medieval period (1526-1712 A.D.) followed by the British rule until 15th August 1947.

**Geographical Mosaics of India**

India has a rich geographical diversity with following characteristics:

i. Northern Himalayan Mountain (Figure 1) incorporates typical land use *Jhum* and unique trans-humance practice together with varied cultural groups including tribes.

![Figure 1: Nanada Devi Biosphere Reserve](image1)

ii. Two coasts of the Peninsula with rich biodiversity, estuaries and backwater ecosystem (Figure 2) and dependent social groups like fishing communities.

![Figure 2: Backwaters in Allapuzha, Kerala](image2)

iii. Diverse humid to arid climates (Figure 3), varied rainfall and related production system, crop calendar and life cycles.

iv. Plateau characterized by steppe to savanna and humid meso-thermic forests and dependent indigenous people on minor forest products.
v. Indus-Ganga-Brahmaputra alluvial plains (Figure 4) in the north exhibiting continuation of traditional unique socio-economic interaction such as \textit{Jajmani} system.

vi. Rising million-cities like Delhi, Agra, Kolkata, Mumbai and Bangalore containing within them, most modern to cultural heritage (Figure 5) and most traditional land uses together with worst form of visible poverty in the form of slums.

vii. Delta in the coastal regions of the eastern sea with typical mangroves and wetlands.
Physical Landscape

The geological history of India started with geological evolution nearly 4.57 billion years ago. Indian geological formations consist of the Deccan trap, the Gondwana and the Vindhyan and those that originated in Pleistocene, Tertiary and Pre-Cambrian periods. Conventionally the country is divided into three physiographic regions viz., the Himalaya and associated mountain chain, the Indus-Ganga-Brahmaputra plains and the Peninsular plateau including the coasts and the islands. The Himalayan Mountain covers about 5,00,000 sq kms of land and extends over 2500 kms from the Karakoram in the west to the Myanmar in the east. Its width is about 240 kms. World’s 14 highest peaks and few large rivers are located in the Himalaya. Indus-Ganga-Brahmaputra plains located in the northern part of the country, extends for 3200 kms from the River Indus in the west to Brahmaputra in the east. Its width varies between 150-300 kms. The senile peninsular plateau in the south is triangular in shape and has some of the oldest mountains of world with elevation varying between 600 and 800 mts. The Islands include the Lakshwadeep (36 coral Islands) and the Andaman (200 Islands) and Nicobar (19 Islands). The soils in India fall into seven categories, namely the Alluvial soils, Black soils, Red soils, Laterite soils, Forests soils, Mountain soils and Desert soils.

Climate and Water Resources

India is situated in the Northern hemisphere and the tropic of cancer divides the country into roughly two equal parts. The southern part enjoys a low temperature range while the North is cold in winters and warm for greater part of the year exhibiting much greater range in its temperature. Though generally described as a tropical country, India experiences varied climatic conditions in different regions. The north is more affected by a continental climate while the south has more maritime influence (Arabian Sea, Bay of Bengal and Indian Ocean). Much of the rain is a gift of the monsoon and is primarily orographic. The annual rainfall of 116 cms is only marginally higher than the global mean of 99 cms. Spatial distribution of rainfall in India is characterized by great unevenness. While Mawsynram, located in the southern face of Meghalaya plateau receives the highest annual rainfall in world, India also has one of the driest regions of world i.e. Jaisalmer, located in the western part of the country. Generally rainfall decreases from east to west (Figure 6).

Source: www.columbia.edu

Figure 6: Water Stress Index
India has 4 per cent of the freshwater reserve of the world. The annually 'replenishable' groundwater has been estimated at 432 Billion Cubic Meters (BCM). The Ganga basin has the highest potential followed by the Godavari and the Brahmaputra. The Indo-Gangetic alluvial plain with an area of around 25,000 km² is one of the largest groundwater reservoirs in the world. Of the total groundwater of India, only 30 per cent has been harnessed. Overuse of groundwater in almost all the states of India has led to ground water depletion in large parts of the country. In certain areas, like Punjab, the level of groundwater exploitation is over 98 per cent.

India is rich in terms of surface water wealth. It has some of the largest rivers of world e.g. the Brahmaputra (2900 kms), the Indus (2810 kms) and the Ganga (2525 kms). Besides, there are many other large river basins, with basin area of more than 20,000 km². Some of its lakes are internally known e.g. Chilka, Wular, Sambhar etc. Rainfall is the main source of surface water in India. It receives about 4000 BCM of water from precipitation. Of this, monsoon rainfall accounts for about 3000 BCM. The total utilizable water is about 690 BCM in the country.

India is one of the most disaster prone areas of world. Nearly 57 per cent of the country’s land is prone to earthquakes included in the seismic zones III-IV. About 8 per cent of the land is vulnerable to cyclones of varying intensity. About 68 per cent of the net sown area and 5 per cent of the total land are vulnerable to droughts and floods (40 million ha). India alone accounts for 20 per cent of the deaths caused by floods in the world.

Forests, Biodiversity and Land Use

Great variation in climatic conditions has given appearance to variety of forest types including tropical and sub-tropical forests in the Western Ghats and eastern Himalaya, temperate and alpine forests in central and western Himalaya and desert forests in the arid and semi-arid regions of the country. According to Forests Survey of India (2009), about 6, 90,899 km², constituting 21.02 per cent of its geographical area is under forest cover in the country. Very Dense Forest (VDF) however accounts for only 2.54 per cent while the Moderately Dense Forest (MDF) and open forest account for 9.71 per cent and 8.77 per cent respectively. The total forest and tree cover of the country is estimated to account for 22.28 per cent of the country’s land.

India contains a great wealth of biodiversity in its forests, wetlands and marine areas. The country has 7 per cent of the mammals, 12.6 per cent birds, 6.2 per cent reptiles, 4.4 per cent amphibians, 11.7 per cent fishes and 6 per cent flowing plants of the world. Among plants, endemism is estimated as 33 per cent. India contains 172 species (2.9 per cent of world’s total) of animals considered globally threatened species. The Western Ghats and eastern Himalaya are biodiversity hotspots. The faunal species of India is estimated to be about 81,000, representing about 6.4 per cent world’s fauna. Besides other invertebrates, there are about 2546 fish species, 204 amphibians, 428 reptiles, 1228 birds and 372 mammals. About 4,900 species of flowering plants are endemic to the Indian subcontinent. Among the endemic species, 2532 species are found.
in the Himalaya and adjoining areas, followed by 1782 species in Peninsular India. About 1500 endemic flowering species are facing varying degree of threats of extinction. The number of plant species in India is estimated to be over 45,000 representing about 7 per cent of world's flora. India is home to 17 biosphere reserves, of which 7 are in the world network of biosphere reserve viz. Sundarban, Gulf of Mannar, Nilgiri, Nanda Devi, Nokrek, Pachmarhi and Simlipal (Figure 7).

Agriculture is the backbone of Indian economy. Agriculture and allied sectors like forestry, logging and fishing in financial year 2011-12 accounted for about 13.9 per cent of GDP and employed about 52 per cent of India’s population. About 43 per cent of total geographical area of the country is used for the agricultural practices. Despite a steady decline of its share in the GDP, agriculture remains largest economic sector and plays a significant role in the overall socio-economic development of India. Indian agriculture is dependent on monsoon and is called “Gamble of Monsoon”. Among the non-food crops, oilseeds, fiber crops, several plantation crops and forage crops are important. Rice and wheat are the principal food crops grown over the large tract (about 70 per cent of agricultural land) of the country (Figure 8).
Economy and Development

According to 2011 Census, a little over 31 per cent of India’s population lives in 7935 urban centres. Going by the world average of 51 per cent living in urban areas, the share of urban dwellers is rather small, but in terms of total size, the urban population is huge by any measure. At least three cities namely Mumbai, Kolkata and Delhi contain a population size of over ten million persons. More than a million people reside in as many as 53 cities of India. The cities of India are a paradox in themselves displaying urban features comparable to any developed country and simultaneously retaining poverty and squalor as evident in the presence of slums supporting over 93 million people.

The country however has made strenuous strides in achieving rapid development of its industrial base from traditional iron & steel, cotton, jute and sugar to engineering, computer, information technology, communication and biotech industries (Figure 9). However, poverty continues to be a major hurdle in faster socio-economic transformation. The National Sample Survey for 2011-12 estimates total poverty at 21.9 per cent, rural poor at 25.7 per cent and urban poor at 13.7 per cent of the respective population. The Five Year Plans and several other developmental schemes are geared to the upliftment of the poor and weaker sections of the society. Since 1991, the liberalization of the economy and the increasing integration of India with the global economy have helped GDP to grow at 9 per cent or more at the present. The growth rate of Indian economy is 7.5 per cent in financial year 2015-16. India in 2000 announced the introduction of...
Special Economic Zones (SEZs) for enhancing foreign investments and to promote exports. More than 500 SEZs have been proposed, 143 of which have been made functional until February, 2012.

Human development has become an important agenda in the development paradigm in India. Growth and development in literacy have been accorded primacy for such an agenda. According to Census of India (2011), 74 per cent of Indian population is literate. There exists however a huge disparity in literacy attainment between the sexes as also among other social groups particularly the scheduled castes and the scheduled tribes. Various programmes such as National Literacy Mission, Sarva Shiksha Abhiyan and non-formal education etc. have been launched with a view to achieve total literacy in the years to come. Improvement in health has been an important agenda in overall strategy through the planning period. Sustained effort at improving the health of the people has borne some results in bringing down the crude death rate to 7.5 per thousand and life expectancy has substantially moved up to 68 years.

Urbanisation received a major spurt during the medieval and the modern period which witnessed the emergence of a large number of towns and cities as eminent centres of economic, cultural, social and religious diffusion. Improvement in transport and communication in a vast country like India has been recognized as an important sector of development. Total length of roads in India is over 4.32 million kms including both metalled and unmetalled roads. In terms of road length, India has one of the largest road networks in the world. The National Highways account for less than 2 per cent of the total road network but carry 40 per cent of the movement of goods and passengers.
The total rail route length is about 0.11 million kms and of this 0.02 million kms is electrified. The railways carry over 30 million passengers and 2.8 million tones of goods every day. There are 14,500 kms of waterways and 454 airports and airstrips in India. Communication facilities show a phenomenal growth during the recent years. Public phone booths, mobile phones, internet facility have grown rapidly in India. The landline telephones have expanded from about 0.084 million connections at the time of independence to about 40 million by the year 2011. In addition, there are about 881 million mobile phones and 121 million internet connections in India in 2011.

**Culture, Ethics and Unity in Diversity**

A grand synthesis of cultures, religions and languages of the people belonging to different castes and communities has upheld its unity and cohesiveness. It is this synthesis which made India a unique mosaic of cultures. People belonging to different faiths-Hinduism, Jainism, Buddhism, Islam, Sikhism and Christianity have coexisted for centuries in a shared space. Diversity in India is not merely confined to racial, religious and linguistic distinctions but also permeates deep into patterns of living, life styles, land tenure systems, occupational pursuits, inheritance and succession law, together with local practices, rites and rituals related to social norms and values. The Indian cultural tradition is unique. The notions of dharma (normative order), karma (personal moral commitment) and jati (caste) as the hierarchical principle of social stratification are basic to Indian society. Twenty three Indian languages are listed in our constitution and more than 544 dialects are spoken in the country. Pali language was prominent in ancient India. Sanskrit enjoyed the status of carrying Hindu Sanskritic culture throughout the country. These were followed by the modern Indo-Aryan languages. The institutional basis of social order and socio-economic interaction among communities like Jajmani system remained unchanged to a large extent. A plural and multi-ethnic society like India would have an overlapping of ethnic, caste and class groupings. There are more than 285 ethnic tribal communities in India accounting for over 8 per cent of her population. The tribes themselves are not a homogenous group, but display remarkable heterogeneity in their racial, linguistic, religious composition as also in their modes of living and levels of development as well as in the level of socio-cultural integration (Figure 10). In spite of this great diversity, India continues to swear by its commitment
to secularism and practices democratic form of governance. The federal principle of governance has provided a sense of identity to most people.

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Status of Geography in Indian Universities

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Introduction

It is believed that Eratosthenes coined the word Geography from two words: “Geo” which means “the earth” and “graphein” which means “write” or “describe”. In the context of description about space, Eratosthenes prepared maps between 276-195 B.C., which are said to be known as the earliest maps. In the process of preparing maps, he came up with the idea of network of graticules. The dictionary meaning of Geography as the science that describes the surface of the earth and its associated physical, biological, economic, political and demographic characteristics entails a vast scope of learning, teaching and research in geography. Geography continued to enjoy centre-stage till the earth/our habitat world, was explored. Then came the other disciplines and geography mellowed down to the background. Since all sciences, viz., physical, biological, economic, political and demographic, are undergoing a process of expansion of knowledge with the advent and advancement of technology, revolution in transport and communication, increase in world population and attitudes towards high consumption, they have a bearing on the subject matter and scope of geography as well.

In the earlier stages, the subject matter in geography had an overtone of ‘areal differentiation’ and ‘spatial variation’ of phenomena, which was explained in terms of generic causes. As the other natural and social sciences became value-loaded, the concept crept into geographical studies as well. The present day researches seek ‘value-loaded’, socially relevant themes. Themes like development and spatio-stratal deprivation, gender-discrimination, women empowerment, backward area development, sustainable development etc. are all socially value-loaded. In the process of change in the thrust-
area approach, the terminology also experienced a shift from environment to ecology, from population to human ecology, from density and distribution of population to health, education and quality of life (Singh, 2012).

Though one of the basic sciences, geography has shown subservience to the academic changes taking place in other disciplines and has imbibed in its scope and methodology from other fields of knowledge. The subject, of and on, emerges on the surface, as the basic mother science, and an important subject for reference and learning. Its various constituents like Geographical Information System (GIS), Remote Sensing, topographical and thematic maps, satellite imageries to understand surface patterns and spatial variations have wide-ranging users and adopters.

New vistas have opened up in the field of physical geography as a result of researches being carried out by the environmental and space scientists, atmospheric scientists, conservators and foresters, oceanographers and researchers in the allied fields. Themes of global warming, sea level rise, ozone depletion, eco-development, conservation of biodiversity, resources and sustainable development etc. have become issues of concern for modern physical geographers.

Population indeed is a wonderful resource of our planet earth. However, increase in the global population size during the last five decades has put extreme pressure on the fragile and limited natural resources of the earth. It calls for the multi-disciplinary approach to the control of human population, improvement in the quality of life and a strategic approach to population environment relationship. This fact has to be repeatedly reminded upon, thus, is being incorporated in all the branches of human and regional geography; where practically half of the themes are woven around traditional, ‘man-environment-interaction’. Human geography and regional geography cannot escape the responsibility to sensitize the students and the community about the new challenges ahead in population-development-environment nexus.

In the process, the new technology has gained momentum. The access to modern sophisticated computer-software has revolutionized application of technology and statistical/mathematical/cartographic techniques in geography. New sophisticated and efficient methods of compiling, processing and presenting geographical information on maps and the associated analytical techniques are now easily available for teaching and research. There is a demand for acquiring skills in GIS, and the interpretation of aerial photographs, satellite imageries and the information obtained through remote sensing, and hence, new courses are woven around these subjects.

‘Geography is learnt by foot’ was a popular expression of Professor VLS Prakasa Rao in the classroom, implying the importance and relevance of fieldwork in geography. Now, fieldwork is becoming popular in a number of subjects. Highly sophisticated methods of sampling, collecting data from the field, coding of information and accessing data-sets have been developed. The geographers need to keep pace with the sophisticated techniques of fieldwork. Fieldwork has always been complementary to instrumental surveys, which also needs to be upgraded to make use of the present high frequency/high precision instruments.
The upgradation and reframing of the syllabi should be designed keeping in view the above dimensions of change in knowledge, attitude and technology. It is expected that the contents of geography are useful for the students to compete in diverse fields of their future vocations. Hence, the orientation to new dimensions of knowledge in geography ought to be imparted right from school stage to prepare ground for quality stock in higher education.

**Teaching Geography in the University System**

In India, progress in geography from traditional to modern began in 1950s, almost coinciding with the launching of the National Five Year Plan and expansion in research and teaching activities under the UGC's programme for development of different disciplines in social sciences. Establishment of many Universities and the opening up of Geography Departments brought new talent and awareness for improvement of the discipline of geography. Notable developments involving geographers in national reconstruction started with late Prof. P. C. Mahalanobis, founder Director of the Indian Statistical Institute, Calcutta, taking initiative in holding a meeting of senior geographers of India and overseas (like Prof. O.H.K Spate) to identify important themes in geography and for application of statistics as a tool for analytical methods in geography. This was followed by setting up of a Regional Survey Unit at the Indian Statistical Institute (ISI), Calcutta, to undertake studies in regional survey and planning with Prof. A.T.A. Learmonth (from Liverpool, U.K.) and Prof. V.L.S. Prakasa Rao (ISI Calcutta) as leaders of the team. The objectives and strategies of the national economic development plans laid stress on minimization of regional imbalances in development and formation of macro-economic regions with strong agricultural and industrial base in those regions. At this juncture, geographers played a key role in sharpening the tools and techniques of regional analysis and providing conceptual clarity to region/space as the fundamental viewpoint of geography.

The first Review Committee in Geography was set up in 1965 by the *University Grants Commission* (UGC) with 10 experts and Professor S. P. Chatterjee from Calcutta University as the Chairman. The Committee took up an extensive exercise of tracing the history of teaching in Geography in Indian universities and colleges; critically analyzing geography syllabi taught there at post-graduate and under-graduate levels and prepared a MODEL syllabus in Geography, after having examined responses from 20 Universities and 18 Colleges. The report of the Committee published in 1968 is the first and classic piece of work, giving an account of the state of art and identifying some future directions for geography teaching (Singh, 2014).

The second Review Committee was appointed by the UGC in 1986, with Prof. G. S. Gosai, Panjab University as its Chairman. The goal of this Committee was to modernize and restructure the curriculum in the light of further developments in the knowledge and the requirements of the subject with changing times. It examined the course-contents of 11 universities and submitted its report providing suggestions and recommendations on academic and para-academic issues. The committee-report was published by the UGC in 1989.
In 1999, the UGC panel of geography with Prof. S.C. Gupte, Pune University as the Convener, and 12 member-experts, decided to review the existing curricula in Geography in various universities with the view to upgrade the geography syllabi. The panel organized two workshops, one at Chandigarh and the other at Pune to obtain information on the existing curricula, programme of teaching and research and invited suggestions for the improvement of content from the departments located in the north-west and western regions' universities. Subsequently, in February 2001, UGC formed a Curriculum Development Committee (CDC) to undertake the job of updating and reframing the syllabi. The Committee examined the course-content of 30 Universities; reviewed the academic and infrastructure facilities provided by the universities to the departments, under-graduate and post-graduate colleges; examined the implementation of the recommendations of the earlier two review committees; upgraded and designed the courses and submitted its report with recommendations to the UGC in November 2001. The report was published and sent to all the universities. It was learnt that several departments adopted the syllabus with slight modifications to suit their regional and academic requirements.

**Chronological Background of Geography Teaching**

**Teaching Geography at Under Graduate Level**

The First Review Committee (1965) provided a historical background to the study of Geography in Indian Universities. As for the Committee’s observation, the under-graduate classes in Geography commenced in the earlier part of the 20th century. The colleges were then affiliated to the Punjab (1920) and Patna (1927) Universities. Aligarh Muslim University started its under-graduate department in 1927/1928, followed by Allahabad (1937) and Calcutta (1939). About seven universities started undergraduate programme in the 1940s. In 1950s, only Dr. H.S. Gaur University at Sagar, Madhya Pradesh started UG department (1958) and in 1960s Visva-Bharati (1968). Recently Jadavpur University, Kolkata started UG teaching in Geography (2015). Since 1960s many colleges started imparting undergraduate teaching in geography.

**Teaching Geography at Post Graduate Level in the University Departments**

The under-graduate departments in the Universities got upgraded to post graduate departments within a time gap of two years to twenty eight years.

**In the 30s & 40s:** As per details given in the first Review Committee Report, the first university to start PG department of geography was Aligarh Muslim University (1931), followed by Calcutta University (1941), Banaras Hindu University and Allahabad University (1946), Punjab and Madras University (1948) and Patna University (1949).

**In the 50s:** During the 1950s, the Post-Graduate departments started functioning at Karnataka University (1952), University of Pune (1954), Ranchi University (1954), Osmania University (1955), M.S. University of Baroda (1956), Dr. Hari Singh Gaur Viswavidyalaya, Sagar (1956), Gauhati University (1958), Deen Dayal Upadhaya University, Gorakhpur (1959) and Mysore University (1959).
During 60s: In the 1960s, during the period of 1960 to 1965, the post graduate departments were opened in the University of Delhi (1960), North Bengal University (1962), Magadh University (1962), Jai Narayan Vyas University, Jodhpur (1962); M. L. Sukhadia University, Udaipur (1964) and Pandit Ravi Shankar Shukla University, Raipur (1965).

Based on the information received by the Curriculum Development Committee (CDC) in Geography in 2001, from 30 University departments, in the prescribed questionnaire, it was further observed that during the period of 1966-1970, the post-graduate departments in Geography started functioning in Shivaji University, Kolhapur (1968); Rajasthan University, Jaipur (1968); Visva Bharati, Santiniketan (1968) and Burdwan University, West Bengal (1969).

In the 70s: During seventies, the following Universities started PG department in Geography: Jawaharlal Nehru University, New Delhi (1970). Here, post-graduate teaching in geography was started in the Centre for the study of Regional Development in the School of Social Sciences. Other universities are: Utkal University, Bhubaneshwar (1970); Jamia Millia Islamia, Delhi (1971); Madurai Kamaraj University, Madurai (1971); Tilka Manjhi Bhagalpur University, Bhagalpur (1971); H. N. Bahuguna Garhwal University, Uttarakhand (1973); Kumaun University, Nainital, Uttarakhand (1973); L.N. Mithila University, Darbhanga (1976); North Eastern Hill University, Shillong (1976); University of Gujarat, Ahmedabad (1977); and Kashmir University, Srinagar (1979); Punjabi University, Patiala (1974); Gujarat University (1977); Sri Venkateswara University College of Science, Tirupati (1972).

In the 80s: During the eighties, the post-graduate departments were set up in Maharshi Dayanand University, Rohtak (1983) and Jammu University, Jammu (1988).

In the 90s: During the nineties, PG departments were established in Rajiv Gandhi University, Papum Pare (1992); Manipur University, Imphal (1992); Vidyasagar University at Midnapore (1995); Sree Sankaracharya University of Sanskrit (1995) and in Nagaland University at Kohima (1997); Bharathidasan University, Tiruchirapalli (1996).

Early 21st Century: In the early part of 21st century, PG Departments in Geography were established in Mizoram University (2003); University of Lucknow, Lucknow (2002-03); Tripura University (2004); Chaudhary Charan Singh University, Meerut (2004); Netaji Subhas Open University, Kolkata (2004); The Global Open University, Dimapur, (2006); Sikkim University (2007); Ravenshaw University, Cuttack (2007); Kalyani University, Nadia (2007); Aliah University, Kolkata (2008-09); Rani Dutgavati University, Jabalpur (2008); Dibrugarh University, Dibrugarh (2008); Central University of Karnataka (2009); Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (2009-10); Indira Gandhi National Tribal University, Amarkantak in Madhya Pradesh (2011); Sidho-Kanho-Birsha University, Purulia (2012); Arunachal University of Studies, Lohit, (2012); Banasthali University, Tonk (2011-12); Himalayan University, Itanagar (2011); Tantia University, Ganganagar, (2013); Chaudhary Bansi Lal University, Bhiwani (2014); North East Frontier Technical University, West Siang in Arunachal Pradesh
(2014); Central University of Haryana (2014-15), Mahatma Gandhi Kashi Vidyapith, Varanasi (2015-16); West Bengal State University, Barasat (2008); Rabindra Bharati University, Kolkata (2008); Gaur Banga University, Malda (2012); Presidency University, Kolkata (2011-12); Panchanan Barma University, Coochbehar (2013-14); Kazi Nazrul Islam University, Asansol (2015) in West Bengal; Gangadhari Meher University, Sambalpur (2013-14) in Odisha; Bastar University, Bastar; Bundelkhand University, Jhansi; C.M.J University, Shillong; Devi Ahilya Vishwavidyalaya, Indore; Gondwana University, Gachihiroli in Maharashtra; Guru Nanak Dev University, Amritsar; M.J.P. Rohilkhand University, Bareilly; Madhya Pradesh Bhoj Open University, Bhopal; Maharaja Ganga Singh University, Bikaner; Maharshahi Dayanand Saraswati University, Ajmer; Mahatma Jyoti Rao Phoole University, Jaipur; Nalanda Open University, Patna; Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur; KDF University, Bhopal; Sant Gadge Baba Amravati University, Amravati; Sarguja University, Surguja in Chhattisgarh; Swami Ramanand Teerth Marathwada University, Nanded; University of Calicut, Calicut; Vardhaman Mahaveer Open University, Kota; Veer Kunwar Singh University, Arrah; Vikram University, Ujjain; Barkatullah University, Bhopal; Bilaspur University, Chhattisgarh; Dr. Bhimrao Ambedkar University (Agra University), Agra.

**Geography Department at the Post Graduate Colleges**

Keeping in view the increasing demand and pressure, PG Departments in Geography were introduced in many reputed colleges of different states all over India. The different states with number of PG Departments in colleges are Arunachal Pradesh (01), Assam (03), Bihar (11), Chhattisgarh (11), Gujarat (04), Goa (01), Haryana (06), Jammu & Kashmir (02), Jharkhand (04), Madhya Pradesh (23), Maharashtra (30), Odisha (02), Punjab (03), Rajasthan (36), Sikkim (01), Tamil Nadu (04), Uttar Pradesh (57), Uttarakhand (15) and 16 in West Bengal

**Arunachal Pradesh:** (i) Jawaharlal Nehru College, East Siang

**Assam:** (i) Bajali College, Goalpara (ii) Cotton College, Guwahati (Now University) (iii) Jagannath Baroah College, Jorehat


**Gujarat:** (i) Government Arts College, Gandhinagar (ii) K.N.S.B. Ltd. Arts and Commerce College, Mehsana (iii) North Pole Institute of Distance Education, Rajkot (iv) Shree Jayendrapuri Arts and Science College, Bharuch.

**Goa:** (i) Smt. Parvatibai Chowgule College of Arts and Science, South Goa.


**Jammu & Kashmir:** (i) Government Degree College, Kathua (ii) Government Amar Singh College, Srinagar.

**Jharkhand:** (i) Marwari College, Ranchi (ii) Ranchi College, Ranchi (iii) St. Xavier's College, Ranchi (iv) St. Columbus College, Hazaribagh.


**Odisha:** (i) Gangadhar Meher College (Autonomous), Sambalpur (ii) S. C. S. College, Puri, (iii) Ravenshaw University

**Punjab:** (i) Lyallpur Khalsa College, Jalandhar (ii) S. R. Government College for Women, Amritsar (iii) Satish Chandra Dhawan Government College, Ludhiana.


**Sikkim:** (i) Sikkim Government College

**Tamil Nadu:** (i) Arignar Anna Government Arts College, Namakkal (ii) Bharthi Women's College, Chennai (iii) Presidency College, Chennai (iv) Queen's Marry College, Chennai.

**Uttar Pradesh:** (i) Abdul Razak Degree College, Jyotiba Phule Nagar (ii) Adarsh Janta Mahavidyalaya, Mirzapur (iii) Baba Baruadas P.G. College, Ambedkar Nagar (iv) Badri
Vishal P.G. College, Farrukhabad (v) Baiswara Post Graduate College, Rae Bareli (vi)
Cane Growers Nehru Post Graduate College, Lakhimpur Kheri (vii) Chaudhary Charan
Singh Post Graduate College, Etawah (viii) D. A. V. College, Kanpur (ix) Dayanand
Vedic College, Orai (x) Devta Post Graduate College, Bijnor (xi) Dayanand Girls Post
Graduate College, Kanpur (xii) Dharam Samaj Degree College, Aligarh (xiii) Gandhi
Degree College, Jalaun (xiv) Gandhi Faiz-E-Aam College, Shahjahanpur (xv) Gandhi
Smarak P.G. College, Moradabad (xvi) Ganga Singh Mahavidyalaya, Kannauj (xvii)
Government Raza P.G. College, Rampur (xviii) Hashmi Girls Degree College, Jyotiba
Phule Nagar (xix) Hindu College, Moradabad (xx) J. V. Jain College, Saharanpur (xxi)
Jatan Swaroop Post College, Sikandra (xxii) Jawaharlal Nehru Smarak P.G. College,
Gorakhpur (xxiii) K.A. Post Graduate College, Etah (xxiv) K. S. Saket Post Graduate
College, Faizabad (xxv) Kashi Naresh Government Post Graduate College, Gyanpur
(xxvi) Km. Mayawati Government Girls P.G. College, Gautam Buddha Nagar (xxvii)
Kuttir Post Graduate College, Jaunpur (xxviii) Lal Bahadur Shastri Post Graduate
College, Gonda (xxix) Maharaja Bijli Pasi Government P.G. College, Lucknow (xxx)
Maharani Lal Kunwari P.G. College, Balrampur (xxxi) Mariahu Post Graduate College,
Jaunpur (xxxii) Maryada Purusottam P.G. College, Mau (xxxiii) Meerut College,
Meerut (xxxiv) Munishwar Dutt Post Graduate College, Pratapgarh (xxxv) N.R.E.C Post
Graduate College, Bulandshahr (xxxvi) Nandini Nagar Mahavidyalaya, Gonda (xxxvii)
National Post Graduate College, Lucknow (xxxviii) Pandit Prithi Nath College, Kanpur
(xxxix) R.N. Girls Degree College, Lucknow (xxxx) Radha Mohan Kisan Majdoor
Mahavidyalaya, Ballia (xxxxi) Raghunath Girls Post Graduate College, Mathura (xxxxii)
Raja Balwant Singh College, Agra (xxxxiii) Ram Khelawan Singh P.G. College,
Mirzapur (xxxxiv) Ram Nagina Kisan P.G. College, Ghazipur (xxxxv) Rana Pratap Post
Graduate College, Sultanpur (xxxxvi) S.M. College, Moradabad (xxxxvii) Saltanat Bahadur P.G.
College, Jaunpur (xxxxviii) Shibli National College, Azamgarh (xxxxix) Shri Rajaram
P.G. College, Jaunpur (L) Shri Saraswati Vidyalaya College, Hapur (Li) Sri Brij Bihari
Degree College, Mathura (Lii) St. Andrew’s College, Gorkakhpur (Liii) St. John’s
College, Agra (Liv) Udai Pratap Autonomous College, Varanasi (Lv) Veetrag Swami
kalyan Dev Degree College, Muzaffarnagar (Lvi) Virangana Avanti Bai Mahila
Mahavidyalaya, Etah (Lvii) Y.M.S. Degree College, Jyotiba Phule Nagar.

Uttarakhand: (i) A.P. Bahuguna Govt. P.G. College, Rudraprayag (ii) D. B. S. P.G.
College, Dehradun (iii) Dr. P. D. B. H. Government P.G. College, Garhwal (iv)
Government Degree College, Udham Singh Nagar (v) Government Degree College,
Garhwal (vi) Government Post Graduate College, Rani Khet (vii) Government Post
Graduate College, Pithoragarh (viii) Kumaon Kesari Pt. Badridutt Pandey Government
Post Graduate College, Bageswar (ix) L. S. M. Government P.G. College, Pithoragarh
(x) P.N.G. Government P.G. College, Nainital (xi) Radhey Hari Government Post
Graduate College, Udham Singh Nagar (xii) Ram Chandra Uniyal Government Post
Graduate College, Uttarkashi (xiii) S.B.S. Govt. Post Graduate College, Rudrapur (xiv)
Shaheed Durgamal Government Degree College, Dehradun (xv) Swami Vivekanand
Government Post Graduate College, Champawat.

It may, however, be mentioned that the list of Post Graduate Departments in the Universities and Colleges set up during the period 1966-2015 may not be exhaustive. However, the sources explored indicate that Post-graduate departments of Geography existed in more than 100 universities as well as in 230 colleges in India.

Professional Courses in Geography

Professional Courses in Geography have been introduced in a quite significant number of Universities:

PG Diploma in Remote Sensing & GIS: Jamia Millia Islamia, New Delhi; Banaras Hindu University, Varanasi; Panjab University, Chandigarh; Allahabad University, Allahabad; Rajiv Gandhi University, Arunachal Pradesh; Utkal University, Bhubaneswar; Chaudhary Charan Singh University, Meerut; Bharathidasan University, Tiruchirapalli; Osmania University, Hyderabad; Lucknow University, Lucknow; University of Jammu, Jammu; Central University of Jharkhand, Ranchi; M. D. University, Rohtak.

Diploma in Remote Sensing & GIS: University of Pune; Pune; Patna University, Patna; University of Kota, Kota; North-Eastern Hill University, Shillong.

Post Graduate Programme in Remote Sensing & GIS: Madras University, Chennai; Vidyasagar University, Medinipur; Burdwan University, Burdwan etc.

In addition, courses on RS & GIS at Certificate, Diploma and PG Diploma are offered by Indian Institute of Remote Sensing, Dehradun; National Remote Sensing Agency, Hyderabad; National Atlas & Thematic Mapping Organisation, Kolkata; Indian Institute of Technology at Kharagpur, Kanpur and Roorkee; Geological Survey of India; Space Application Centre, Ahmedabad; Jharkhand Space Application Centre, Ranchi.

PG Diploma in Disaster Management: Himachal Pradesh University, Shimla; Panjab University, Chandigarh; Guru Gobind Singh Indraprastha University, Delhi; Lucknow University, Lucknow; Andhra University, Vishakhapatnam; Pondicherry University, Port Blair; Chaudhary Charan Singh University, Meerut; Allahabad University, Allahabad; Osmania University; Indian Red Cross; Indira Gandhi National Open University, New Delhi; Bhoj Virtual University.

Diploma in Disaster Management: Jamia Millia Islamia, New Delhi; Nalanda Open University, Patna; University of Pune, Pune; Shobhit University.
Change in the Name of Geography Departments

With the passage of time there has been change in the name of the Geography Department with professional orientation since last decade of the 20th Century. For example, Department of Geography and Environment Management in Vidyasagar University, West Bengal; Department of Geography and Disaster Management in Tripura University; Department of Geography and Resource Management in Mizoram University; Department of Geography and Regional Development in Indira Gandhi National Tribal University, Amarkantak, MP.

Research in Geography

M. Phil. Programme

Since seventies of the last century M.Phil. Programme in Geography has been introduced in a quite large number of universities. These are: Jawaharlal Nehru University, Jamia Millia Islamia, New Delhi; University of Delhi, Delhi; Panjab University, Chandigarh; Kurukshetra University, Kurukshetra; M. D. University, Rohtak; University of Kashmir, Srinagar; Himachal Pradesh University, Shimla; Banaras Hindu University, Varanasi; Aligarh Muslim University, Aligarh; University of Mumbai, Mumbai; Madurai Kamraj University; Ranchi University, Ranchi; Utkal University, Bhubaneswar; Ravenshaw University, Cuttack; Gauhati University, Guwahati; North Eastern Hill University, Shillong; Rajiv Gandhi University, Arunachal Pradesh; Pandit Ravi Shankar Shukla University, Raipur; Rajasthan University, Jaipur; J. N. Vyas University, Jodhpur; Mohanlal Sukhadia University, Udaipur; Burdwan University, Burdwan; Barkatullah University, Bhopal; Shivaji University, Kolhapur; Chaudhary Charan Singh University, Meerut; Devi Ahilya Viswavidyalaya, Indore; Dr. B. R. Ambedkar Open University, Hyderabad; Dr. C. V. Raman University; Karnatak University, Dharwad; Maharaja Ganga Singh University; Mewar University, Chittorgarh; North Maharashtra University, Jalgaon; Rani Durgavati University, Jabalpur; Sant Gadge Baba Amravati University, Amravati; SNDT Women's University, Pune Campus; Solapur University, Solapur; Sree Sankaracharya University of Sanskrit, Ernakulam; Tilak Maharashtra Vidyapeeth; University of Mysore, Mysore; Vardhaman Mahaveer Open University, Kota.

In addition, some of the reputed colleges in India have introduced M.Phil. programmes in Geography viz. B. R. Ambedkar Government College, Ganganagar; Government Arts College of Kumbakonam, Thanjavur; Government Dungar College, Bikaner; Mahila Mahavidyalaya, Satara; Nirmal College for Women, Coimbatore; Prof. Ramkrishna More Arts, Commerce and Science College, Pune; Queen Mary’s College (autonomous), Bharthi Women’s College, Presidency College, Chennai

Ph.D. Programme

Almost all the P.G. Departments at the University level listed in this report have introduced Ph.D. Programme. Some of the reputed colleges having PG Departments
are also pursuing Ph.D. Programme. There has been change in the orientation of research issues mainly from theoretical to applied aspects and from hardcore physical to human elements. In addition, emphasis is being placed on the use of modern tools and techniques especially RS & GIS for dealing with the research problems in real sense.

**Research Projects**

The PG Departments of Geography both at the University and College level are carrying out research projects on the relevant and burning physical, social, economic and political issues. The issues covered are increasing geomorphological and climatic hazards, environmental problems in different regions, social issues like women and child trafficking, gender development, child labour, social exclusion; regional disparity; geo-political issues and many more. Geographers usually receive financial assistance from a number sponsoring agencies at the national level viz. University Grants Commission, Indian Council of Social Science Research, Department of Science & Technology, Ministry of Earth Science, Ministry of Water Resources, Ministry of Environment & Forest, Ministry of Health and Family Welfare, Government of India; international agencies like UNDP, Ford Foundation as well as a some state government departments.

**Geographical Associations**

Along with the expansion of Geography in the University Departments, several national and regional Associations were formed to expand research and communication in Geography as is evident from the following list:

- Aligarh Geographical Society, Aligarh
- Allahabad Geographical Society, Allahabad
- Association of Bengal Geographers, Burdwan
- Association of Geographers in Bihar and Jharkhand, Patna
- Association of North Bengal Geographers, Siliguri
- Association of Geographical Studies, Delhi
- Association of Punjab Geographers, Patiala
- Deccan Geographical Society, Pune
- Eastern Geographical Society, Bhubaneswar
- Geographical Development Research Institute, Gorakhpur
- Goa Geographers Association, Goa
- Himalaya Samiksha Parishad, Kolkata
- IGU India Conference/Foundation, Delhi
- Indian Council of Geographers, Patna
- Indian Environment Society, Delhi
The Geographical Congress organized under the aegis of International Geographical Union (IGU) was held in 1968 in Delhi under the Presidency of Prof. S.P. Chatterjee, with pre and post Congress symposia held in different parts of the country. At the initiative of the ICSSR, a National Association of Geographers, India (NAGI), was established in 1978 to facilitate interaction among the geographers across the regions, identify thrust areas of research and teaching, explore new dimensions of research with a view to make concerted efforts for the development of the subject. The NAGI headquarter was located at Indian Statistical Institute (ISI) Delhi with Prof. C. D. Deshpande as the first President of the NAGI. It was later moved to Delhi University. Every year Indian Geography Congress is being organized in different parts of India under aegis of NAGI. Under the leadership of Prof. R. P. Misra an active initiative was taken to publish NAGI Compendiums of Geography in different titles (i) Resources: Concepts, Classification and Role by R. P. Misra; (ii) Human Resources by Sudesh Nangia, N. C. Jana and R. B. Bhagat; (iii) Land Resources by H. S. Sharma; (iv) Water Resources by R. B. Singh; (v) Biotic Resources: Forests and Animals by A. K. Pandey; (vi) Soils of India by Arun Chaturvedi; (vii) Mineral Resources by Rana Pratap Singh; (viii) Energy Resources by R. B. P. Singh; (ix) Marine Resources by Srikumar Chattopadhyay; (x) Managing our Resources: Problems and Prospects by R. P. Misra. It may, however, be mentioned that some of the volumes have already been published.

In 1979, another premier organization in Geography viz. Institute of Indian Geographers was established in Pune University under the leadership of Prof. K. R. Dikshit. Similar mega event is being organized every year under the auspices of Institute of Indian Geographers. With the active initiative of Prof. Savindra Singh Indian Institute of Geomorphologists was established in Allahabad University in 1987. This association organizes annual conference in different universities and colleges. In 1996, Professor R.N. Dubey Foundation was established in Allahabad under the chairmanship of Hon’ble Sri T.N. Chaturvedi for dissemination of geographical knowledge and methodology for opening new frontiers of research in Geography. In 2000, Dr. K.V. Sundaram, established the Bhoovigyan Vikas Foundation in New Delhi. The Indian Chapter of Regional Science Association was established in 1967 with the active initiative of Prof. C.
R. Pathak. Under its banner Annual Conference of Regional Science is held in different institutes and universities.

In addition, international conferences are being organized in India by IGU Commissions. For example, Department of Geography, M. D. University, Rohtak organized IGU Conference on Geo-informatics for Biodiversity and Climate Change in 2013 under the aegis of Commission on Biogeography & Biodiversity and Commission on LULC. Another IGU Conference on Land Use, Water, Climate and Urban Health in Changing Urban Environments was organized in 2015 by the Department of Geography, SNDT Women’s University, Pune Campus. Similar IGU Conference was recently organized in March 2016 jointly by Shaheed Bhagat Singh College and Delhi University. The title of the conference was Land Use Change, Climate Extremes and Disaster Risk Reduction. In this conference, an initiative was taken to establish IGU-India Foundation.

**Journals of Geography**

A number of Journals are being published from various University-Departments to disseminate research-writings at the regional and national levels. Some of them are listed as under:

- Analytical Geography, Delhi
- Annals of National Association of Geographers, India, Delhi
- Annals of Rajasthan Geographers, Jaipur
- Bhudarshan, Udaipur
- Contemporary Geographer, Burdwan
- Earth Surface Review, Gorakhpur
- Eastern Geographer, Bhubaneswar
- Geographical Perspective, Patna
- Geographical Memoir, Siliguri
- Geographical Outlook, Ranchi
- Geographical Review of India, Kolkata
- Hill Geographer, Shillong
- Himalaya Prasanga, Kolkata
- Indian Cartographer, Hyderabad
- Indian Geographical Journal, Chennai
- Indian Journal of Geography, Jodhpur
- Indian Journal of Geomorphology, Allahabad
- Indian Journal of Landscape Systems and Ecological Studies, Kolkata
The discipline of Geography offers several career options with numerous specializations: (i) **Cartography** - Geographers specializing in this make maps, charts, globes and models; (ii) **Survey** - Geographers can specialize in surveying, either by joining the Survey of India or state Survey Departments or Private organizations. Surveyors map the surface of the earth through mathematical observations and field work; (iii) **Town Planning** - Geographers specialized in this field are employed by public and private organizations engaged in urban planning and design and by NGOs involved in this type of projects. Many universities are offering Diploma courses in Town Planning; (iv) **Urban and Regional Planning** – Geographers specialized in this field is concerned with planning, housing and development projects with respect to their location and utilization of available land-space. Degree courses available in many institutes for this stream; (v) **Remote Sensing** - Remote sensing satellites provide a variety of information about the earth surface especially studies of quickly changing phenomena such as floods, drought and forest fires etc.
Depending on their area of specialization, geographers may be employed as forest managers or in agricultural or economic institutes or as demographers in government and research organizations. Sound background in geography is also an asset for careers in travel and tourism. Knowledge in geography also helps in competitive examinations and general knowledge papers.

At present, based on available information, Geography at the Post-Graduate level is being taught in more than hundred universities as well as more than two hundred colleges. The institutions where extensive use of geographical knowledge is being made, however, few specialized ones like National Bureau of Soil Survey and Land Use Planning (NBSS & LUP), National Atlas and Thematic Mapping Organization (NATMO), Indian National Cartographic Association (INCA), Survey of India, Census of India, National Remote Sensing Agency (NRSA), Indian Space Research Organization (ISRO), Central Arid Zone Research Institute (CAZRI), Centre for Earth Science Studies (CESS) etc. However, various voluntary agencies have used geographical knowledge for research, fieldwork, teaching and development programmes. Geography is especially popular with the candidates appearing in Civil Services and other competitive examinations. For instance, the data tabulated by UPSC (UPSC Annual Report, 1998-99), on the number of candidates who appeared and qualified in each of the optional subject prescribed in Civil Services Examination in 1997, indicated that geography was the 4th most preferred subject chosen by the candidates out of 52 optional subjects, after History, Public Administration and Anthropology. Geography is rated as the best subject for General Knowledge in competitive examinations.

It is a matter of great concern that at the post-graduate level, geography is being taught only in more than100 universities out of more than 700 universities in the country. But at the same time it is a healthy symptom that geography as an important discipline has been expanded and is taught at PG level in more than 200 colleges in India. It may, however, be pointed out that most of the departments suffer from lack of adequate faculty, specially trained committed faculty. This has its impact on the quality of infrastructure including library and lab facilities, faculty-recruitment and research in geography. This primarily explains the secondary status of geography both among the sciences and social science disciplines, which needs adequate intervention from the reputed and senior geographers of the country to increase its important role in national-level planning and development.

New Initiatives

Since the last half-a century, the subject-matter of Geography has been undergoing diversification and transformation. The subject moved from qualitative to quantitative explanation and analysis. Quantitative revolution in geography initiated in developed countries had its backlash in India, creating a trend in the application of quantitative techniques in data processing and cartographic analysis.

Statistical and mathematical models were introduced in regional and systematic geography to make the subject more integrative conforming to the developments in
sister disciplines. However, the quantitative revolution in the subject fell short of the level of integration of these analytical tools aimed at enriching the analytical and spatial component. There has been a re-shift towards qualitative approach and towards selective use of quantitative techniques. The use of multiple/sophisticated statistical/mathematical models became possible through the use of computers. The computer technology also helped in quick map production and reproduction and hence better analysis of information mapped.

In regional geography, the subject has fast moved from the identification of regions to regional planning, micro-regional planning and development, enlarging the scope and content of regional geography.

The concepts of region and environment have been modified and expanded to widen their scope for application with contents of other disciplines like economics, sociology, political science and environmental science (e.g. economic space, social space, individual space, urban environment, social environment, political and cultural environment.

A review of the course contents, syllabi and the themes for the conferences reveal that some subfields in the discipline of geography have moved faster than the others, for example; Regional Planning, Population Geography, Settlement Geography (Urban and Rural), Cartographic Techniques (GIS/Remote Sensing, Computer Mapping, Field-work), and Geomorphology. The inputs from disciplines other than Geography in terms of data availability, methodology and research design have enabled above branches in Geography to grow faster than the others. Besides, new branches of geography appeared with interest shown by some scholars (like administrative geography, electoral geography, geography of central places, gender geography, geography of social well-being, environmental management, medical geography, population geography of special groups, human ecology), as off shoots of several branches in geography. Taking note of this trend, the Curriculum Development Committee tried to integrate some of the courses to make them more cohesive.

The Curriculum Development Committee suggested the following:
(a) Incorporate multidisciplinary skills required in the teaching and learning of the subject.
(b) Link the general courses with the professional courses.
(c) Introduce modular system to enable specialization keeping in view the multidisciplinary approach to knowledge in the present day scenario.
(d) Promote flexibility in the evaluation system like the introduction of credit based system.
(e) Introduce bridge courses allowing for vertical as well as horizontal academic mobility.

The Committee organized the subject-matter of Geography in four broad streams: Physical Geography, Human Geography, Regional Geography and Analytical Techniques in Geography. The CDC identified further thrust areas. Here, the Committee
decided that though the study of environment is an integral part of geography, as per UGC guidelines, the environmental education should form part of the contents of the syllabus of each paper reviewed. Here, geographers have a challenging opportunity to integrate environmental education and awareness through the teaching of geography in all its sub-fields. Geographers can play a leading role in assisting the allied disciplines in environmental assessment, awareness and education.

Since the subject of geography filters from a wide spectrum of knowledge, a student should be exposed to all types of major branches in geography: Physical, Human, Regional and Philosophy, methods and techniques. Upgrading of courses in all branches is necessary with the march of time.

The Committee recommended the inclusion of some vocation-oriented courses for the students who terminate their studies at the undergraduate level. Computer application, Introduction to statistical and mathematical methods in geography, fieldwork, practice and application, are some of the subjects suggested which could prepare a student for employment in the relevant fields.

The success of the revised syllabus would depend largely on the upgradation of the knowledge of the teaching community in the field of geography and allied disciplines, with which geography has its interface within earth sciences, bio-sciences and social sciences. Different training modules appropriate at different levels of education for the teachers and orientation courses are suggested through Academic Staff Colleges.

As the first step, it is necessary to prepare an inventory of institutions, which impart training in the latest technology and its application to the problems of spatial dimensions. Secondly, it would be necessary to take stock of the existing training programmes and infrastructure in various departments of Geography with a view to upgrade/build the infrastructure to meet the requirements of the Discipline.

In the post-graduate programme, the students may be allowed to opt for a few courses from other departments of Social Sciences, Environmental Sciences, Computer Sciences, Information Technology and even Basic Sciences. The total number of such courses could be up to twenty percent of the total course-work.

Geography, by virtue of its multidisciplinary nature, and its practical value, can easily imbibe professional qualities. The departments of Geography are encouraged to initiate professional courses of short duration for in-service/post-graduate students leading to certificate or Diploma in subjects like:

- Geographical Information System (GIS)
- Computer-aided Cartography
- Population, Education and Development
- Geo-Informatics
- Remote Sensing
- Digital Image Processing
• Population-Environment and Development
   (The list is subject to diversification/additions)

While preparing the course-contents of such courses, inputs may also be sought
from experts working in research & development in industry, professional organizations
and the allied disciplines.

While several subjects are being taught in Open Universities, Geography has not
yet entered the distance mode of education. Geography should also be included in the
distance mode of education like other disciplines.

The Committee further recommended strengthening of fieldwork components at
the post-graduate and under-graduate level. In fact, requests for fieldwork at
undergraduate level have come from various quarters. It is suggested that the theoretical
work should precede the fieldwork being undertaken by the class; be of short duration
(say a week or so) and be arranged in the vicinity. Budgetary allocations must be made
available for such fieldwork.

The laboratories including GIS and Remote Sensing labs in most of the departments
are ill-equipped with obsolete material and instruments. The GIS labs are often equipped
with pirated software. There should be provision for a block grant from time to time to
upgrade and modernize the laboratories. The financial assistance to laboratories should
commensurate with the changing needs of the departments.

Priority areas imperative to the development of geography as an inter-disciplinary
subject and its foundation rooted to environment in the phrase “study of earth as the
home of the man” need to be revisited in the coming years. These are enumerated
below:

• Preparation and implementation of bridge courses jointly by geographers,
economists, sociologists and computer scientists at the M.A./ M.Sc. Programme.

• Focus on environment, land and water resources and sustainable development.

• Research methodology courses to have sharper focus on themes of current interest
both in theory and application.

• Identification and analysis of poverty as a region specific problem, indicators of
human resource and economic development to be identified and deliberated upon.

• Study of human settlements with special reference to levels of facilities and amenities,
identification of spatial gaps and formulation of area and location specific
programme for implementation under decentralized planning.

• Setting up research and training centres, networking centres in four or five regions
of the country as a priority for upgradation of skills in Geography & Geographical
techniques like GIS, Computer.

• Cartography and Remote Sensing. This would serve to fill the gaps in the
dissemination and application of geographical knowledge and spatial techniques
among the academia.
The Ministry of Human Resource Development initiated a flagship programme of rejuvenating teaching and research in Basic Sciences at the university level. Earth Sciences like geography are a part of them.

**Some of the highlights of the programme are:**

(i) **To promote**

Infrastructural development grants for strengthening of infrastructure in terms of power supply, water supply, safety equipment, laboratories, working tables and infrastructure required for including the component of research at post graduate level:

- Special Assistance Programme (SAP) at the level of Departmental Research Support (DRS)
- Department of Special Assistance (DSA)
- Centre for Advanced Studies (CAS)

(ii) **To provide**

- Assistance to Non-SAP Departments
- Assistance to Non-SAP Colleges with potential for excellence, “Autonomous Colleges”, “NAAC Accredited Colleges”

(iii) **To award**

- Meritorious Fellowship
- Single Girl Child Fellowship
- Dr. D.S. Kothari Post-Doctoral Fellowship

(iv) **To facilitate the functioning of**

- Networking Centre/Summer-Winter Schools for providing facilities for research and training in given disciplines.
- Operation Faculty Recharge-UGC Faculty Recharge Programme for selection and appointment of UGC selected Faculty in scientific disciplines to augment research and teaching facilities at the University level.

(v) **To sanction**

- UGC-BSR Faculty Fellowships for continuance of research contributions by talented teachers nearing superannuation.
- One time grant to faculty for augmenting research facilities.
- Start up grant for newly recruited faculty.
Geography departments and faculty/scholars can reap full benefit of this initiative and strengthen physical infrastructure and man-power support for development and expansion of their programme initiatives.

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Introduction

The understanding about the concepts concerning with water security, food, energy, climate, environmental studies, health care, disaster management and sustainable development with the methods of both the natural and social sciences is core to the geographical research and its application to attain human security (Singh, 2014). The developmental activities that took place in the name of socio-economic transformation of human society without taking prior care of its implication to the immediate environment have resulted into depletion of natural entity of the environment. The extraction of resources for construction of roads, eviction of lands for dam construction and cutting of forested areas for generating more build up spaces to cope up with the ever increasing population in the cities have exerted tremendous pressure to the existing environment. These environmental implications have resulted into occurrences of frequent natural hazards in the form of landslides, recurrent drought and floods, cyclone, earthquake and many more. The effects of climate change and threat to bio-diversity are two major problems in the current scenario from environmental point of view. Combining all these, the following discussion is a synthesis of works covering various environmental issues across India which need wider concentration in the achievement of sustainable development.

Natural Hazards and Disaster

The Indian subcontinent is prone to almost all type of natural hazards due to its environmental and geographical diversity varies from mountain range in north to plateau in the south, desert in the west to sea coast along the southern peninsula. A study on occurrences of cyclonic storm in East Coast of India revealed that during the last 124 year (1891-2014), about 814 storms which includes 509 cyclonic storms (CS), 174 severe cyclonic storms (SCS), and 131 very severe cyclonic storms (VSCS) have crossed the east coast of India (Naga Kumar et al., 2015). Among these storms; 388 have crossed
over Orissa coast, 182 in Andhra coast, 150 in West Bengal coast and 94 in Tamil Nadu coast respectively. Andhra Pradesh coast had experienced more VSCS (41) and these are mainly occurred during southwest monsoon season.

Landslides are the natural hazards mostly occurring at the hilly slope areas and if found associated with densely populated areas, may results into disaster. Landslides vulnerability to the people in Guwahati, using Participatory Geographical Information System as a tool revealed that areas around the high slopes which mostly occupied by weak buildings with sizable population are highly vulnerable to landslides hazard (Nongkynrih et al., 2015). Whereas Gabhale and Devne, (2015) pointed out that heavy rainfall during monsoon season in the Konkan coast of Maharashtra leads to an increasing amount of landslides. In Himachal Pradesh, the landslides happen to be the regular phenomenon which is mostly dominated by rock slides followed by debri slides, rock fall and slumps are due to the combined effect of coexistence of week geological structures, rivers, unplanned roads and developmental activities etc. (Patra and Devi, 2015; Sharma and Sharma, 2014). Kullu district of Himachal Pradesh has been regarded as the disaster prone region where all type of disasters are very much frequent and further expansion of human activities might expose the area vulnerable to more natural hazards (Chandel and Brar, 2012).

Floods, highly frequent and recurrent among the natural hazards are mainly concentrated on the major river basins crossed over India where the possible causes for its genesis in Lower Brahmaputra River Basin, Assam have been identified as heavy rainfall, inadequate capacity of river to carry water, severe soil erosion which further resulted into river-belt siltation, landslides, earthquake, extensive river catchment, deforestation and practices of shifting cultivation (Jhum) etc. (Singh et al., 2014a; Singh et al., 2014b).

Another side of argument raise the consensus that floods can be managed and transformed into opportunities for socio-economic growth and development by applying some new strategies like construction of more raised platform, drainage channels, culverts, sluice, embankment etc. Some non-structural measures such as flood forecasting, flood warning, sanitation, relief operation and health check-up should also be included (Kalita et al., 2012; Singh et al., 2014c).

The individual effort of structural and non-structural measures in nature is less effective as the flood is associated irrespective of state boundaries. Therefore, regional cooperation between states and countries are required for the water resource management through flood mitigation, food production and power generation in the Ganga basin of Murshidabad district of West Bengal (Mollah, 2013).

Drought like other hydro-metrological hazards has its slow pace of occurrence but the manifestation and duration of its impact has extended for a long period of time and can involve large section of people at a time. A historical-geographical perspective of drought in Himachal Pradesh envisages noticeable variations in drought occurrences in different climatic zones where more incidences have been found in cold desert and hot humid zones. The overall situation revealed that the region has variable rainfall regime.
where the chances of more extreme event is high resulting thereby vulnerability to horticulture and hydropower generation (Chandel and Brar, 2013).

**Urbanization and Urban Environment**

Urbanization, a process which has interpreted as both social phenomenon and cultural transformation of landscape has remained the most powerful, irreversible and visible anthropogenic forces on the earth leading to colossal fossil energy use, urban sprawl, land use/cover change, deteriorating water quality, groundwater depletion, air and land pollution in most of the developing countries of the world (Aggarwal, 2014). Urbanization is the result of both the natural increase and migration from rural counter part where the rural-urban migration has been identified as the major important factor in the rapid growth of urban population in Nagaland (Longchur, 2014).

Urbanization and globalization are not separate entities and have same implication to the economy and landscape which has its manifestation in developing countries like India is such that the concentration of people in the cities are increasing as more than 70 per cent of the people who happen to be in the villages are rushing to the city centre especially to the large cities (Mishra, 2014). On the other hand, it has been identified that rapidly increasing population and subsequent outspreading towards the fringe village with unplanned and unregulated land use and city services has led to serious land use problems along cities urban peripheries (Shekher and Diddee, 2015). In city centre especially in megacities, changes to land use practices and concentration of more build-up areas have resulted into occurrences of Urban Heat Island (UHI) as build-up and fallow lands record high temperature than vegetative cover and water bodies (Grover and Singh, 2015; Singh et al., 2014).

The distribution of population and facilities are complementary to each other where the urban centres having large number of facilities and much functional importance induce pulling effect and become a centre with greater chance for further growth by attracting people from surrounding areas (Ali and Varshney, 2012).

The dealing of ‘Mega Spaces’ in the world in the twenty first century has been identified that the two Asian ‘Mega Spaces’ i.e. India and China possess both the natural and human resources to come out of the Euro-centric colonial economy and to transform themselves into morally strong and materially more prosperous societies (Mishra, 2014).

The spatial system of cities through applying the rank-size rule and nearest neighbour model in India and its distribution pattern revealed that the cities are inclined more towards uniform pattern rather than the random pattern of distribution and could be categorized into four hierarchical orders i.e., global-cum-national urban system; sub-national urban system; regional urban system and sub-regional urban system (Mishra, 2015). A linear pattern between actual population and expected population in Nadia district of West Bengal has found while plotting the data applying logarithmic scale based on Rank Size Rule (Sheikh and Rukhsana, 2015).

Development in an urban environment mainly those of the cities are highly dependent in the improvement of the transport network system where road, rail and air
networks are of major concern. A current study on transport network of Varanasi district in Uttar Pradesh encompasses that the rapid growth and uncontrollable demographic pressure leads the city to a crucial juncture where it faces the problem of congestion, slow moving traffic, increasing number of vehicles, encroachment and less parking space (Pal, 2015). Another study revealed that the phenomenal rise in the build-up areas to cope up with the increasing demand of residential accommodation and expansion of business activities exert a pressure on the existing agricultural land and make the city unsafe for ecological sustainability and development (Jaiswal and Verma, 2013).

Managing waste in an urban environment becomes a pressing problem and the problem is acute to those in the megacities. Study of solid waste management in Faridabad city with its comparison to rest of the cities in India revealed that the non-biodegradable materials are decreasing which is due to the result of construction activities which shows as slowing down in the city (Yadav et al., 2014). Chuwan and Kuberka, (2012) have drawn into conclusion that level of education, type of occupation, living standards of population and functioning of ULBs may bring change into the management of solid waste. They have their emphasis on education and environmental awareness as two important factors in proper managing of solid waste.

Another very important study on the dynamics of 'peri urban interface', which often uses as the dumping site for city garbage and get neglected from the development point of view, argued that people living at the interface should be provided with all the necessary urban amenities and shall be treated as an inseparable part of urban system (Sarkar and Bandyopadhyay, 2013). Urban bias can also be identified by looking at the healthcare facilities in the form of lack of higher grade hospitals in peripheral areas of the cities (Lalmalsawmzauva, 2013)

Looking at the shrinking spaces and high price of land in the urban environment, a new initiative and very innovative approach could be to use the rooftop as valuable urban resource which will have its great economic value for the residents. Taking case study of Patna Municipal Corporation, it revealed that by installation of various rooftop technologies and improved water quality it will lead us to save energy, grow fresh vegetables and flowers, generate clean electricity and contribute to greater community resilience with healthy lifestyle (Verma and Kumari, 2014).

Environment and Health

Environment is very intimately related with health and well-being of people where the absence of suitable environmental conditions may result into health related problems in the form of communicable diseases and associated morbid condition. In rural India, one of the big problems is the people’s lack of awareness about the sanitation and health related issues on the one hand and less and non-availability of sanitation facilities on the other hand. Study revealed that in Dharwar taluk of Dharwar district in Karnataka which consists of 2,26,968 people out of which merely 4.95 per cent (11,240 persons) use toilets and remaining 95.04 per cent do not avail the sanitation facility and practicing open defecation (Nayak, 2015).
Another very lively and most sought problem in rural India is ground water contamination with arsenic. Study revealed that in Eastern Barddhaman district of West Bengal, arsenic contamination has detected which is due to increasing groundwater irrigation practices. It also clarified that poor socio-economic facilities, poverty accompanied with poor nutritional status at remote villages make arsenic a hazardous pollution associated with health hazards which sometimes become 'social hazard' specially to the women (Laha, 2013).

The traditional use of biomass fuel in the rural households and the rigorous exposure of rural women to the toxic pollutant released from that fuel resulted into instant short term problems with diseases like respiratory infection, adverse pregnancy outcomes, eye related problems and severe ulcers/cancers etc. (Singh and Jamal, 2013).

In cities also, it has been established that there is positive relationship of indoor air pollution and respiratory diseases mostly among the slum dwellers due to their use of bio-fuels for cooking associated with meagre living spaces, ill ventilation and poor exit capacity of smoke from inside the house (Ibrahim, 2014). Another study established a positive relationship between housing conditions and occurrences of diseases in Srinagar city where it has found that households belong to poor income group and low socio-economic status suffer the more (Singh and Baba, 2015).

The problems faced by the houseless people in India are very tragic as they compel to live and sleep in informal places frequently resulted with incidences like road accident, lack of water, sanitation, air pollution, unhygienic living conditions comprises with full of mosquitos, flies, filths, heaps of garbage and wastes etc. These vulnerable living of houseless population are very much susceptible to infectious diseases like asthma, skin infection, gastroenteritis, tuberculosis and constant morbid condition (Shamshad, 2015).

Accessibility of medical facilities and its availability to the people who are in need happens to be the indicator of development. The variation in using the medical facilities among the slum dwellers in selected cities in West Bengal have identified significant disparity based on socio-economic status, educational level, age and gender variation, use of private or public hospital and rate of hospitalization among the respondents (Mojumder, 2015). The use of traditional knowledge of herbal home remedies (herbs useful for curing diseases) and the role of traditional healers as health care provider could be an affordable means of healthcare to the poor and marginalized people where there is lack of modern medical facilities (Nitu et al., 2012).

The Uttar Pradesh state of India has the population below poverty line is estimated as one third of the people of the state where the responsible factors for this endemic poverty has been identified as interior location, pressure of population, poor quality of political leadership, lack of planning for development, lack of economic diversification, regional disparities and rampant corruption (Misra, 2012).

Disposal of solid waste and the practices involve in the disposal processes are the pressing point from the sustainable development point of view. The improper waste disposal with its degrading capacity of the environment resulted into poor urban health
with increasing microorganism and disease carrying vectors causing weak, tired and fatigue people (Srivastava et al., 2014).

The squatter settlements and their spatial location play a vital role as if a settlement is located along the drains and in the riverbed are environmentally hazardous and unhygienic. In some settlement, people are involved themselves in certain specified works which could be avoided if they have been relocated in some other suitable places. Here, it has been established that the policy of eviction, demolition and resettlement has failed to control the growth of squatter settlement for the case of Delhi in the last 40 years. Therefore, in order to have a proper understanding of the problem, an attempt has been made based on locational attributes of jhuggies where it has suggested that those jhuggies lying on critical locations required resettlement elsewhere due to potential threat to human health or danger of outbreak of epidemic (Shekhar, 2012).

Slum is the worst form of visible poverty. These are the unwanted creation of urbanization and urban development. These are also the most neglected part of city development and planning. The constant negligence and deprivation of all the basic amenities and facilities make the living of slum dwellers vulnerable to numerous health related problems. The condition of those of migrant slum dwellers who basically migrated from the nearby villages in search of better employment and jobs have found in more deteriorated condition where they mostly engaged with informal sector as the major source of livelihood and become victim of uncertainty of work, low wages and indebtedness (Singh and Kaish, 2013).

**Land Resources and Its Utilization**

Land is one of the most precious natural resources in the earth. To know the potentiality of land and its productive capacity, ‘land capability assessment’ may be an important aspect for a thorough understanding of the diversified use of land (Prasad and Ghosh, 2013). The anthropogenic activities like mining and manufacturing may result into degrading the quality of land and thus decrease the soil fertility. Study revealed that in Chittorgarh district of Rajasthan successive mining leads to the significant degradation in the quality of land resources (Jalal and Porwal, 2015).

An investigation in relationship between land degradation and area without forest cover and population density revealed that the degradation of land increases with decrease in forest cover land and increases in population density in India (Priya and Pani, 2015). Another study established that land degradation is a function of susceptibility and resilience where the current problem of land degradation in Kendujhar Plateau, Orissa is directly linked with inappropriate agricultural practices, mining activities, deforestation and to some extent shifting cultivation (Abhay, 2015).

The ‘hybrid classification techniques’ to detect the changes in land use/land cover has been established as more appropriate than the existing classification techniques with their applicability in studying the urban sprawl, urban utility services, urban infrastructure development and studies related to sustainable urban planning (Jaybhaye and Mundhe, 2013). In Gurgaon, Ranchi, Jaipur, and Solan town of Himachal Pradesh; the land use
pattern are showing a trend where build up areas are increasing and other land uses are decreasing (Gupta, 2012; Sharma and Sharma, 2013). The expansion of built-up areas towards the peripheral part of Dehradun city at the cost of urban green spaces and agricultural land to cater the needs of increasing population has adversely affected the quality of urban environment accompanied with fragmentation of continuous patches (Sharma and Jalal, 2013).

Land use is also termed as crucial component in shaping the settlement pattern where in south plateau region of Maharashtra district, pentagon shape of villages are found meaning thereby a scattered settlement (Pawar et al., 2012). Planning for eco-tourism in Aravalli Ranges near Delhi and sustainable tourism in Goa which could be of recreational in nature will help to protect and rejuvenate the currently unsustainable relationship between environment and development (Yadav and Yadav, 2012; Mulimani and Morakar, 2013). The importance of green-tourism in Indian Himalaya becomes urgency by looking at the unplanned development of tourism. It involves a sustainable community-based tourism where it would protect the local wildlife and natural resources and most importantly offer alternative opportunities to the native people (Anand et al., 2012).

Another important attempt has made in eastern Uttar Pradesh with an aim to make the region suitable for tourist attraction where there are lot of opportunities has been identified for the development of a full-fledged tourism industry which could be an alternative to agriculture (Tyagi, 2013). The north eastern states in India having the potential to develop the rural tourism, agro tourism and eco-tourism that could be transformed into reality through the initiation of state institutions, urban local bodies, civil societies and more importantly developing rapport with the local communities (Mehta and Yadav, 2015).

**Water Resources and Management**

Water resource, mainly the water for drinking and sanitation purposes to the people is prime concern from sustainable development point of view. One of the biggest problems that Indian megacities are facing concerning water resources is the lack of availability and poor accessibility of water for drinking and sanitation purposes to the city inhabitants (Singh et al., 2015). The degradation of land and water resources in the Phek district of Nagaland are attributed to land-use change which is due to shifting cultivation, deforestation, road construction, slash and burn on hill slopes, accelerated soil erosion, landslides, use of both chemical and power generators in catching marine foods etc. (Lohe and Rawat, 2015).

Study revealed that the traditional water bodies in Delhi have declined in quantity and degraded in quality which is due to the effects of anthropogenic activities further exerted threat in the form of encroachment, pollution and catchment destruction. Mapping and creation of database of water bodies, preservation of catchment areas, ban on unauthorized construction in the pasture and farm land, regular monitoring of water bodies and departmental tie up of authorized water bodies with various citizens
organizations may ensure adequate availability of water for all and can form a sound environment with reasonable prosperity (Singh et al., 2013a; Singh et al., 2013b).

The wetlands, known by different names as swamp, marsh, bog, fen, wet meadow, mire and slough (Moss, 1980 cited in Patnaik and Patra, 2015) are important part of our ecosystem. Therefore; identifying, mapping and managing the wetlands with an aim to extend benefits to the local community through providing them seasonally altering economic activities like fishing, cultivation could be a good practice from aquatic resource management and community development point of view (Patnaik and Patra, 2015). Another side of argument is that the development of shrimp farming in wetlands resulted into destruction of natural environment. The potential environmental impacts of shrimp farming in the Sundarbans, West Bengal has been categorized as destruction of wetlands and mangroves for pond construction, hyper nitrification of estuaries by shrimp pond effluent, spreading of shrimp diseases through livestock transfer, effect of chemical used to the adjacent estuarine ecosystem and salt water intrusion in paddy field (Dutta, 2015).

The utilization of groundwater for drinking purposes may be rare in big cities but in small cities and towns in India, the uses of groundwater for drinking purposes are quite frequent. Study envisaged that as groundwater generally content chemicals which are harmful to health if consumed without purification, therefore, prior analysis is required for any groundwater location to be declared as suitable for drinking purposes (Bala and Kaushik, 2015).

Watershed, a homogenous lithological structure, geographic terrain, socio-economic conditions and cultural-ecological settings is a very important unit from a planning and management point of view (Sahu, Singh, Kumar, Da Silva and Behera, 2013; Sahu, Behera, Ratnam, Da Silva, Parhi, Duan, Takara, Singh and Yamagata, 2014). Land, water, soils and forest which are the basic components of environment have their optimum interaction in a watershed (Mishra and Mishra, 2013). For the proper management of watershed, a Watershed Development Model have been proposed with a context to the nineteen watersheds/ river basin in Bihar and hoped that the application of the model will being socio-economic transformation with an eye of sustainable development of the regions (Mishra and Mishra, 2013).

The scarcity of water resources is the pressing problem where there is a need for proper assessment of fresh water resources. The methods involving in assessing the water scarcity by different indices includes crop water stress index (CWSI), water supply tress index (WaSSI), water availability index (WAI) and water poverty index (WPI). It also involves the socio-physical parameters such as dry land agriculture, irrigation deficit techniques, traditional knowledge system, waste water reuse and good governance for water scarcity management which also includes water education and policies for sustainable development of water resource (Singh and Kumar, 2014).

The management of water resources need to focus on two important areas: ‘human intervention in surface water’, where it has opined that apart from natural forces like seasonality and cyclic drought and floods, the human factors like population growth,
urbanization, economic development etc. also affect the water system and ‘water governance’ (Chattopadhyay, 2015). The differences in the management of water sector between rural and urban India has been the consequence of both natural and socio-political factors where it has identified that the urban population possess some extra cash to make for their water thirst where their rural counterpart are not (Singh and Roy, 2015). The Interlinking of River (ILR) could be an opportunity in this regard to meet the need of available water for drinking, sanitation and hygienic practices for better health and well-being (Goel, 2012).

**Forest Resources and Biodiversity**

Forest is an important natural renewable resource which is the backbone for economic and cultural development of an area closely associated with forest induced economy (Singh and Singh, 2014; Shukla, 2012). Deforestation and degradation of forest has resulted into degradation of lands which adversely affected the socio-economic development and have its serious implications over the livelihoods of the people (Goswami, Kala and Singh, 2012) and thus induced the condition where people started migrating towards the cities in searching of jobs (Singh and Sharma, 2013).

India with its diverse natural resources spreading in length and breadth has made it a unique entity. The prime concerns here for these pristine resources are their proper conservation and management (Ma, Haapanen, Singh and Hietala, 2013). The very developmental activities in the name of transformation for better living and prosperity have resulted into depletion of the natural resources and thus disturb the bio-diversity. Along with the governmental initiatives like planning for Biosphere Parks, introduction of Biodiversity Bill; there is a need to spread awareness about environmental protection among every section of society through formal, non-formal and informal system of education and tracing the cultural, philosophical and contemporary developmental models to conserve the bio-diversity (Dixit, 2014).

Mapping geographical heritage, raise awareness about geographical diversity through capacity building, inclusion of geo-parks as a subject for teaching in life-long programme, integrated geo-conservation in land-use planning and develop legal framework under National Policy on geo-parks are some of the recent initiatives that could be an alternative in conserving the biodiversity in India (Singh and Anand, 2013).

**Developmental Activities and their Environmental Implication**

Construction of roads is a vital sign of development as the connectivity among the places has increases by the development of road networks. There is positive relationship between road transport and regional development as the extension of transportation network to rural areas helps in converting the fallow and cultivable wasteland into cultivation, marketing for agriculture products, growth of rural industries and social transportation through better accessibility to basic amenities and therefore the development (Kumar and Sen, 2014).
The developmental activities which have disastrous implication at later stage, dam constructions are one of them. Study revealed that Khoupum Dam Project, Manipur has both the positive and negative impacts on environments, agriculture, social and economic life of the people and when it has been evaluated; the negative impacts have exceeded the positive implications. It has its negative impacts in the form of disturbances in the wetland ecosystem, decrease in the fertility due to active erosion in the downstream valley, more use of chemical fertilizer and pesticides which further impacting to the environment and economy of the farmers and thus the number of families living below the poverty line and landless in the valley rose higher than before the dam (Rongmei and Singh, 2013). Similar impact have seen in case of Renuka Dam Project, Himachal Pradesh where out of 32 villages, people from 24 villages have lost their agricultural land and displaced as their house are fallen in submerges zone (Sharma and Chand, 2012).

Another very important issue of construction of dams is the resettlement plans for the people who vacated or evicted from their land. Studies in identifying the factors influencing choices of resettlement site are revealed that people have their strong bondage with the socio-cultural, economic and geographic factors of the region they lived since long and their choice of resettlement are greatly influenced by these factors while asking for selection of their resettlement sites (Dalal and Banarjee, 2014; Dalal and Kumar, 2012).

The development of dam sites from the tourism point of view is another initiative which has its additional benefits and some shortcoming also. Study revealed that the sustainable dam site tourism with an eye for natural resource management at Maithan Dam under Damodar Valley Corporation (DVC), West Bengal and Jharkhand holds a huge potential for development of pleasure tourism which will also enable the local people to improve their livelihood (Sengupta and Saha, 2013).

Brick industry which is considered as a sign of development and coincided with urbanization with growing economy may result into environmental degradation due to some faulty manufacturing practices. The unscientific way of mud collection, using river bed as road and unscientific quarrying of sand and cutting of slope have resulted into severe soil erosion, slope failure and supply of sediment to River Haora in West Tripura. It further disturb the general flow of the river which shows gradually narrowing with sedimentation in the lower stretches with deteriorating water quality leading to several health hazards (Bandyopadhyay, 2013).

Study on environmental quality revealed that villages located surrounding the hydropower projects are affected adversely due to the construction activities where people with diseases like cough, respiratory illness, breathing problems, irritation in eyes and nose are found to be more in number (Sharma and Kuniyal, 2013).

Inland water transport which is considered as economic, fuel efficient and environment friendly mood of transport system could be a viable option for the multimodal transport system in India to coup up with the increasing dependencies on road and rail transport in the metro cities. Although all the big cities in India are not
connected with the perennial river system but in case of Kolkata, where there is vast potential to use river Hooghly for passenger movement need strategic attention with an eye for its proper planning and management to redevelop it as an alternative to the road and rail transport system (Dey, 2013).

**Climate Change and Environment**

Climate change is a reality where the cleanest evidence could be gathered by looking at the variability in the concentration of snow cover, glacial recession and global warming, ice caps, permafrost and ecology of a region (Mal and Singh, 2013). It has been attempted to delineate the glacier boundaries in three different years to classify them on size basis in Doda Catchment in Himalaya to assess the movements of glaciers with respect to retracts and global warming impacts on glaciers (Doi and Singh, 2012).

Prediction of monsoon variability and trends along with involved mechanism is another difficult task where studies have reached into assertion that there is positive correlation between ENSO and the number of depression crossing the Indian coast and this suggest that it can be a good predictor of monsoon rain (Singh et al., 2013; Singh et al., 2015; Singh and Janmaijaya, 2012; Singh and Mal, 2014).

Climatic variability also create vulnerability where the empirical findings have suggested that the south eastern and extreme western Rajasthan falls in the zone of vulnerability which is due to the effect of climate change (Poonia, 2014). Changes in the climatic condition especially the weathers exert noticeable changes in the occurrences of diseases. Study revealed that there has been a positive correlation between Chickenpox and Acute Respiratory Infection with temperature where both the diseases found at peak position during summer when temperature soars high. On the other hand, diseases like Chigungunya, Acute Diarrhoeal Diseases and Typhoid fever are positively correlated with monsoonal rain (Emayavaramban and Sreelakshmi, 2013). High temperature and reduced rainfall in Haryana in *Kharif* season in the month of August resulted into pest and disease outbreak in the region (Singh and Kumar, 2013).

The Himalayan ecosystem mainly termed as agro-ecosystem homes a multitude of natural resources aids traditional mountain societies to sustain themselves. The recent large scale population expansion and subsequent encroachment to agriculture and forested land resulted into deforestation which further contributing to flood and stagnating agricultural output. It has been suggested that a holistic approach is the need of the hour which link ecology with social system services and bring land use/ cover analysis as a joint platform for natural science and humanities to optimize trade-off for a better ecosystem practices (Ma et al., 2012). Integrating the Clean Development Mechanism (CDM) forestry project could be an important effort in this regard to mitigate the climate change effect through afforestation and reforestation activities on degraded land in developing countries (Ma et al., 2014).

Another very important aspect is the glacial lakes and associated outburst floods (GLOFs) in the Himalayan regions which have increased due to the climate change effects in the last century and has a devastating effects and damage potentials in the
form of losses of life and properties to the society. It is therefore needed to carry out an assessment of potential GLOFs with a view to provide the community a better warning and management system (Mal and Singh, 2014).

The vulnerability of arid region of India especially the western part of Rajasthan state to climate change are attributed to the use of modern tools and techniques in farming and increase in population density. Water scarcity and land degradation due to wind erosion are the factors which make it moderately vulnerable as a whole with some highly and low vulnerable zones (Singh and Kumar, 2015a; Singh and Kumar, 2015b; Singh and Kumar, 2015c). Cropping strategies for aberrant weather conditions, cropland management techniques, improving access to information, enhanced role of bio-technology, risk management in agriculture and community participation are some of the mitigation strategies for a sustainable agriculture practices which need for wider implementation (Singh and Kumar, 2012a; Singh and Kumar, 2012b).

Conclusion

The fragility of environment to natural hazards at the high mountainous regions has been conceptualized as the result of week geological structure which is accentuated by the anthropogenic activities in recent times. Urbanization and the subsequent expansion of build-up areas at the urban city centre and resultant impact to the land and water resources have degrade the pristine beauty of the environment which further impacting the health of city inhabitants. A balanced use of resources by keeping in mind the regional disparities along with the regional aspirations in allocating the resources and recognition of geographical disparity, socio-economic dynamics of regions, diversification of economy and improvement in the quality of education and promoting health and well-being in cities (like smart cities) are some of the key areas where attention from a planning point of views are required for sustainable future of regional development in India (Singh, 2015; Singh and Singh, 2015).

References


Geomorphology

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Introduction

India is a country of great geological and geomorphological diversity. The region is well endowed with a number of outstanding landforms and landform assemblages (landscapes) (Singh, Singh and Hasan, 2014). With the exception of landforms of continental glaciation, every type of landform and geomorphological process can be observed within the subcontinent (Kale, 2014a). It is therefore, not surprising to note that the number of geomorphological studies has increased rapidly in recent years. Many interesting studies have been published in various sub-fields of geomorphology in national and international journals by geographers and geologists. This note presents a brief review of the papers published in the field of geomorphology between 2012 and 2015.

Fluvial Geomorphology

Fluvial geomorphological research continues a pace with publications appearing on diverse sub-themes. Although the obsession with drainage basin morphometry and hypsometry continues and a number of papers on traditional morphometric analysis have been published in the last few years, there are several papers on other interesting aspects of fluvial geomorphology. Romshoo et al. (2012) studied the morphometric control on hydrological response at watershed scale in the upper Indus Basin. Using field evidence from a vegetated hillslope plot, Sarkar et al. (2015) made an attempt to understand the runoff generation processes in wet sub-tropics. Kopal Kumar and Dhorde (2013) estimated the runoff from impervious surfaces using remote sensing data. Hydrodynamic modeling of flooding and stage hydrographs of Tapi River was carried out by Timbadiya et al. (2014). The effect of land-use/cover changes at sub-catchment levels on downstream flood peaks was analyzed by Sanyal et al. (2014), and Vashisht and Bam (2013) derived a function for Ranichauri Spring to predict the spring water availability during the recession period. Ramakrishnan and Rajawat (2012) carried out
simulation of suspended sediment transport with satellite derived suspended sediment concentration. Rill hydraulics, based on experimental study, was investigated by Shit and Maiti (2012). The environmental flow for the Yamuna River at Delhi was estimated by Soni, et al. (2014). They concluded that about 50 to 60% of the virgin flow is necessary throughout the year to maintain the health of the river system.

Mandal et al. (2015), using large number of Be-derived average erosion rates, inferred that topographic steepness is the major control on the spatial variability of erosion and strong rainfall gradient is of secondary importance in the southern Indian Peninsula.

Other aspects in fluvial geomorphology include the study of the spatio-temporal complexity of the Ganga River dispersal system (Jain et al., 2012), the geomorphic effectiveness of a large flood on the Tapi River (Hire and Patil, 2013), bedload characteristics of lower order streams near Cherrapunji (Syiemlieh et al., 2013), the distribution of stream power along the Yamuna River (Bawa, et al., 2014), and bank erosion (Laskar and Phukon, 2012; Bandyopadhyay et al., 2014). Sahu et al. (2015) have documented and described the surface morphology, palaeochannels, sedimentology and the areal extent of an unusual megafan, created by the cratonic Son River. The connectivity structure of the Kosi megafan and the role of rail-road transport network were investigated by Rakesh Kumar et al. (2014).

Gupta et al. (2012) studied the role of large dams in reducing sediment fluxes in South Asia as well as other Asian rivers. They show that at the decadal scale, decline in sediment fluxes of the large Asian rivers are proportional to the number of mega dams present in the respective catchments.

The alluvial rivers of the Indus-Ganga-Brahmaputra plains are known for channel migration and frequent changes in the channel morphology. Using remote sensing techniques and old topographical maps, the changes in the channel morphology (Laskar and Phukon, 2012; Bandyopadhyay et al., 2013; Hossain et al., 2013; Ghosh and Guchhait, 2014) and position (Gogoi and Goswami, 2013; Gupta et al., 2013; Rudra, 2014) have been analyzed. Sinha et al. (2014) studied the avulsion threshold and planform dynamics of the Kosi River. The geomorphic changes in Srinagar (Garhwal) Valley in the last two centuries were studied using landscape painting by Devrani and Singh (2014).

The mythical Saraswati river in western India has been the focus of a number of studies in the last few decades. Several workers have postulated that the former river was a monsoonal river and not a Himalayan river. Valdiya (2013) put forth a number of evidence in support of his hypothesis that the Saraswati river was a glacier-fed Himalayan river.

It has been proposed that during early Cenozoic the Tsangpo River in Tibet did not drain into the Brahmaputra River but into other large rivers of South Asia, such as the Irrawaddy, Salween and Red River. Using uranium/lead dating and hafnium measurements of detrital zircons from Cenozoic sedimentary deposits in Central Myanmar, Robinson et al. (2014) have demonstrated that the Yarlung-Tsangpo formerly
drained into the Irrawaddy River. They infer that by Middle Miocene (c. 15 Ma), the Yarlung Tsangpo–Irrawaddy River had disconnected, and the Yarlung Tsangpo had been captured by the Lohit River (A tributary of the modern Brahmaputra).

**Coastal Geomorphology**

The characteristics of waves, tides and currents as well as shoreline changes were the main themes of studies in coastal geomorphology. The coastal studies include–variations in nearshore waves along the Karnataka coast (Sanil Kumar et al., 2012), sediment routing system along the Gulf of Kachchh Coast (Prizomwala et al., 2012), wave characteristics in the Gulf of Mannar and Palk Bay (Gowthaman et al., 2013), tidal variations in the Sundarbans estuarine system (Chatterjee, et al., 2013), coastal processes and longshore sediment transport along Kundapura coast (Shanas and Sanil Kumar, 2014), tidal and residual circulation in the Gulf of Khambhat (Nayak, et al., 2015) and the analysis and prediction of tides in the Hooghly estuary (Rose et al., 2015). The salinity gradient and the vegetation history during the last 3.7 ka in the Pichavaram estuary were studied by Srivastava et al. (2012).

Unlike coastal depositional features, there are very few studies during the last few years on rocky coasts and rocky features, such as sea caves, sea cliffs and wave-cut platforms. Karlekar and Shitole (2013) presented field data on the morphology of intertidal rocky platforms occurring along Dahanu Coast of Maharashtra and the fractal dimension of a shore platform profile was determined by Dasgupta (2013).

Changes in the shoreline and beach morphology have been the focus of some studies. Using multi-temporal satellite images, Mahapatra, et al. (2014) evaluated the shoreline changes along the coast of south Gujarat. Seelam, et al. (2014) studied the post-monsoon equilibrium beach profiles and longshore sediment transport rates at three beaches of Goa and Jeevivek and Chandrasekar (2014) analyzed the seasonal changes along the central Tamil Nadu coast. The spatial inventory of shoreline changes using satellite data of 1989–1991 and 2004–2006 shows that 45 per cent of the Indian coast is under erosion, 36 per cent is getting accreted, while 19 per cent of the coast is, more or less, stable in nature (Rajawat et al., 2015).

The impact of sea level rise was studied by Lalbiakzuali et al. (2013) and Nayak et al. (2013). The total coastal area inundated due to sea-level rise during the 20th century was estimated by Nayak et al. (2013). Their analysis reveals that 34.9 km² of Indian coastal region has been inundated by sea during the 20th century. Alappat et al. (2015), based on a large number of OSL dates, have inferred that along the Kerala coast, the beach ridges were formed between 5 and 4 ka and that the sea level was between 3.5 and 4.5 m above MSL and the position of shoreline was about 3 km inland during 4 ka.

There are several deltas on the east coast of India. The Holocene environmental changes of the Godavari Delta were inferred by Nageswara Rao et al. (2012) on the basis of sediment core analyses and radiocarbon dating. Studies by Singh et al. (2015) on six cores indicate that the present Kaveri Delta was formed during the Holocene in response to the sea-level rise after the Last Glacial Maximum (LGM). The Holocene
reef and associated beachrock of coral islands in the Gulf of Mannar were studied by Krishna Kumar et al. (2012).

**Glacial Geomorphology**

There are several studies on the fluctuations in the snout position of individual or multiple glaciers, glacial features and glacial lakes occurring in the Karakoram-Himalaya Mountains using remote sensing and ground observations (Dutta et al., 2012; Mehta et al., 2012; Pandey et al., 2012a; Pandey et al., 2012b; Sharma and Chatrantra, 2012; Negi et al., 2012; Negi et al., 2013; Raj et al., 2013; Ghosh, et al., 2014; Amit Kumar et al., 2014; Bajpai et al., 2015).

There are two studies that have attempted to understand the rate of retreat of Himalayan glaciers at the regional scale. Mapping of 11,000 out of 40,000 km² of glaciated area, distributed in all major climatic zones of the Himalaya by Kulkarni and Karyakarte (2014), reveals that the Himalayan glaciers are retreating at the rate ranging from a few meters to 61 m/year. This study also shows about 13 per cent loss in glaciated area in the last 4–5 decades. In another study, Bahuguna et al. (2014) mapped over two thousand glaciers of Karakoram, Himachal, Zanskar, Uttarakhand, Nepal and Sikkim regions. Their results indicate that about 86 per cent of the glaciers show no change in the snout position as well as the area of ablation zone, and only about 13 per cent glaciers are retreating.

**Tectonic Geomorphology**

There is a noteworthy increase in the number of studies in tectonic geomorphology in recent years. Most of the studies attempt to infer the degree of tectonic activity in an area on the basis of commonly used geomorphic indices of active tectonics, such as stream gradient index, hypsometric integral, basin asymmetry, valley width-depth ratio, etc. or on the basis of litho-structural evidence in the field (Chaudhri 2012; Thakkar et al., 2012; Lahiri and Sinha, 2012; Joshi et al., 2013; Dar et al., 2013; Sharma and Sarma, 2013; Joshi and Nagare, 2013; Ambili and Narayana, 2014; Sahu and Saha, 2014; Kale et al., 2014; Luirei et al., 2015; Alam et al., 2015).

Mandal et al. (2015), using Be-derived average erosion rates, inferred steady-state topography in the southern Peninsular India. According to them the steady-state conditions reflect the balance between erosion and isostatically driven uplift in this part of the Indian shield.

An attempt to understand the evolution of trans-Himalayan rivers through the study of drainage network, morphology, and internal organization of the smaller watersheds was made by Ghosh et al. (2015). Their study suggests that the catchments of the trans-Himalayan rivers represent an integration of processes such as headward drainage enlargement, capture of pre-existing drainage, and diversion of drainage in response to crustal deformation at successive stages of Himalayan mountain growth. The upper part of the catchments are the remnants of pre-orogenic drainage, the middle part of the catchments, represented by a series of small drainage basins, formed on the precursor
topography of the modern Himalaya and the lower parts of the catchments were shaped by drainage diversions induced by deformations related to the frontal thrust (Ghosh et al., 2015).

**Weathering and Soils**

Owing to enormous differences in lithology, climate (rainfall) and topography (elevation), there is large diversity in weathering profiles and soils in India. Bhattacharyya et al. (2013), in their review of soils of India, have described the extent and distribution of the different soil classes of India. Red ferruginous soils cover nearly one-fourth of the country. Pal et al. (2014) provide an exhaustive review of the physical, chemical, biological, mineralogical and micro-morphological properties and the degradation status of the red ferruginous soils occurring in various parts of India.

The mapping of soil micronutrients in Kashmir agricultural landscape was undertaken by Wani et al. (2013), the climatic and topographic controls on soil organic matter storage and dynamics in the Indian Himalaya were assessed by Longbottom et al. (2014), and the physico-chemical properties of soil profiles of two dominant forest types in Western Himalaya were analyzed by Joshi and Negi (2015). Sinha and Joshi (2012) used the Universal Soil Loss Equation (USLE) and Joshi (2014) carried out field measurements to estimate the soil loss in the Pravara Basin, Maharashtra. Sajjad et al. (2015) estimated the soil loss in Tons watershed using USLE.

Laterites occur in many parts of the Indian Peninsula. Ghosh and Guchhait (2015) have described the characteristics and evolution of laterites in West Bengal. Laterites and lateritic duricrusts in the cratonic parts of India are the result of long-duration chemical weathering. However, the exact time of the lateritic weathering in southern India is not well established. In a recent study, Bonnet et al. (2014), on the basis of $^{40}Ar/^{39}Ar$ ages, have inferred significant laterite weathering over the Mysore Plateau and the adjacent Deccan Traps between 36 and 26 Ma.

A study on weathering pits called tafoni was carried out by Arjunan and Achyuthan (2015) along the southern part of the east coast of India. The study indicates that the formation of weathering pits on granite, granite gneiss, charnockites and sandstone is not only related to tropical weathering processes, but also to sea salt water splays and microbial activity.

**Geomorphic Hazards**

Two types of geomorphic hazards have received greater attention from Indian geoscientists in the last few years. These include landslides and floods. Studies on landslides include relationship between slope failure and heavy rainfall in Uttarakhand (Sharma, 2012), analysis of the spatio-temporal evolution of an active debris slide in Eastern Himalaya (Ghosh, et al., 2014), assessment of seismically-induced landslide hazard in Karnataka (James and Sitharam, 2014), thresholds for evolution of mining scars at Darjiling (Maiti, 2013), and landslide susceptibility analysis/assessment. Several workers have carried out landslide susceptibility analysis/assessment using different methods.
such as probabilistic certainty factor approach (Sujatha et al., 2012), analytical hierarchy process (Mondal and Maiti, 2012), conditional probability analysis (Sujatha et al., 2012), information value method (Sarkar et al., 2013), and fuzzy logic (Ghosh, et al., 2013; Rohan Kumar and Anbalagan, 2015).

Monsoon floods are the most recurring, widespread and disastrous natural hazard in South Asia that are responsible for enormous social, economic and environment consequences every year (Kale, 2014c). Singh and Manish Kumar (2013) examined the flood events and fatalities resulting from various flood types occurring in India between 1978 and 2006. The extraordinary floods of Mumbai in 2005 and of Bihar in 2008 were investigated by Vishwakarma et al. (2013). Rana et al. (2013) studied the causes and consequences of recent and past floods in the Alaknanda Valley and Durga Rao et al. (2014) undertook hydrological and hydraulic simulation study of Kedarnath flash floods. The impact of climate change on flood characteristics in Brahmaputra basin was analyzed using a macro-scale distributed hydrological model by Ghosh and Dutta (2012), and the extent and magnitude of floods due to soil erosion in the lower Brahmaputra River Basin was evaluated by Singh et al. (2014).

The influence of active tectonics on the spatial distribution pattern of floods along eastern Tamil Nadu was evaluated by Selvakumar and Ramasamy (2014). Their analysis reveals that micro-scale topographic highs and lows imparted by active tectonic movements and the associated drainage anomalies have substantially controlled the distribution pattern of floods in the area.

Palaeoflood records have been investigated by few workers. The flood chronology of the largest landslide-dam outburst floods in the upper Ganga Basin reveals 25 large floods within the last millennia (Wasson et al., 2013). Sridhar et al. (2014) have reported the occurrence of large floods on the Sabarmati river during 1400 to 1440 AD. The synthesis of all the palaeoflood data reveals a remarkable absence of extreme floods during the Little Ice Age (Kale, 2014c).

Kale (2012, 2014c) made an attempt to answer the question whether flooding in South Asia is getting worse and more frequent, by analyzing all the available instrumental, historical and palaeoflood data. Analysis of the global archive data shows that 372 large and 55 extreme flood events have occurred since 1985 (Kale, 2014c). Analysis of ten largest floods on nine large rivers of South Asia point to clustering of large floods (Kale, 2012). Palaeoflood records show that modern floods (post-1950) have higher flood levels than the late Holocene floods. The main conclusion that emerges from the analysis is that the flood-generating extreme rainfall events are rising and human interventions have made the recent floods more destructive (Kale, 2014c).

Miscellaneous

A significant contribution to Indian geomorphology has come in the form of two volumes published in 2014. The first volume on the ‘Landscapes and Landforms of India’ edited by Kale (2014a) describes the landscapes of the major geomorphic provinces of India, namely, the Himalaya, the Indus-Ganga-Brahmaputra Plains, the Indian
Peninsula, the Thar Desert, and the Indian coastline. In addition, eighteen specific landscapes and landforms (such as, the Siachen Glacier, Ladakh, Valley of Kashmir, Duns, Chambal Badlands, the Sundarbans Delta, Belum and Borra Caves, Andaman Archipelago, Rann of Kachchh, Lonar Crater, etc.) are described in some details in the monograph. In the last part of the volume, Kale (2014b) has provided a list of four dozen potential geomorphosites in India.

The Atlas on “Landforms of India from Topomaps and Images” (Vaidyanadhan and Subbarao, 2014) provides 60 examples of different types of landforms occurring in different sections of India and resulting from different geomorphic processes such as fluvial, aeolian, glacial, marine, tectonic, weathering, mass movement, etc.

The Thar Desert is a vast tract in the northwestern part of the Indian subcontinent. The antiquity of this Indian desert is not very well established. Using all the available Quaternary climatic proxies, Dhir and Singhvi (2012) infer that for much of the Quaternary period, the Thar region experienced a semi-arid climate and the desertic conditions came to dominate much later.

The Lonar meteor impact crater is located in the Deccan Traps Region of India. Vijayan et al. (2013) have carried out topographical mapping of the Lonar crater using Cartosat-1 DEM. The results indicate that the post-impact topography was abruptly altered along the south side and active erosion and degradation is present on the west.

Using Tropical Rainfall Measuring Mission (TRMM) data, Tawde and Singh (2014) analyzed the spatial pattern of monsoon rainfall with orography of the Western Ghat. They observed that the rainfall is enhanced before the peak of the escarpment and is mostly confined up to the height of about 800 m on the western flank of the Western Ghat Scarp.

**Conclusion**

Even a cursory examination of the papers published between 2012 and 2015 reveals that fluvial geomorphology and coast geomorphology continue to dominate the Indian scene. The interest in tectonic geomorphology and Quaternary geomorphology is growing, and there is scope for initiating systematic studies in other less-studied sub-branches of geomorphology, such as aeolian geomorphology, desert geomorphology, karst geomorphology, periglacial geomorphology and mountain geomorphology. There is also an urgent need for greater attention from Indian geoscientists on India’s geological and geomorphological heritage or geoheritage (Singh and Anand, 2013).

**References**


Population Geography

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Introduction

Population geography emerged as a distinct branch of geography in the 1950s following Trewartha's presidential address to the American Association of Geographers in 1953. Although geography was concerned with man-environment relationship right from the classical period of Humboldt and Ritter, the neglect of population was a result of the broad division of geography into physical and cultural geography. Trewartha (1953) argued that geography needs to be organized as an interaction of three areas of concerns, namely i) population; ii) natural earth; and iii) cultural earth. As such, population constitutes a pivotal element in the field of geographical analysis providing a nexus between physical and cultural worlds. Looked from this perspective, population geography is not only confined to population distribution and its spatial arrangement, but also covers the whole gamut of population structure and its dynamics including the processes of fertility, mortality and migration in relation to development and environment. Methodologically, population geographers, like demographers, have shown an orientation that is hugely empiricist and crudely positivist in nature (White and Jackson, 1995). In India, population geography started in the 1960s covered issues like population growth and distribution, ethnic and social composition, literacy and education, health and nutrition, migration and urbanization. Of late, issues like environment, development and gender are also taken up increasingly. This review presents the research works in the field of population geography of India during 2012-16.

Demographic Transition and Ageing

Historical understanding of population trend in various countries of the developed world vindicates that it has passed through a condition of high fertility and mortality to a condition of low fertility and mortality leading to a situation we may call a stationary population or a situation showing even decline in the size of population. Due to
improvement in the material conditions of life generally mortality declines first followed by fertility decline. As it occurs in various stages, we call it demographic transition. The theory of demographic transition is the single most important theory in demography and population geography. It helps not only in the understanding of the changes in the demographic processes of fertility and mortality, but also the economic and social changes in a country. It has been brought out in several studies that India has been passing through slow but steady demographic transition (Bhagat 2014; Kumar 2013; Navaneetham and Dharmalingam 2012). Regional variations in demographic transition is very prominent as southern states like Kerala, Karnataka, Tamil Nadu, Andhra Pradesh are ahead compared to many northern states namely Bihar, Uttar Pradesh, Rajasthan and Madhya Pradesh. While the Total Fertility Rate (TFR) is well below the replacement level i.e 2.1 in south India, it is well above 3 in most of the northern states.

India’s birth rate declined from about 45 per 1000 population at the time of independence to 21 in 2013. The current fertility level is TFR 2.4 in 2012 and India is expected to achieve replacement level of fertility i.e TFR 2.1 very soon. On the other hand, due to control of the communicable diseases and improvement in public health and mortality decline over the last several decades, the life expectancy has increased from about less than 40 years at the time of independence to 66 years now. Similarly infant mortality in the country has declined from about 150 per 1000 live births in the early 1950s to 40 in 2013. Overall, India has been following the path of demographic transition and its population is likely to stabilize at about 1.6 billion by 2050 (Bhagat, 2014). Navaneetham and Dharmalingam (2012) think that the regional imbalance in the nature of demographic transition is potentially loaded for large scale internal migration and consequently rapid urbanization in India in future.

**Population, Development and Environment**

Demographic dividend is the new paradigm that defines the relationship between population and development. According to the proponents of demographic dividend as a country passes through the different phases of demographic transition from high fertility and high mortality to low mortality and low fertility, the age composition of a country’s population changes. During the transition, all countries have a demographic ‘window of opportunity’ when the growth in the working-age population is greater than the growth in the total population. This bulge in the working-age population, that is, the increase in the share of the working-age population in total population, is referred to as the demographic dividend. Using data for 1971–2001, Kumar (2013) has shown that the states with a higher growth in the share of the working-age population tend to grow economically faster. Narayana (2015) argues that economic growth has two components—one is related to rise in productivity and other to the rise in number of workers due to age-structural transition. He found that growth effects of productivity are found to be stronger than age-structure transition. The main reason is that the most of the workforce in India is employed in low productivity informal sector. There is a need to apply stronger policy efforts to improve the productivity level of India’s workforce to maximize the harvest of demographic dividend. In the changing economic conditions
of India, women are likely to participate more in the workforce. Hannan and Siddiqui (2015) found that female work participation increases with increasing educational level, however, the work participation rate of women among minority community like Muslims remains very low (Hussain and Siddiqui, 2013).

Underdevelopment manifests in various forms. Child labour, human trafficking, violence and sexual exploitation of women are some of the malaise associated with underdevelopment and poverty. Pala (2014) made an attempt to study child labour in India and suggested three kinds of approaches to deal with the child labour problem such as providing support to the distressed family, overhauling the education system and advocacy. Chandra and Jana (2014) also studied child labour in slums areas of West Bengal. They observed that the children are bound to be involved in various economic activities due to their poor socio-economic background, which is nothing but the exploitation of children.

In a study by Khan, Menka and Hassan (2014) highlight that beggars are most deprived and vulnerable section of population in India. They argue that along with socio-economic conditions, religious beliefs and activities encourage begging in India. Samshad and Khan (2014) also tried to study houseless population in Kanpur city and found that most of the houseless population was working and sending remittances back their homes regularly. In an interesting study on the relationship between population, development and environment, Lakshmana (2013) observed that the rapid economic growth and expansion of infrastructure development in recent decades have not come without serious environmental consequences in India. However, in the eastern, north-eastern, and central regions of the country, environmental damage has been mainly due to rapid population growth.

Population Distribution and Composition

India accounts for 2.4 per cent of the world surface area and supports 17.5 per cent of the world population. In contrast, the US accounts for 7.2 per cent of the surface area with only 4.5 per cent of the world population. As such among ten most populous countries, only Bangladesh has a higher density of population compared to India (Census of India 2011). As area remains fixed, the change in the size and growth of population increases the density of population in an ascending manner. The population density of India has increased from 117 persons per sq km in 1951 to 382 persons in 2011. The north-eastern zone has lowest density of population. In contrast, the southern zone had highest density consistently until 1991 census, after that eastern zone occupied the highest density in the country. It is also interesting to note that Kerala occupied the first rank in density until 1981 superseded by West Bengal. In 2011, Bihar superseded West Bengal showing the highest density of population (1102) among major states of India (Premi and Das, 2012). It is also to be noted that Bihar is a state with one of the lowest per capita income in the country.

India’s population composition has witnessed a significant change with decline in mortality began in the 1920s and subsequent fertility decline since 1970s. As such, the
study of the age structure has been an important concern among population experts and population geographers. Nayak and Behera (2014) examined the trend and spatial pattern in the changes of household size in India using state level census data. Population growth is found to have strong correlation with the growth in the number of households. However, a number of households have multiplied at a faster rate than population in many states. There has been a decline in household size particularly large household size (6 and more), but there is no corresponding increase in the single member households. In a study by Thakur (2012) shows that tribal people have high dependency and low ageing but there has been a shift in sectoral composition of tribal population from farm to off farm sectors. Jobs have been provided to them both by the government and private sectors and this is likely to affect their distribution of population and presence in urban areas.

**Ethnic and Religious Composition**

Religious composition of population has been very important characteristics of India's population. Sahu et al. (2012) examined the effect of minority status on fertility in India and Bangladesh. Using the DHS data at cross-country level and census data at district level for India supports the study confirms that the minority status irrespective of religion and nationality increases the size of family. Muslims are a minority in India and Hindus in Bangladesh. This paper contends that high fertility among religious minorities is a result of vulnerability due to socio-economic disadvantageous position of minorities in India and Bangladesh. Minorities are part of the vulnerable population that gets neglected in the developmental programmes of many countries and religious minorities like Muslims in India and Hindus in Bangladesh are no exception from this. District level analysis for India, as data for Bangladesh at district level was not available, further indicates that the high fertility among Muslims at the district level of India is the result of the socio-economic infrastructural disadvantage of the 'space' where Muslims reside in India. Gill, Bhardwaj and Mustafa (2013) in a study observed that natural growth has been the chief determinant of the growth of India's Muslim population during the post-independence period. Higher concentrations of Muslims are found in two types of areas: (a) those that experienced a longer duration of Muslim rule and (b) those located at the margins of the Hindu heartland. This study attributes relatively high growth of the Muslim population to two factors namely a higher incidence of poverty and slow acceptance of family planning. Thakur and Kumar (2013) examined the population growth rate of scheduled tribes based on 2011 Census data. The study indicates that the scheduled tribes recorded a high growth rate (24.45 per cent in 1991-2001 and 23.66 per cent in 2001-2011) in comparison to growth of general population (21.54 per cent and 17.69 per cent respectively). The study reveals a marked regional variation in growth pattern of scheduled tribes in India. Similar observations were also made in regard to scheduled castes by Kant (2013). The category of scheduled caste consisting of 1221 individual castes is not a homogeneous category. On the other hand, there are only handful castes numbering 16 which are numerically preponderant- have one million and more population as per 2011 Census. Studies also show that fertility among scheduled categories is higher than the others. Singh and Patidar (2012) observed
that among scheduled tribes the more primitive tribes like Saharia and others have higher fertility compared Meena and Bhils in Rajasthan. They suggested that raising the age at marriage, provision of basic education, and enhancement in women work participation, provisions of free maternal and child health care and access to family planning services may be undertaken in such areas.

**Migration, Displacement and Environment**

In a study by Das and Reja (2013) shows that one third of the total out-migrants from West Bengal, migrated to the distant states like Maharashtra, Delhi and Haryana. West Bengal is a relatively better state but lacks employment opportunities for the young people with rising level of education. Work/employment was reported to be the dominant reason for male out-migration, whereas marriage migration still constitutes the most dominant form of female out-migration. The study also found that the male out-migration for work/employment has increased, while female out-migration for marriage purpose has decreased during 1991 and 2001. In a more recent study based on 2011 Census data, Das and Mistry (2015) also estimated the interstate migration using life table survival ratios to identify the emergence of new destinations as pull centres. The study revealed that India has produced more emigrants than immigrants in the recent decade compared to the previous one.

Sawant, Rebello and Ferro (2015) made an attempt to study the emigration from a village from Goa. Goa is known for emigration particularly from the Catholic dominated talukas. This study makes a comparison between emigrant and non-emigrant households. It found that the emigrant families have higher level of expenditure and investment in the education of children, housing and business and agricultural improvements. Emigration has also helped in promoting village clubs and contributed in organizing inter-village football tournament. Longchar (2014) attempted to evaluate the nature of rural-urban migration and its impact on the urban environment and quality of life in the urban centres of Nagaland. The author concludes that migration from the rural areas to the urban centres has been taking place at a rapid pace in Nagaland. Multiple problems and issues associated with the movement of people and materials in a large scale than the land can hold were observed. Das and Bhusan (2014) observed that migration to metro-cities in India has taken place mainly from adjoining districts. They also found that Delhi and Mumbai attract more migrants compared to Chennai and Kolkata. In another study Ishtiyaq (2013) observed that besides economic reasons, caste prejudice and social discrimination in areas of origin was also reported to be the strong basis of migration from rural to the urban areas. Singh (2015) made an attempt to study the displacement of Kashmiri Pandits from Kashmir valley to Jammu region and showed, how Kashmiri Pandits tried to rebuild its lost world by building the replica of shrines, which they used to worship earlier.

Keshri and Bhagat (2012) have studied the seasonal and temporary migration and found that regional variations in temporary migration are noteworthy in India. The states like Bihar, Jharkhand, Gujarat, Madhya Pradesh, West Bengal and Nagaland have a very high intensity of seasonal and temporary migration. Also, seasonal and
temporary migration is more among poor and scheduled tribe households. Overall, migration has been taking place from eastern to the west and south-west India. There has been an emerging east-west contrast in pattern of migration unlike north-south contrast in fertility levels.

India has a long history of emigration but international migration from India has not been a topic of great interest of the population geographers. Perhaps one reason is the paucity of data. Bhagat, Keshri and Ali (2013b) using NSSO data show that coastal and plain areas have high emigration from India compared to central and north-eastern India. Also emigration has been higher from the relatively better off sections compared to the poor. On the other hand, immigration into India particularly in the northeast from Bangladesh and other neighboring countries has been a subject of social tension and conflict leading to half a million people displaced who are living in relief camps in recent years (Singh and Sinha, 2012).

**Population, Nutrition and Health**

The health status of population has been an important subject matter of population geography during the last two decades. The regional disparities in the health status of population and also health infrastructure have been a matter of concern. Saikia and Das (2014) made an attempt to study the status of public health infrastructure in the rural areas of North-eastern India. They found that the health sector suffers from an acute shortage of trained health workers. Laltlinzo (2012) addressed the specific sexual and reproductive health needs of women living with HIV/AIDS and made recommendations for counseling, care, amongst other interventions in the state of Manipur.

Growth and development of children in a community are largely influenced by a host of factors related to socio-economic, socio-cultural and agro-climatic conditions. Landholding, pucca house and education are important variables affecting the nutritional status of children. A study by Rao, Kumar and Brahmam (2013) highlights that nutritional status of children is better in western Uttar Pradesh compared to eastern Uttar Pradesh. Bano and Mishra (2012) studied nutritional status of women in Varanasi city. The paper highlights the role of nutrition as an important factor influencing health of women which varies by age, expenditure class, education and economic activity of women.

**Population, Education and Gender**

Child marriage has many negative consequences such as poor health status of girls along with higher risk of maternal and infant mortality. Child marriage also impedes girl’s education and their personality development. Females who have married before the legal age of 18 have also experienced greater domestic violence. Bhakat (2015) mentions that about one-fourth of marriages of females have been child marriage in the states of Bihar and Jharkhand. With rising level of education, child marriage declines. Bhagat (2015) argues that there is a need to distinguish between child marriages and the
incidence of child bride. Child brides are those with present age of below 18 whose marriages were solemnised, while child marriages are those whose marriages were contracted at age below 18 year in the past with present age beyond 18 years. Rajasthan shows the highest prevalence of child brides (8 per cent) among all major states of India as per 2011 Census.

Work participation is the single most key indicator of women's status and empowerment in a society ridden with patriarchal values. Kalita (2012) found that education, willingness to work and the availability of work are the key determinants of women's work participation in India. Mukherjee (2014) studied the level of female education particularly among three major tribal communities namely Santal, Kheria Sabar and Birhor. It is revealed that economic backwardness leads to poor educational standards among the tribal women. The social and geographical isolation is the cardinal factor responsible for the slow progress of education among tribal women. Dutta and Sivaramakrishnan (2013) attempted mapping out the literacy level and the extent of rural-urban and male-female disparity in literacy levels existing among the scheduled and non-scheduled populations in India after six and half decades of independence. The proportion of literates among both the scheduled and non-scheduled populations has shown an increasing trend over the past four decades. The states with higher concentration of christian tribal population have lower levels of disparity by both sex and rural-urban residence. Gill (2013) made an attempt to discuss the basal factors influencing female foeticide in India. Son preference and the cost of providing dowries are important factors of female foeticide. Further, the degree of son preference shows strong positive correlation with level of daughter aversion in large parts of the country. Hence, in order to locate the basal reasons of female foeticide, it is necessary to understand the dynamics of both son preference and daughter aversion. It is observed that rising female literacy is negatively related with gender disparity. Singh (2012) showed persistence of gender discrimination in spite of economic development in Haryana. Kaur (2013) finds that the border districts of Rajasthan have higher level of gender disparity in literacy level. Das and Chattopadhyay (2012) observed that status of women in Bangladesh is higher than West Bengal and religion plays very little role in determining the status of women.

Other Issues

There are very few studies which tried to look into the population issues from critical geography perspective. This requires delving into the areas of politics, power and injustice shaping population outcomes and its geographical manifestations. The areas of communal conflict and riots, caste and gender discrimination have been little explored in population geography. A paper by Bhagat (2013a) shows the publication of data on size and growth of population by religion during British rule invoked sharp communal reactions. The paper argues that the demographic data on religion was one of the important factors that raised Hindu-Muslim consciousness which shaped the Hindu and Muslim relationship in both colonial and postcolonial India. This turned out to be the ground for the division of Bengal in 1905 followed by the division of the country in
1947. Since independence there exist several demographic myths feeding communal tension rooted in the cartographic anxiety of the nation state shaping Hindu-Muslim relation in India. In another paper, Bhagat (2012) showed that the Hindu-Muslim riots have occurred in some states more than others indicating the regional character of Hindu-Muslim violence. Further, the conflict between natives and migrants has also been occurring in certain states and regions of the country which have initial advantages in industrial development (Bhagat, 2011). Apart from politics of demographic data, the quality of data in itself is a subject of serious study in the field of population studies/population geography. Unisa et al. (2015) tried to explore the levels, trends and differentials in age not stated in India and the major states over the period 1971-2011. The proportion of age not stated was higher for illiterates compared to literates. There was also the possibility of household members not reporting the age of young children.

**Conclusion**

The recent research works in population geography in India have covered a large number of issues of contemporary relevance. However, the traditional topics like size, growth and composition of population such as sex-ratio, literacy and education and ethnic composition continued to occupy a large space of population geography. Migration continues to be a favorite topic. On the other hand, topics like demographic dividend, ageing, gender, population and environmental changes have also emerged as new areas of research in recent years. The research works clearly show that space matters in understanding India’s demography. Overall, migration has been taking place from eastern to the west and south-west India. This has led to an emerging east-west contrast in pattern of migration unlike north-south contrast in fertility levels.

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Urban Geography

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Introduction

Urban Geography has emerged as one of the major sub fields of Geography. Studies span intra-city settings as well as inter-city scenarios. The studies, however, are majorly at a descriptive or at best an analytical level, very few studies endeavor to predict or forecast for the future. The researches in India deal with issues at differing levels of scale from the global to the local. Urban Problems have been the focus of many of the studies – these relate to lack of availability of water to issues related to transportation, fuel used for cooking in the houses and the impact on women's health. Urban heat Islands as they are related to land use, density of built up areas, population size, urban geometry, density of built up area, anthropogenic factors besides others.

Inclusive City Concept

A study of the housing situation in Hyderabad to glean into the inclusivity of the people in the teeming Metropolis of Hyderabad has been brought out by Markandey and Srinagesh (2014). It is found that there are extreme cases of 'exclusivity' typified by gated communities on one hand and informal housing with attendant vulnerabilities on the other. The recommendations that flow out from this study are that land meant for housing the underprivileged should be subsidized and funds at low rates of interest should be provided for construction purpose.

Development of integrated township in the area which can also house information technology firms can be taken up. The development of the township can be undertaken, in the private public partnership. The poor can be provided access to safe drinking water and drainage. Also pollution control and personal safety in slums can help the poor. This will cut down the health costs of the less privileged. They can also be given a sense of belongingness by encouraging labour intensive work routines and providing support for small-scale family enterprises and the informal sector. Inclusiveness in
housing can be brought about by providing reasonably priced housing and also by guarding rental housing and ensuring that people are not displaced due to reasons beyond their control. This is apart from providing a well knit society, more so that which is assorted from the religious, cultural and caste point of view, giving a multi-cultural touch to the society, which will be healthy, tolerant and nationalistic (Misra, Thakur and Singh, 2013).

**Micro Climates**

In a study of ‘Temperature variation over Dehradun in Doon valley of outer Himalayas in India (1967 – 2007)’, Singh, Arya and Chaudary (2012) have demonstrated the increase in temperatures as is witnessed by the rise in annual mean, maximum and minimum temperatures. According to the authors the results of this study will be useful for the farmers, agricultural research workers, water resource managers and town planners of the Doon valley. The analysis pertaining to Dehradun substantiates the global warming effect. Warming specifically at the beginning of the 21st century is attributed to urbanization, consequent to Dehradun becoming the capital of the newly carved Uttarakhand state. An increasing incidence of hot nights is not considered a healthy sign from the point of view of crop production in the vicinity.

Mahesh, Tripathi and Kumar (2012) have analyzed the Urban Growth and its Impact on Surface Temperature in Greater Mumbai District Maharashtra using Geospatial Techniques. They have monitored and analyzed the urban growth patterns and their relationship with land surface temperature for accessing the urban heat island (UHI). They have used remote sensing and GIS for evaluating the impact of urbanization on surface temperature and have found an increase in radiant temperature by 0.8°C between 1999 and 2011 in Greater Mumbai district. Singh, Grover and Jinyan (2014) conducted study based on Landsat Thermal Bands for estimation of Inter-seasonal variations in land surface temperature. This is associated with the greater biomass content. As the built up area and density of urban expansion is different in different parts of the study area, the temperatures showed a decline with distance from the main road increased (Singh, Janmaijaya, Dhaka and Kumar, 2015). A positive relation is found between UHI magnitude, the size of urban area and its impact on biophysical setting using multi-date TM thermal infra red data.

**Urban Heat Islands**

Singh and Nath (2012), have made use of remote sensing, GIS and Micrometeorology to study the impact of various factors like land use, density of built up areas, population size, urban geometry, density of built up area, anthropogenic factors, wind speed, surface water proofing, air pollution on the creation of urban heat islands in Kolkata city. They have made a pioneering study where the climatological factors are statistically linked to the urban heat island. The study will help to relate the modification of environment by human beings and creation of different climatic end-products. The authors suggest ways of making Kolkata a carbon resilient mega city.
Similar study has been conducted over Delhi (Singh and Grover, 2015; Singh and Grover, 2014).

Pandey (2013) has made a study of ‘Urban Expansion and its Impact on Urban Heat Island (UHI) Effect’ with reference to Allahabad city. A temporal study from 1990 to 2009 indicated that a large amount of infilling has taken place in the urban area apart from an expansion of the fringe of the city and temperatures within the city have increased by 4 to 6 ºC compared to the rural areas.

Air Quality

Sahay and Ranjana (2013) in a study of ‘Air Quality and Health: Focus on Dust Borne Diseases in Patna’, have said that due to increase in vehicular traffic, overcrowding, congestion, industrial enterprises, solid waste, burning of fossil fuel and dead bodies, shifting of River Ganga, unawareness, poor infrastructure and maintenance of urban facilities the people of Patna face innumerable dust borne diseases. The study focuses on the alarming increase in the dust borne diseases in Patna and offers suggestions its minimize the ill effects, so that the quality of life of the people is enhanced.

Ibrahim (2014), has made a study entitled ‘Indoor Air Quality and Respiratory Diseases : A Case Study of Lucknow’, wherein she examines indoor air pollution caused by bio fuels, poor ventilation, congested living space sand entrapment of smoke within the house for prolonged periods of time, besides others. This is in contrast to other studies where air pollution in urban areas is attributed to vehicle exhaust and industrial activity. She has found a significant correlation between indoor air pollution and respiratory diseases and has suggested a medley of measures to reduce both (O’Shea, Roy and Singh, 2015).

Singh and Jamal (2013), in 'A Comparative Analysis of Indoor Air Pollution due to Domestic Fuel used in Rural and Urban Households: A Case Study', have found that the rural women who rely on biomass fuels which generate more of indoor toxic pollutants, have a much more health issues like instant problems, respiratory infections, eye related problems, adverse pregnancy outcomes, ulcers etc. This is vis a vis the urban women, barring those in the slums, who use LPG and hence are less impacted by the rigours of indoor air pollution. Education and type of occupation have also been found to be correlated with the type of fuel used. They have recommended that education, quality education, awareness about ill health effects of indoor pollution, increase in income leading to affordability and better dwellings, government indoor air pollution oriented programs through subsidies for cleaner fuel choice in rural areas and increase in income and mass awareness to reduce indoor air pollution in low income urban households.

Land Use

Ramesh (2011) in ‘Land Use in Suburbia: Perungalathur Village of Chennai Metropolitan Area’, has made a temporal study of one of the villages on the fringe of Chennai, which has evolved into a suburb. Various economic, social, political and
technological factors have facilitated this development over a period of time and it is manifest in the land use pattern of the settlement. The author has identified changes in the land use over 5 phases of time and the predominant finding is that of conversion of agricultural and fallow land to residential and institutional use.

Lallianthanga and Sailo (2013), in Urban Land Use Mapping and Site Suitability Analysis of Champhai Town, Mizoram (India): Application of RS and GIS Technology, have used remote sensing and GIS to map and analyze the urban land use pattern of Champhai town using merged Cartosat I and LISS IV data. The fast demographic and unplanned spread of the city is found to have a negative impact on infrastructure and environment. They advocate site suitability analysis for developing a mechanism for scientific planning.

Srinagesh and Baktula (2014), in Land Use Analysis of Dehradun: Application of RS and GIS’ have studied the changing land use pattern in Dehradun, using LISS IV data of 2004 and 2009 and have traced back the land use situation to 1990. While the agricultural area has dwindled, the high density residential area has increased marginally compared to the medium density residential area. Low density residential area has substantially decreased and there is also a decline in forest land.

**Migration and Slums**

Shekhar (2012), in ‘Squatter settlement in Delhi : A Quest for New Typology’, finds that the policy of demolition, eviction and resettlement has failed to contain the growth of slums in the past 40 years. Slums in varying locations were found to have varying problems. In order to gain a better insight into the scenario, the author has attempted a typology of slums based on their location and services present in them. The slums lying at critical location and those where pressure on services is stretched beyond repair and there is a threat of outbreak of epidemics, need resettlement as they both pose a threat to human health. The author also brought out the fact that slums are not usually located on areas of least choice as is commonly understood. In Delhi they are located on some of the prime land and with the intervention of the concerned agencies and the judiciary they will eventually be evicted.

Shekhar (2014) in ‘Towards Building a Slum Ontology for real stakeholders’, feels that satellite remote sensing helps to map as well as to monitor the slums for sustainable planning. The paper tries to find answers to the questions like why do we need “slum ontology”? How can the slum ontology help in identifying the slums in a high resolution data? Who is going to identify the slums? The proposed methodology will be useful to the actual stakeholders who are on-ground for the implementation of slum development programs. The results are quite encouraging and further research on this to refine the slum ontology will yield more reliable outputs for better enactment of slum policies in developing countries.

These stakeholders vary from geospatial experts at GIS cell of national, state or municipal corporation level to the poor slum dwellers. The knowledge model such as slum ontology basically helped them to understand the domain concepts and facilitated
the communication between the stakeholders. By refining the ontology further and also training of the local community, even better results can be obtained. This will really help in the better intervention of slum development programs, where the benefit of science will reach the common man in improving their standard of living.

Singh and Kaish (2013), in ‘Livelihoods of Migrant Slum Dwellers in Aligarh City’, examine the plight of migrant slum dwellers, causes behind migration and assess their livelihood conditions. The study which is based on primary data collected from 1140 households points out that rural poverty, higher wages in urban areas and better employment are the main reasons for migration. But as these migrants lack education and skill, they find employment only in the informal sector. Uncertainty of work, low wages and indebtedness are common and hence the authors feel that migrants in slums have the worst of both the rural and urban worlds.

Ayyar and Khandare (2013) in ‘Social Networks in Slum and Rehabilitation Sites: A Study in Mumbai’, have made a study of the slums located in the suburbs of Mumbai, through socio – anthropological surveys, focused group discussions and interviews. They examined the role of caste in the background of voluntary housing and the role of social networks. They find that there is a positive outcome of social networks enabling the poor to have safety nets that are vital to survive. However, these networks have been found to be segmented, closed and restrictive and exclude others.

Jha and Tripathi (2014), have made a study of five slums of Varanasi in their paper ‘Quality of Life in Slums of Varanasi City: A Comparative Study’. The study is based on primary survey of 150 households in the five slums of Varanasi city. It is an attempt to determine the quality of life statistically in slums of Varanasi city. For determining the Quality of Life in slums Composite Index and Standard Deviation techniques are used. To calculate the composite index 10 variables were chosen to determine Quality of life. The paper also attempts to briefly compare the condition of slum dwellers with the targets of UN Millennium Development Goals and India Vision 2020 and suggest some measures of inclusive development and planning to improve quality of life in slums.

Khan, Shamshad and Hasan (2011), in ‘Determinants of Rural – Urban Migration of Male Population in India’, have analyzed the socio – economic causes of rural to urban migration of male population in the states and Union Territories of India in the age – group of 15-39 years. Close to 60 per cent of this migration is accounted for by employment. The state of Punjab has 80 male migrants for employment. Even a single state in the country has not witnessed less than 40 per cent of male rural to urban migrants who migrate for employment. Migration for business, after marriage or birth etc account for a very small proportion of rural to urban male migrants. The authors feel that solution of the urban problems associated with rural to urban male migration lie in ameliorating the rural economy which is largely responsible for the exodus. For this they suggest small scale household industrial units of tea processing, those related to horticulture in the northern mountainous states of the country with special emphasis on eco–tourism. The plain areas of the country make have agro, agro-allied and ancillary
industries, animal husbandry, poultry, fisheries, horticulture, floriculture, dairy, piggery, apiculture, silviculture, sericulture etc. In the plateau and peninsular parts of the country emphasis may be placed on promoting small – scale mineral, forest – based and agro-processing industrial units. The coastal areas may rationally utilize marine resources, have forest based cottage industries and look for tourism promotion. Education - especially higher and vocational education may be imparted in the rural areas to mitigate rural to urban migration by the youth.

Deshmukh and Khadke (2015), in ‘A geographical study of slums in Nanded city’ have highlighted the fact that slums are increasing in Nanded and the general standard of living of the people is decreasing.

Urban Transportation

Bhattacharjee, Mukherjee and Bhaduri, in Kolkata Metro Railway: A Performance Analysis, feel that Kolkata Metro Railway can be considered a successful intra urban rail based mass transit system. It has provided several benefits to the people of Kolkata and added new ones over time. It is the fastest and among the affordable modes of transport in the city and has decreased air pollution. It has also promoted development around some of the stations. Its integration with other modes of transport has made it accessible to more people.

Banerjee and Kumar (2011), in their paper Cycle Rickshaw Pullers of Delhi: An untold story, have made a study of the rickshaw pullers in Delhi and found that most of them are migrants from the Hindi speaking states close by. They migrate in search of better economic opportunities in the face of the challenges posed by agriculture. While some of these migrants are ‘seasonal’ others are ‘permanent’ or ‘intra - city’. The migrant rickshaw pullers were at a disadvantage from the point of view of shelter and in addition they have to send remittances from their earnings back home. Nevertheless, the economic security that this work imparts offsets the strain that the rickshaw pullers have to endure in the course of the day from the vagaries of climate and the tests of physical endurance. The authors recommend that the government needs to revise tariff schedule at least once in two years, encourage them to join adult education courses and issue identity cards to them.

Raj and Singh (2011) in ‘A Study of Traffic Congestion and Urban Problems of the National Capital Region of Delhi using Geospatial tools’ have discussed the consequences of industrialization and urbanization in the National Capital Region of Delhi and find that GIS is of help in urban planning. They infer that while the National Capital Region of Delhi was developed to ease the pressure on Delhi, it has escalated the migration to Delhi and hence the pressure. They suggest that smaller towns outside this region need to be developed so that people find sources of work in their native places and hence do not have to migrate. They suggest the development of the public transport system and the need to discourage cars for shorter trips. Community transport or pooling of vehicles for travelling is also suggested.
Markandey, Kumar and Kumar (2014), in 'Metropolitan Hyderabad and the Metro Rail Project', have brought out the salient features of the upcoming Metro rail project in Hyderabad. The metro rail may play a transforming role on the socio economic conditions in south Hyderabad, which has remained less developed. It will provide the city with an efficient and economical fast mode of transport. It may increase commuting distance but will substantially reduce commuting time. It will open up new areas for development hitherto undeveloped and will make some of the isolated areas accessible to major centres of economic activity. However, a cyclic build-up of higher accessibility, more demand for land followed by high land values, vertical development, change of land use from residential or lower order commerce to higher order commerce and consequent leap in traffic is the likely future scenario for these areas. A feasible and harmonious combination of this project along with growth incentives to the satellite settlements is likely to be the ideal solution to the problems associated with growth and increasing traffic.

Srinagesh, Bhagyaiah, Baktula and Sadanandam (2014) in ‘Urban Growth and its Impact on Road Transportation – A Case Study of Hyderabad’, have related population growth in Hyderabad with road journeys and found that travel demand has grown faster than population because it is a function of increasing number of trips by an incremental population and an increased trip length on account of the increasing spatial spread of the city.

Srinagesh, Bhagyaiah, Mallikarjun and Rani (2015), in ‘Urban Mobility and its Effects –A Case Study of Hyderabad’ have tried to probe into the heterogeneity in traffic and jaywalking behavior of pedestrian which leads to severe conflicts with motorized vehicles and results in a decline of pedestrian safety. This complexity of interactions between pedestrian and vehicular traffic increases mostly at uncontrolled and un-signalized intersections. Questionnaire and interview method have been used to analyze the pedestrian behavior at 6 major road intersections in Hyderabad.

**Urban Hinterland**

Sharma and Sen (2015), in ‘Gurgaon – Manesar Urban Complex’, deal with one of the zones of the National Capital Territory (NCT) of Delhi. They present the levels of development in terms of urban influence on settlements and functional hierarchy of settlements. It is a micro level study, 120 settlements comprising both rural and urban settlements form part of the study. The temporal span covers the census years of 1981, 1991 and 2001. The highlight of the study is that it scrutinizes the level of urban influence and functional hierarchy in each settlement at these three points in time and examines the changes occurring among them. Intra regional differentials in demographic characteristics and infrastructural facilities are found. The study emphasizes on issues of development in rural settlements and growth centres in the emerging urban complex within central NCR (National Capital Region) which is a functional on pivoted on the NCT of Delhi (Singh and Jannmajaya, 2014).

Ishtiyak (2012), in his paper ‘Socio – economic Conditions of Artisans in the NCT of Delhi’, has highlighted the paucity of facilities to educate the children of artisans.
This results in an enhanced proportion of child labour in the handicraft industry. Though most of them belong to the lower income groups, yet the marginal increase in income that they have registered has been siphoned off into modernization of tools. This in turn has increased the demand for their products. However, it is the middlemen who seem to reap the benefits. To minimize the role of the middlemen and to harness the full potential of the artisans the Government has introduced various programmes so that their quality of life improves and they are able to establish direct contact with the buyers.

Ali and Varshaney (2012), in ‘Spatial Modelling of Urban Growth and Urban Influence: An Approach towards Regional Development in India’, have made a study of the hierarchical growth and functional potentiality of urban centres in Aligarh district of Uttar Pradesh as well as the diffusion of developmental impulses to the surrounding rural area. They examine the adequacy or inadequacy of facilities in the urban centres and put forth recommendations so that balanced regional development can be achieved by not leaving out any rural area from the zone of functional influence of urban area.

Mammen (2015) in a study ‘Evolution of Hinterland: The case of ‘Uran in North Konkan’, has brought out the phase wise historical analysis and transformation of the peri urban region of Bombay before independence. She has traced the relationship between local communities, traders, religious establishments and rulers through ancient, medieval and colonial times. Different forms of land use, patterns of exchange and settlements that developed in the region as a result of people – environment interaction is outlined.

Samuel and Karunakar (2015), in ‘Dynamics of Urban & Rural Spatial Units in Telangana: 1901-2011’ conclude that Telangana state can be called as ‘fastest growing state’, as villages and towns both have increased simultaneously and fast.

**Water Woes**

Srinagesh, Bhagyaiah and Mallikarjun (2015), in Urban Water Crisis: A Case Study of Hyderabad, have pointed out that though Hyderabad has a river passing through it and three tanks which had been supplying drinking water to it, yet it now seeks water from distant sources like the Nagarjunasagar dam. The water bodies have become replete with waste disposal. The authors seek to assess the current water situation in Hyderabad and also seek to study the future demand and supply of water to Hyderabad.

Singh, Haque and Grover (2015), looks into the quality and quantity of domestic water supply and its impact on the health. A study by Singh (2013) on the people in the city of Gondar in his paper ‘Gondar City, Ethiopia: Quality and Quantity of Water Supply and Socio – Economic Well being of people’. The paper looks at the affordability of water connection, the peoples’ ability to pay for water, accessibility of pipelines to the residences and availability of water even if water connection is there. Data is collected from primary and secondary sources to substantiate the case of poor water, poverty and health issues in Gondar city of Ethiopia which has a population of over 2,00,000 persons.
**Waste Disposal**

Yadav, Bansal and Kaushik (2014), in their paper ‘Managing the Municipal Solid Waste: Comparative Study of Faridabad City with other Cities of India’, have found that Municipal solid waste in Faridabad contains high proportion of biodegradable waste and yard wastes which are suitable for composting. Recyclable material also constitute a sizeable proportion of the wastes and should be recovered and recycled.

Srivastava, Singh and Srivastava (2014), in Impact of Domestic Waste Disposal on Health : A Case Study of Kanpur City, have tried to analyze the consequences of improper disposal of domestic waste on health of the residents of an area. The urban environment is degraded with the improper disposal of waste. This includes deteriorating aesthetics, encroachment on vacant land, diminishing civic pride and loss of property value, apart from increasing microorganisms and varying disease carrying vectors. They suggest following sustainable practices, introduction of bio composter and effluent digester at household level and following of the 5R’s (reduce, reuse, recycle, rethink and refuse things we do not need) policy by the people on the other. They suggest replenishment of the green cover, if it is depleted during the course of construction of development in the cities.

Phansalkar (2013), in her study Innovative Use of GIS in City Sanitation Planning (CSP), has brought forth the importance of GIS in City sanitation planning vis a vis the traditional approaches. Her study relates to the experience of using GIS during the development of a sanitation plan for the cities of Gwalior, Ashta, Raisen and Khajuraho in Madhya Pradesh. The use of GIS software has been found useful for quick planning and decision making, generating information, easy updating of information on map and ease in handling. The ICT tools have been found to be efficient at handling multi-sectoral and multi-spatial data which helps in continual updation of data, data mining and use of relevant data, increasing data readability and understanding, easy accessibility to stakeholders, use of data in awareness and public participation and monitoring and evaluation of performance in sanitation.

**Urban Environment**

Kuchay and Bhat (2014), in “Analysis and Simulation of urban expansion of Srinagar City”, have traced the growth, expansion and sprawl of Srinagar from 1901 to 2011. The high growth is facilitated by developments in transportation, tourism and industrialization. It is found that geo-structural constraints discourage vertical development and Srinagar is expanding horizontally. While earlier the expansion was in a circular fashion, now it has taken a tentacle shaped pattern. The sprawl has encroached on horticultural and agricultural land. As a result the food security and environmental status of these regions is severely compromised. The trends and patterns of population growth and spatial expansion in this fast growing Himalayan urban centre are simulated. This trend is likely to continue into the future too. It calls for a comprehensive a land use plan for the sustainable and balanced urban development in the region. Otherwise the city may turn into an unmanageable metropolitan complex with serious ecological and social consequences.
Tiwari (2013) in his paper ‘Warangal: A World Heritage City of Andhra Pradesh’, has taken an overview of the city of Warangal – its spatial, temporal and demographic background, civic administration over a period of time, economic base, civic amenities, urban environment, planning and development. He concludes by saying that Warangal has a great potential for development and its rise will help the economy of Telangana. Efficient implementation of City Development Plan will make Warangal a tourism hub of south India.

Jadhav and Suryawanshi (2015) in ‘A state of demographic features in Jalgaon City Maharashtra, India’ have studied Jalgaon city in the context of various demographic parameters. Data has been collected from the Census of India and a field survey of 500 households comprising 57 per cent non slum and 43 per cent slum households. The authors come up with the imminent health dimension as it is inextricably tied up with the demography of an area.

Shikha and Sharma (2012), in a conceptual paper on ‘Scale Dynamics of Ekistic Units’, have pointed out that the form and functions of ekistic units – the scientific version of settlements- underlie expression of cultural differences particularly with reference to rural and urban units. The transformation in structural and functional form and size of human settlements invites scientific explanations that are related to the mechanism behind size dynamics, the process of transformation from rural to urban, urban to metropolitan, metropolitan to megalopolitan and from megalopolitan to ecumenopolitan or rather from unit dimensions to regional dimensions.

Longchar (2014), in Rural-Urban Migration and its Impact on the Urban Environment and Life in Nagaland, says that migration from rural areas to the urban centres has been the driving force behind the explosive population growth rate which has created serious impact on the environment in these urban centers besides causing strain on the limited urban services and infrastructure and increase in urban poverty and unemployment levels. In 1981, the urban population of the state was 1.2 lakhs, which increased to 3.5 lakhs in 2001. There is an urgent need to address the growing infrastructural and social needs of the increasing urban population, problems relating to land acquisition, issues of public safety and environmental protection.

According to Bano and Mishra (2014), the fruits of development are distributed unequally among males and females. The process of women’s marginalization is evolved through excluding them from certain functions, by confining their roles and responsibilities in certain spheres and by not recognizing their works. This gender discrimination severely limits the expansion and utilization of women’s capabilities. This has critical implications for the development process, the society, half of which are women. Even the fruit of development is unevenly distributed among women according to region. This paper is an attempt to measure the spatial variation of women’s development in Varanasi city. A survey of 600 women was carried out to ascertain the index of development of women. It is based on literacy of women, standard of living of women assessed by their working status, decision making capacity, material possession and monthly per capita income, their health and nutritional status under various headings.
such as age at marriage, age at the birth of first child, number of children, delivery place of the last child, Body Mass Index, intake of Kcal, protein, calcium, and iron.

Aggarwal (2014), in Emerging global urban order and challenges to harmonious urban development, feels that push factors that propelled urbanization until the mid-90s are now reversed by pull forces. He broadly examines the emerging issues and possible responses and tools to manage contemporary urbanization. Urban sprawl, linked with mega-urbanization is becoming a global phenomenon and is considered one of the most significant characteristics of contemporary urban landscape. Further the paper examines in what respects current urbanization is environmentally disturbing and socially discriminatory? Is globalization and neo-liberalization going to create/facilitate sustainable and just cities despite the use/transfer of new technologies, capital flows and access to information and communication systems? Towards prescriptions of the prevalent issues we explore new theoretical underpinnings to explain present urban landscape; importance of conservation of urban ecosystems; kind of urban models that need to be developed to address spatial reconfiguration to accommodate the disjointed urban growth, agglomeration economy and informality at different scales and places? Finally he has suggested policy responses and planning tools to manage urbanization in the developing countries.

Lonavath and Kumar (2015), in ‘An analysis on urban literacy: A case study of undivided Andhra Pradesh’, attempt to make a comparative analysis of the literacy rates in the urban centers of entire erstwhile Andhra Pradesh comprising 23 districts on the basis of secondary data pertaining to 1961 to 2011. They find that the percentage of total urban literates is high in Coastal Andhra and an increasing pattern is observed in Telangana region. Rayalaseema however recorded a low. Overall increasing pattern of urban literates is seen in the entire state. Urban female literates are high in Coastal Andhra region. Percentage of female literacy in Telangana and Rayalaseema region is low.

**ICT in Urban Studies**

Narayanan (2015) has carried out ‘Urban Growth Analysis of Gulbarga City’ through remotely sensed data and by applying entropy techniques. Shannon’s entropy combined with satellite image processing and GIS techniques are found to provide better efficiency in quantifying the urban growth and further analysing its characteristics. She concludes that the North Western part of the city of Gulbarga shows increasing compactness in the settlement. This was old Gulbarga, which is filling up in terms of density. Sprawl occurs in the North Eastern, Eastern and South Western part of the cities. These are the new areas of urban growth in the city. There are urban layouts sprouting here. But, when we observe the occurrences of sprawl here, it is important for the Urban Local Bodies of Gulbarga to have appropriate land reserved for infrastructure and development plans at place. These are the area where valuable agricultural lands are converted for urban use. The planning should incorporate the practice of sustainable development. The technique of entropy can be applied on two time-period satellite imagery to assess urban sprawl on continuous basis.
Jaybhaye and Munde (2013), in their technologically oriented paper, ‘Hybrid Image Classification Technique for Spatio Temporal Analysis of Pune City’, have emphasized on hybrid image classification technique for remotely sensed data from different sensors. IRS LISS II and LISS III are used and the proposed classification technique integrates ancillary information into the classification process and combines ISODATA clustering, rule based classifier and Multi layer Perceptron (MLP) classifier which uses Artificial Neural Network (ANN) that produce higher accuracy classified map. The technique is used to produce a high accuracy map of Pune City.

Kumar, Lonavath and Karunakar (2015) in ‘Urban Sprawl Analysis of Suryapet Town through GIS and Remote Sensing Techniques’, have found a rapid pace of growth of Suryapet town in Nalgonda district of Telangana. They feel that this unabated growth of the town will make it the largest town in the district, in the times to come and will also convert it into a satellite town of Hyderabad.

Challenges of Urbanization

The series on “Challenges of Urbanization in the 21st Century” is a five volume compendium of articles edited by Markandey, Srinagesh and Kumar (2013). The first Volume- Amenities and Facilities in Urban areas deals with the presence or a lack of Amenities and Facilities in Urban Areas across a cross-section of space. Infrastructure, educational facilities, transport and traffic, modeling, designing and redesigning of these facilities and amenities form the core of this book. The micro and macro spatial scales, rural urban contrasts and ‘Divides’ in access are also highlighted. Divides range from rural - urban divide to the gender divide to that between the haves and the have-nots. The role of Technology in streamlining these services and their efficient governance is also brought out. The second Volume- Facets of Urban Environment deals with topics as diverse as Water woes and management, Quality of environment, Disadvantages of expansion, Health Issues and Pollution. Environmental issues span the frame from human activities like mining, to the encroachment of wetlands by urban areas. Papers include those on arsenic pollution of underground water or those on Chikungunya, role of NGOs in bringing about sustainable environment and the concern shown for maternal health. The third volume is on “Planning and Governance” various aspects of city sustainability, governance and management. Issues relate to Special Economic Zones, Peri urban areas, transitions of villages to towns, urban demographics as they pose challenges to governance, contested urban spaces, urban planning shifts, urban governance reforms, modelling urban growth and environmental management apart from globalization, liberalization and urbanization, land use and physical environment besides others. Technological Mediations in comprehending urban spaces are also elaborately dealt with. Articles dealing with urban street vendors, urban heat islands, Geospatial Library for Urban Planning and Management, Heritage Texture or restructuring of urban space heighten the curiosity quotient in the readers. The fourth volume on “Urbanization and Urban Growth” discusses topics as diverse as Land Use and Land Cover, Demographics, Spatiality in Urbanization, Urban Impact on Economy and Sustainable Urbanization, gentrification, media and development, role of Indian
Judiciary in Urban Development. The fifth volume on “Marginalization and Exclusion in Urban Spaces” discusses topics like spatial pattern of slums, quality of life in slums, use of technology in slum improvement, women and children in slums, amelioration of slum habitat and use of technology for the same. While some studies are of a largely descriptive nature, others are analytical and yet other fringe on being predictive in nature. Issues range from detection of slums to governance and modelling.

Conclusion

Studies in this discussion relate to Micro Climates, Urban Heat Islands, Air Quality, Land Use, Migration and Slums, Urban Transportation, Urban Hinterland, Water Woes, Waste Disposal, Urban Environment, use of ICT in urban studies, inclusivity and various types of Challenges of Urbanization (Singh, 2015). Air quality has been analyzed for cities like Lucknow, Patna etc as also a comparative analysis of indoor air pollution due to domestic fuel used in rural and urban households as it impacts the health of women. Studies of urban land use span the entire country from the suburbs of Chennai in the south, to Champai town in Mizoram in the north east to Dehradun in the north. Studies of slums have been path- breaking in their own way ranging from those looking for a new typology to those seeking to build slum ontology for real stakeholders. Other themes in studies of slums include social network, livelihood patterns, quality of life etc.

While some studies related to transportation relate to the untold story cycle rickshaw pullers of Delhi, some relate to the Metro rails in Kolkata or Hyderabad and their spatial ramifications. Traffic congestion and mobility have also broadly been the subject of study. Studies pertaining to the urban hinterland relate to topics as diverse as of artisans in the NCT of Delhi, spatial modelling of urban growth and urban influence, evolution of hinterland besides others.

Studies have also viewed the water crisis in various cities, management of solid waste, impact of domestic waste disposal on health and innovative use of GIS in City Sanitation Planning. A number of studies pertain to demography and some have made use of ICT in studying urban problems.

References


Cultural Geography

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Cultural Geography Studies in India: Purview

The diversities, distinctions and varieties of landscapes and regional/sub-regional traditions scattered and rooted in different parts of India and overall their interconnectedness by the historical-cultural bonds converge into the mosaic of landscapes – a complex web of cultural whole. That is how many disciplines in their own ways and also with interfaces and interaction with others too worked in the broad realm of ‘cultural geography’ (Singh, 2012a). That is how cultural studies using historical, archival, ecological, literary, travelogue, ethnographic and associated methods to investigate localised patterns of religion, language, diet, arts, customs and any associated attributes are concerned with some of the aspects of cultural geography. Idea of place-based ecoliteracy and visioning India has open a new dimension of cultural understanding (Singh, 2014c). Taking the Brand India initiative—promoted by the Indian state to produce positive images of the nation for global publicity—as a case study, it is argued that in this shift from nation building to nation branding, the very idea of prosperity and equity has now become first and foremost a matter of image (Kaur, 2012). In promotion of tourism image making is an important means for promotion and also cultural politics of branding (Geary, 2013).

Sacrality, symbolism and formation of landscapes in ancient India were the nexus of Nature-divine-Man interaction, which has been now taken as emerging philosophy of nature conservation (Singh and Rana, 2016e). This idea is comparable to deep sense of ecospirituality and cosmology (Singh, 2013e and f; Singh 2016c; Singh, 2013a) that ultimately will help in harmonizing global order (Singh, 2012c), and also comparable to the geographical thoughts in ancient India (Singh, 2016d), and searching similarities and archetypal relationship in the works of Leonardo da Vinci (Singh, 2014b). The historical perspective and geographic imprints on the sacred landscapes of India has also drawn attention to the historians and also in the interdisciplinary debate (Singh
and Rana, 2016g; Singh, 2016a), especially in the context of cosmic integrity (Singh, 2012d). Being a Hindu exposition of lifeworld and the landscape in a literary narration has attracted the West to understand the root (Singh, 2015k). Also, study of Hindu family in the formation of Indian society in terms of space and time illustrates the example of geographical vision (Singh, 2013c). The study of rural landscapes and the village unit is also an example of uniqueness and distinction (Singh, 2013d).

Exploring the cultural changes and innovations relating a number of contexts in contemporary India, emphasising the foundation, India and the world, society and class, religion and diversity, and Cultural change and innovations, the Routledge Handbook provides the contemporary cultural scenario of India (Jacobsen, 2016a). The analysis of Hindu tradition what called as Hinduism, has explored the notion that spirituality is expressed in materiality in the form of material exchanges of foods, liquids, money, festivities and pilgrimages on daily basis (Narayanan and Vasudha, 2016), and their rules that further exchanged with technological and information growth (Jacobsen, 2016b). Of course one has also to keep in mind that sacred geography, represented with sacred space, time and functions (Singh, 2013g). It is argued that existence of caste system is mostly due to India’s electoral politics, in addition with its synonymity with inequality, identity, purity-pollution hierarchy and value that ranks the belongingness (Jodhka, 2016). The study of Hindu family and related marriages indicate that feminist understanding is still at margin (Sinha Roy, 2016). In spite of all the modernized age of society, adivasis (tribal/indigenous) people are treated subaltern individual (Chandra, 2016). Ambedkar’s role in establishing and spread of newly revived Buddhism, Navayana Buddhism, has not yet elaborated (Zelliot, 2016); and to project Ravidas as separate dalit identity is a question of threat (Ram, 2016). Garhwal Himalaya (Uttarakhand), recently enriched with a study that emphasizes socio-religious background, pilgrimage places, environmental and economic impacts, and prospects for the betterment and further development (Sati and Mansoori, 2012).

A review of the current focal areas and infrastructure for ecological research and education in India, along with the surrounding legal and policy aspects of related socio-economic issues, concludes that biodiversity crisis needs Greater integration and alignment among the mandates of government agencies, scientists, policymakers and educators are needed to meet contemporary environmental issues (Singh and Bagchi, 2013).

Over the past five decades, the field of religion-and-science scholarship has experienced a considerable expansion, and a recent anthology explores the historical and contemporary perspectives of the relationship between religion, technology and science with a focus on South and East Asia, with four case studies from India. Cosmology has been a significant part of Jainism, but scientization and academinization are the contemporary concerns by using entertainment technology and supporting recreational outings and pilgrimages that promote a new religious landscape (Auckland, 2015). Critical example of scientization of literature shows parallel cosmological interpretation between religious literature and scientific perspective, especially interfaces among Vedic science, modern science and the reasoning approaches (King, 2015). There
also appears illusion of conciliation, religion and science in the writings of Devendranath and Rabindranath Tagore that needs to be critically examined in terms of contemporary debates (Brown, 2015). The impact of internet has played a significant role in the understanding historical perspective at the ways in which the use of new communication technologies has brought about processes of transformation on different levels (Scheifinger, 2015). Ritual too has been in the process of becoming technology, as in case of producing deities; this helps reconceptualise ritual combining theoretical approaches from ritual studies and the anthropology of technology (Keul, 2015).

In contrast to theologically-determined conversations Christianity's interactions with India's cultural and religious traditions conforms to the descriptive practices of ethnography, resulting to the acceptance of the notion of 'acculturation' instead of 'inculturation', however an under-recognised linkage between the current debate over Indian Christianity's claims to Indianness and a concurrent debate going on in the background, has been long-stoked by Hindu nationalists — whether Indians or Americans or residents of other countries (Bauman and Young, 2014); nevertheless one has to keep in mind that India has maintained the 'tolerance' landscapes in all the spheres, while several times scholars from abroad tried to see the seen in the narrow lenses portraying India as a religiously-singular 'Hindu' nation.

**Indian Cultural Landscape (ICL)**

The concept of Indian Cultural Landscape refers to a complex cultural mosaic and network of spatiality of time, temporality of space, sacrality of nature and overall the encompassing manifestation of transcendence of man who since time immemorial is trying to make a strong bridge between conscious mind and super-conscious divine (Singh, 2013). The ICL is envisioned as amalgamated mosaic of mental construction, visual exposition, memorial repositories, monumental structures, physical existence, ritual happenings, cultural traditions, and several of their associates and auxiliaries that result into a complex web of a collection of religious, cultural and physical meanings ascribed to geographical components through collective memory, planted on the ground (shaped in the landscape) in active engagement with communities over generations (cf. Thakur 2012: 154-155). The Hindu literature, both the classical and modern, is full of reverence for 'Mother India' (*Bharat Mata*) and 'Mother Earth' (*Bhudevi*). The 'land (and earth)' is a personified goddess. This image, as described in literary tradition, is conceptualised by relating all geographical features, viz. mountains, hills, rivers, etc. to the mother earth and in that sense the goddess automatically becomes part of the sacred geography of the country (Eck, 2012; Singh 2013g).

In Indian life and landscape the water pool and ponds have integral part, serving spatial activities at multiple scales, thus forming the deep sense of liminality (Nawre, 2013). Moreover in urban development, water plays a special role in making 'greenfield' developments (Nawre, 2015). The Indian Landscape encompasses historical, social and cultural ensembles of the development of the rural-urban landscape from the era of the Indus Civilization to contemporary post-colonial times; the recent most magnum opus from a geographer's pen tends to focus particularly on colonial and postcolonial urban
development, including issues of urbanization down the ages, the multifaceted concepts
of urban space in Indian cities, whether sacred, public, commercial or practical and the
socio-economic and socio-cultural dimensions of postmodernism, globalization,
expanding urbanization, town planning, conservation, heritage, race, class, ethnicity,
poverty, gender, public health, the natural and built environment and other related aspects
of urban India and also focusing the evolution of the natural and rural landscape of the
country (Chatterji, 2014).

Religion - Urban Landscape Interfaces

A pioneer book paved the path to link Hindu religion, heritage, urban development,
women and the environment in a way that responds to the realities of Indian cities,
illustrated with detailed field study of Jaipur, and successfully narrated the religious
influence on the urban experience that has resonances for all aspects of urban
sustainability in India, however yet it remains a radiant path for articulating sustainable
urban policy, while focussing on three key aspects: spatial segregation and ghettoisation;
gender-inclusive urban development; and the nexus between religion, nature and urban
development (Narayanan, 2015). This study has further encouraged researchers to take
cases from other parts of South Asia. A recent anthology dealing with religion and
urbanism discussing the sustainable cities discourse in South Asia, emphasises the
intersections of religion and urban heritage, and religion and various aspects of
informality, while demonstrating the multiple, and often conflicting ways in which
religion enables or challenges socially equitable and ecologically sustainable urbanisation
in the region (Narayanan, 2016). A case study of Amritsar establishes religion as a key
determinant for urban planning through the case of pilgrim city, specifically purveying
the role of the state at various points in the city’s history and its actual growth and
transformation linked to religious associations (Jain, 2016). With the notion that
informality can be understood usefully as a produced condition rather in terms of absence
of characteristics of formality, with case study of the phenomenon of religious structures
being found on traffic lanes on the streets in Delhi, it is concluded that such sites become
the sites for political contest and citizenship claims must strive to re-imagine cities and
everyday life in terms of reference that are grounded in local realities (Chakravarty,
2016). The critical analysis of ground rooted realities helps to realise the interfacing
states of religion and development that are vital force (Narayanan, 2016a).

With case studies of a holy city of Ayodhya, studies highlighted role of waterfront
in the formation of sacredscapes together with development of culture-heritage tourism,
and also the pilgrimages routes and the interlinking scenario of the agricultural
landscapes (Kumar and Singh 2013, 2015 a and b). As cultural resource, heritagescapes
represent the sacredscapes of mystic religious sites, built structures, historical monuments,
the perceived natural scenarios and landscapes, and intangible resources. The UNESCO’s
World Heritage Sites enlists 1031 such sites based on their criteria of which 32 fall in
India. And, in India eight are representative of Hindu Religious Heritage Sites (Singh
and Rana 2016 h). The religious values and symbolism are closely linked to the
sacredscapes and the related built-up structures, especially in Hindu sacredscapes in
India and the Southeast Asia, and represented through the divine images (Singh 2015 g). The site study at Hampi, and similarly to other such sites there is a need of preservation, but due to lack of priority, non-participation of local people, lack of promoting heritage tourism and ecological awakening, such sites are neglected and are victim of illegal encroachment and inhabitation (Fritz and Michell 2012).

In the framework of colonial governmental studies, a book presents a scalar study of the tolerated brothel and a temporal examination of the turn from segregation to suppression in the interwar years in Delhi, and also continues a broader attempt to critically examine the excesses and neglects of colonial power relations, and thus extends Foucault’s antiessentialist project to that of scale, arguing that scales do not have natural processes, whether economic, social or political; that scales are networked into existence; and that they also operate through the awesome power of naming (Legg 2014).

**Pilgrimage and Sacredscapes**

The ‘land (the earth)’ is personified goddess. This image, as described in literary tradition, is conceptualised by relating all geographical features as lived and imagined landscapes, viz. mountains, hills, rivers, caves, unique sites, etc. to the mother earth and in that sense those sites and places automatically becomes part of the sacred geography of ancient India (Eck, 2012). Within the purview of the ancient text and context (especially pilgrimage and tourism today), the pilgrimage places are conceived and methodized as salvific places (Jacobsen, 2013).

After a gap of over decades of publication of Bhardwaj’s classic (1973), the followed up book, *Hindu Tradition of Pilgrimage* (Singh 2013 g) provides a wide range of faith-based and scientific perspectives on Hindu sacred centres and spaces, also dealing with cosmology, contestations, interdisciplinary research and re-appraisal of researches from an insider’s view.

The study of sacrality has been extended in pilgrimage studies, as India having the longest tradition of pilgrimage routes and pilgrimages; even in the contemporary time it has its strong and influential base (Singh, 2012k and l; Singh and Haigh, 2015d; Singh and Rana, 2016g). The feminine divine and formation of 51 Shakti Pithas has converged into making whole India as mother (Singh, 2012j). Sacred geography of Gaya forms the manescape, a complex combination of sites and rituals related to ancestors (Singh, 2012b). Goddess site and temple of Vaishno Devi (in Jammu, Tirkuta Hills) being one of the most popular shrine is visited by millions of devotees every year that helps to promote the local economy and also harmonious understanding of human interaction (Ashfaq and Parveen, 2014). The study of Puri (Shrikshetra, Odisha) reveals the facts of merging sacred geography and ritualscapes, and justified the forces of ritualscapes in shaping the morphology of the entire town (Kar, 2015).

Hindu theology views rivers as goddesses who confer blessings and spiritual purification. The release of celestial waters from the grip of ‘Vritra’, the demon dragon, to flow down from the heavens and relieve drought on the earth is a recurring theme in Hindu mythology (Warrier, 2014). Similarly the Ganga river itself symbolizes the body
of Shiva and representation of India as ‘Bharat Mata’ (Singh, 2012m). The River Ganga has drawn attention from a vast array of scholars, including hydrology, tributaries, water uses, and environmental features such as river water quality, aquatic and terrestrial flora/fauna, natural resources, ecological characteristics, sensitive environmental components and other related aspects; altogether helps for better understanding of the national river of India (Sanghi, 2014). A recent book orchestrates a magnificent portrait of the Ganga River Basin, and its continuous reinvention as a test-bed for infrastructural innovation, presented with the hybrid genre of the Atlas-Almanac-Travelogue, thus it unfolds the many nested spatial and temporal scales that characterize this highly contested territory (Acciavatti, 2015).

Conceptualising pilgrimage and tourism as two separate domains, it is argued that tourist guides and their guided tours have become an integral part of Hindu pilgrimage and its operation in contemporary India, as illustrated in case studies of Rishikesh and Haridwar, two pilgrimage towns in Northern India (Aukland 2016). The most popular ritual at any temple is offering food to the god and taking it back as prasāda (offered food to Gods) as blessing; presenting some general principles of contemporary prasāda illustrated by examples from four Hindu pilgrimage sites, while analysing prasāda’s usage in well-known Sanskrit scriptures (especially the Purāṇas), it is argued that it should also to be conceived as a foundational concept for making sense of Hindu religious life in South Asian terms (Pinkney, 2013).

A study examines the consolidation of a ‘political Hinduism’ in British colonial India through the study of the material culture of the pilgrimage town of Brindaban (Vrindavan) in north India, and challenged prior assumptions of timelessness with their troubling Orientalizing overtones, alerting us, instead, to the inherently provisional, mutable, and incremental nature of survival, resistance, and innovation (Ray, 2012). Assessment of the cultural heritage of the sacred Braj region within the framework of phenomenology of place experience in ritual enactments involving visual and haptic engagement with the landscape, recommends remediation approach seeks to promote environmental values through restoration of water bodies and groves on the Yamuna Riverfront and Govardhan Hill (Sinha, 2014). In another study the oracle landscape of Orchha, the authors highlighted the architectural grandeurs and aesthetics beauties manifested there in, that in span of time turn to be issue of devastation that needs project for renovation and conservation of the heritage (Sinha and Valderrama, 2014). The study of the heritage landscape of Burhanpur describes the town as an architectural and horticultural composition, consisting of many historic gardens, a unique water management system, a sustainable planning and design framework, where the use of landscape and topography with numerous heritage components and historical monuments, temples, tombs and mosques are locally, regionally and nationally significant (Wahurwagh and Dongre, 2015).

The repeated renovation of south Indian temples over the past millennium and the conception of the Tamil temple-city indicate the widespread temple “renovations” by the devout Nakarattar (Nattukottai Chettiar) community in the early twentieth century, and the consequent dismay of colonial archaeologists at the perceived destruction of
South India’s monumental heritage (Branfoot, 2013). The claims of the colonial state and local Hindu devotees were separated by different precepts about religiosity and alternate orders of aesthetics, time, and history, are examined on the line of an exploration of the principles of archaeological conservation, as they were formed in the European bourgeois imagination, and then traces their transfer through imperial administration, to case-studies of specific temples (Sutton, 2013).

An interdisciplinary study in the Kailash Sacred Landscape region in north-western Nepal, aims to explore opportunities for, and barriers to, sustainable tourism as an adaptation strategy, not only for reducing community vulnerability to climate change but also as a poverty-alleviation measure, recommends incorporating and legitimising local traditional knowledge (Adler et al., 2013).

The Otherness in Indian Culture: Muslims’ Lifeworld

The study of other side of Muslim with reference to theological and organizational schools and reformist orientation, projects the question of Muslim citizenship in the context of present political scenario becomes crucial with increase of religious polarization, communal violence and Hindu national movement (Santhosh, 2016). A recent study that remarks that under-representation of Indian Muslim in India’s administration and security institutions contributes to religious violence and unreliability (Vicziany, 2016), is a narrow and naïve conclusion and lacks several other associated aspects, especially political positions and minority protection. Similarly blaming Sangh Parivar and such cultural materialism for conversion of vast masses of low caste Hindus and Christianity are serious questions of naïve ideas and biasness (Webster, 2016). The study of interfaces between Hindu and Muslim landscapes in Varanasi reveals the areas of transition and mutual cohesiveness (Singh, 2013b).

Using Hyderabad as a “central empirical touchstone” to demonstrate “the enduring fragmentation of sovereignty across imperial terrain”, Beverley (2015) presents copious materials about other “zones of anomaly”; probably few would question this main point about varying and contested degrees of sovereignty in the context of Muslimness that can refer to an expansive range of political, social, and cultural practices, and understandings. Critical among these were solidarities and alliances with other Muslim states and populations. Hyderabad provides a historical example that helps us think outside stereotypes of the Muslim (or 'Islamic') state as ultra-conservative, exclusivist, and scripturally-oriented (Beverley, 2015).

Varanasi, the Holy City and Symbol of Indian Culture

In continuation of earlier studies (Singh, 2012a), studies continued taking various aspects of Varanasi. Surveying, exposition and narrating historical-heritage perspective of Varanasi continued. Based on an International Seminar on Banaras (7 - 8 October 2011, NTNU, Trondheim Norway), that exposed more than decadal experiences of Varanasi, the studies presented expositions based on literary travelogues, critique to ancient literature and mythologies, images perceived in the West, encountering
experiences, aesthetics and space perception, pilgrimages sites and role of sacred waterfront, festivities and performances, rituals and sacred iconography, and memorial reconstruction (Keul, 2014).

Various issues, from historical-cultural aspects of pilgrimages and performances that responsible of emergence of religious landscapes have been concerned of a notable monograph (Rana, 2014). The symbolic expression of place, the set of symbols that gives the people a culture orientation in space and time, is pervasive in Hindu culture and explicitly manifested in Banâras. This is reflected and exposed in its religious landscape, landscape geometry, and several affiliated and auxiliary supporting attributes that make this city a mosaic of sacredscapes which are eulogised in Hindu mythology, or oral epics, with divine connotation and spatial manifestation – there intersects myth and *terra firma*; experiencing and exposing Varanasi during last over three-decades is itself a deeply rooted pilgrimage and co-sharing (Singh, 2014a). To justify city of Varanasi as cultural capital of India and its present scenario for cultural heritage and planning has taken a serious turn (Singh and Rana, 2016f). While addressing the local pilgrimages in Varanasi and the ongoing changes and disputes, it is debated that use of religious heritage by urban authorities will be crucial for re-conceptualizing sustainable cities, especially old holy cities (Lazzaretti, 2016). Examining the role of Master Plan (2011-2031) in terms of planning heritagescapes the importance of sacred sites and related vision for future has been realized (Singh and Pal, 2012e; Singh, 2015a and b; Singh, 2016b). The expanding impact of the city influences its surrounding peri-urban areas (Singh and Pal, 2012f; Singh and Chaturvedi, 2012h; Singh, 2012g; Singh and Singh, 2012i).

Representation of the landscape through sacred art, symbolism and signs have been codified to understand the inherent meanings (Singh, 2015j); this is earlier examine in a book by Gengnagel (2011), however its review further incorporate the whole gamut of representation (Singh, 2015h). The study of various pilgrimage routes and related symbolism and experiences provide a distinct image to this city (Singh and Rana, 2016i). Flowing water has been an archetypal representation the city. The riverfront of Varanasi represents a form of sacredscapes where also created and re-created amusescapes and awfulness (Singh, 2015c). Washer men and their territorial segmentation generate caste politics in the City (Bunn, Kumar and Virchow, 2015). The basic architectural plan of Banaras Hindu University has archetypal representation and result of the vision of its founder Madan Mohan Malaviya (Singh, 2015i).

Intending to reconceptualize ritual combining theoretical approaches from ritual studies and the anthropology of technology, using one ethnographical instance of ritual – a consecration of an image of the Hindu deity Hanuman in Varanasi, the complex issue of ritual efficacy is analyzed taking in view important Sanskrit ‘ritual’ that shows the changing tendency of the traditional ritual systems and its power (Keul, 2015). A doctoral dissertation deals with tourist representations and practices in India, exemplified with Varanasi, adopted an ethnographic approach, combining participant observation, interviews and questionnaires, visual methods, and textual analysis of popular tourist literature, and examined their role as to how tourist practices (re)produce and make
sense of the city’s ‘sacredscape’ (Zara, 2012). The Shivlingas in Varanasi also have the spatial connotation that installed here in the frame of spatial transposition, thus representing in abbreviated forms different sites of India (Aktor, 2015).

Within a critique of the politics of peace and place, a book explores everyday peace in Varanasi as it is experienced by the Hindu-Muslim community, while challenges normative understanding of Hindu-Muslim relations as relentlessly violent and the notion of peace as a romantic endpoint occurring only after violence and political maneuverings the work examines the ways in which geographical concepts such as space, place, and scale can inform and problematize understandings of peace as well as concepts of citizenship, agency, secular politics, and democracy (Williams, 2015).

From the other perspective to envision Varanasi at professions and locations that provide opportunities for making a meagre living by hard work was the issue for geographical development expedition, representing certain trades and professions, groups and communities, individuals and office-bearers, etc. that make the city as mosaic of living conditions (Schütte and Kreutzmann, 2015).

The importance of Muslims (about one-third of its total population, i.e. 1.65 millions in 2015) in Banaras is noticed by existence of their 1388 shrines and sacred sites, in contrast to Hindus’ recording over 3300 shrines and sacred sites. At the neighbourhood such fourteen popular places attract even the Hindus who especially visit such places for healing, exorcism and spiritual merits, and they maintain multi-religious characteristics that result into making Hindu-Muslim communal harmony and peacemaking. At these places during religious ceremonies like the urs (anniversaries) or melas (religious fairs), occasionally developed bazaars to support the needs of visitors, Hindus and Muslims both (Singh, 2013b).

A leading study on eighteenth century North India concludes that the ‘decline’ in the political scenario of eighteenth-century India did not imply an all-round decay and stagnation of society, especially in its religious and cultural realms. The emergence of regional forces, following the disintegration of the Mughal empire, greatly aided the promotion of regional centres which provided the grounds for a religious and cultural efflorescence (Kalam, 2013).

The study of Khrist Bhaktas (‘devotees of Christ’) in Varanasi refers to the unregulated messiness of on-the-ground acculturation often looms ominously over Christian elites (theologians, priests and pastors, etc.) as a threat to their authority, and also raises the issue of fuzzy identities of the Khrist Bhaktas — are they ‘Hindu’ or ‘Christian’ or ‘Hindu-Christian’ or ‘Christian-Hindu’ or something else? — this also poses a deûnitional problem for scholars of religion (Chirico, 2014).

The study of political history of the ruling dynasty of Banaras, 1740-1950, narrates the story of emergence of the state that emerged into being in 1911, which has its linkages to the British rule which gradually encroached the political rights and influences of the rulers (Pathak, 2014). With a view to analyzing population shifts within spatio-temporal frame of growth, distribution, and characteristics, a recent study has considered city’s socio-economic, cultural structure, and role of heritagescapes and Master Plans.
in the evolution and expansion of the cityscapes and surrounding rural landscapes (Pal, 2015).

**Conclusion**

Geography, like other social sciences, is in a state of flux. Geography matters because it affects human life and the natural environment, and serves as force in the formation of landscape. With increasing pace for critical examination of the varieties, distinctions and uniqueness, and the linkages that bind and apart interrelations and interactions among the attributes of the cultural landscapes through the re-examining and re-assessing the paths of post-structuralism, post-modernism, post-traditionalism and post-colonialism, a fresh framework of cultural geography of India has started its turn, quite close to humanism (Singh, 2012a). The turning of geography towards interdisciplinarity has paved the path for broadening the horizon of cultural geography in India (Singh, 2015f). Hinduism and globalization reciprocity has also drawn the attention (Singh and Aktor, 2015e).

The present, or past, mosaic of Indian landscape and its regional variations and their maintenance are not the product of simple result of ‘natural’ consequences, rather product of complex process reflecting the historical movements and cultural formations as a whole that always passed through the process of acculturation, transformation and continuity of traditions that possessed the ancient roots but also provide bases of flourishing the new or even imposed cultural notions. The study of cultural ecology with its basic attributes of subsistence, work, reproduction, and resources and their interrelationships as embedded in the rules and ethics of Indian society also need consideration for future research. The image of ‘incredible’ India is further shines into the mirror of ‘make in India’, ‘shining India’, ‘skilful India, and above all ‘harmonising India’. The studies in cultural geography of India will take these issues in coming future. We have to realise and reveal for changing the mind setup, and mass awakening in making our culture harmonious, peaceful and happy; remember the core concern of geographical practice is to make happy places and spiritual landscapes.

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Introduction

The present report is an evaluation of the progress and developments in the subfield from 2012 to the present. It is third in a series of earlier reports by this author and can be read in continuation to the previous reports for those interested in an insider’s documentation of the growth of the subfield. Alternatively it may also be used as a stand-alone reference to developments in the field for the period 2012 to the present. Rather than simply documenting publications, the reports attempt to map and contextualize the overall developments of the field with a special focus on emerging research. In a subfield that is still relatively young, research in progress, conference presentations as well as publications must all be seen as equally important and contributory to the growth and development of the sub field within the discipline.

Locating the Subfield

The first report entitled ‘On Not Holding Half the Sky’ co-authored with Prof Saraswati Raju in 2004 highlighted the several challenges faced in the expansion of the subfield in Indian contexts. Among these were cited the lag between growth and development of the subfield internationally and it’s still nascent position in India. The report argued that the debate about what is or not geography together with the positioning of Geography departments in Faculties of Sciences, left less scope to integrate gender issues into curricula. The next report for the period up to 2008 entitled ‘Claiming the Dawn Sky’ talked of the beginning of the spread of research work using the analytical lens of gender within mainstream human geography in India. A cautious widening of the field, together with the introduction of new gender oriented syllabi in at least two University Departments at the Post graduate level as well as an increase in number of geographers engaging with gender related themes was optimistically reported. The last report published in 2012 along with another essay entitled ‘Wildflowers on the Margins of

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Geography of Gender

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Introduction

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the Field’ (Datta, 2013a) attempted to contextualize the growth and development of the subfield in the light of local contexts as well as international developments within the discipline.

Building from developments cited in the earlier reports, what emerges as significant in the growth of the subfield in the period 2012 to date are three main drivers. These are the almost organic growth of the subfield and consequent consolidation of a larger critical mass as well as growing international connections and better networks. The significantly higher number of publications as well as the organization of conferences where gender is either the main theme or a sub theme can be read as both an outcome as well as driver of the widening of the subfield and its now greater acceptability.

**International Collaboration**

The importance of growing international connections as a driver has been commented upon both by Prof Shirlena Huang Chair of the IGU Commission on Gender and Geography in her plenary address to the IGU at the Lomonosov State University in Aug 2015 as well as by Prof Avril Maddrell in the recently concluded AAG at San Francisco in 2016 in a session titled ‘Feminist Geography Actually’. In the period under review, Indian geographers working with gender have held scholar in residence positions, participated in several international conferences as plenary and keynote speakers, presented gender themed papers on India, been awarded for their work and also occupy key positions as members of international editorial boards, review committees and steering groups within the IGU and other international bodies. This visibility has only served to highlight the importance of the subfield globally and has been a definite driver to its growth within the country. A downward percolation is also seen with students and early career researchers participating in international conferences such as IGU and AAG in sessions organized around gendered themes as well as in student exchanges. In this light it is relevant to report the Linnaeus Palme exchanges between the Department of Geography, University of Delhi and the Department of Gender Studies Lund University Sweden. This flagship collaboration, under the Linnaeus Palme Programme is currently in its third phase with the twin aims of strengthening and supporting the growth of the subfield in India and providing a greater understanding of the spatialities of gender in the Indian contexts on the one hand and southern feminisms on the other.

**National Scenario**

Alongside these growing international connections, the organic growth of the subfield is also not to be discounted. From only a handful of scholars pursuing research on gender in the 90’s the field has grown organically with these now taking up teaching positions. Hitherto mid-level and junior faculty are now occupying senior positions, the pool of researchers pursuing research on gender related themes has grown significantly, and at least four universities are offering full-fledged courses on the geographies of gender and several others in the offing, together with an increase in the volume of publications on the theme of gender.
From a near invisibility, it is now fairly commonplace to see national level conferences with at least a session or two focused on gender. This underlines the process of mainstreaming gender with other human geography themes. In addition, in the period under review a major international conference Re-Orienting Gender: Geographies of Resistance Agency Violence and Desire was organized at the University of Delhi in 2014. The conference marks an attempt to shift the discourse from viewing gender as a development issue towards recovery of agency, gendered resistances, violence and desire.

Reporting on publications shows that themes related to development and social well-being continue to dominate. These include women's education, health, work and decision making (Sajjad, Iqbal, Siddiqui, and Siddiqui, 2012; Roy, and Chattopadhyay, 2012). Studies on women's health continue to focus on nutrition and reproductive health (Chattopadhyay, and Mukherjee, 2015; Dutta, 2012; Singh, 2012a, 2012b; Ram, Unisa, Chattopadhyay, and Fulpagare, 2013) whereas studies on other aspects of health, especially mental health and its interface with violence remains unexplored. A number of studies have explored the worlds of women's work, particularly in the context of neo liberalism (Paul, forthcoming; Paul, and Raju, 2014; Datta, 2013b; Paul, 2013; Paul, 2012; Raju, forthcoming; 2014; Raju, 2013a,2013b; Sajjad, 2012; Sen, and Bandyopadhyay, forthcoming; Sen, 2013). Similarly women's status and empowerment remain popular themes with some works moving on to investigate agency (Singh, forthcoming; Das, and Chattopadhyay, 2012; Raju, 2013c; Samanta, 2012; Sen, and Bandyopadhyay, 2014).

A new set of eclectic themes related to home making, homelessness, witch hunting, gendered resistances, agency, identity and gendered experiences of urban spaces is also reported (Bhagat, 2015; Datta, 2016; Datta, 2015a,2015b; Datta, 2013; Gandhi, Bhasin, and Mander, forthcoming; Gandhi, forthcoming; Handique, 2014a,2014b; Lahiri-Dutt, and Samanta, 2012; Raju, (with Tanusree Paul), forthcoming; Samanta, and Banerjee, 2013; Samanta, and Sil, 2013; Sen, 2014; Gupta 2014, Bailung, and Acharjee, undated). Ongoing research which is likely to shape the directions of the subfield in the coming years is focused on everyday geographies (Singh, ongoing; Biswas, ongoing; Dipankar, ongoing; Siwach, ongoing), ageing, (Jahangir, 2015) expressions of agency (Naithani, ongoing; Ghosh, ongoing), post-colonial readings of space (Bhattacharjee, ongoing), mobilities and migrations (Madhuri, ongoing) even though the older development oriented themes still maintain sway (Banerjee, ongoing; Baranwal, ongoing; Bhim Singh, ongoing; Biswas, 2014; Dutta, 2015; Ghosh, 2013; Jaleel, ongoing; Jangra, ongoing; Jhakar, 2013; Kour, 2014; Koner, ongoing; Renuka, 2012; Roy, undated; Siwach, 2015). Studies on space and sexuality are conspicuously absent from this review and suggest another area where research could progress.

The continuation of older themes together with a sprinkling of newer ones is also seen in the research projects included in this report. Themes such as microfinance (Samanta, 2012), climate change (Sarkar, Gupta, and Singh, (2015-16), nutrition (Chattopadhyay et al. 2013), health (Singh, 2013) and empowerment are maintained together with new areas such as ageing (Chattopadhyay et al.), theorizing violence (Datta,
2013-14; Gandhi, 2015) and mapping feminist geographies (Datta, 2015-16). The DST sponsored project of the gender atlas (Raju et al., 2015) encompasses an array of themes to provide district level maps on various gendered indicators. This is extremely significant in visibilising the spatialities of gender and an important tool for the growing body of researchers engaging with gender in geography and other disciplines as well.

The survey of publications, research in progress and projects hold hope that the thematic stagnancy reported earlier is perhaps giving way to new themes. Yet the continuance of development related themes and their relevance needs debate. While gendered disparities need to be highlighted, the processes through which these are maintained also need interrogation. It is also particularly important to examine these processes from the emic perspectives. According to this author, this involves engaging with qualitative methodologies and adopting a grounded theory approach. Further, the preponderance of descriptive rather than analytical frames particularly where gender and gender issues are concerned ensures that unequal processes and structures are not sufficiently interrogated but merely described, leading possibly to their further normalization and entrenchment.

**Conclusion**

Elsewhere I have argued that the category of women geographer is not synonymous with feminist geographer or necessarily a geographer engaging with gender. However in India there is a remarkable overlap between these categories. Given this peculiarity, the still small number of women faculty within the discipline even in 2016 is a cause of concern. Preliminary findings from a parallel project initiated by this author point to the near absence of Dalit Women, women from minorities (except for certain hubs) and the fact that in almost all cases class privilege and metropolitan locations have worked to provide entry into institutional spaces. The fact that this is more marked in particular disciplines speaks more of the nature of disciplinary and institutional contexts rather than constraints in balancing the professional and personal. More structural and institutional support to offset deeply patriarchal institutional spaces, mentorships and supportive networks will act as catalysts to further growth and towards more inclusive geographies both in terms of subjects and practitioners.

**Notes**

The report has been prepared on the basis of information solicited through emails, personal communications and review of literature. Help received from Rupsa Ghosh research scholar at the Dept. of Geography, University of Delhi in compiling the information is gratefully acknowledged. Thanks to all colleagues who responded to our emails and to Prof R B Singh for the invitation to write this report.

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Introduction

Ancient Indian literature, including the great Epics: the Ramayana and the Mahabharata, the Vedas, the Puranas and the political and economic treatises, like the Arthasastra contain such ideas and explanations, which to a greater extent appear to parallel and equivalent to the modern ideas of political geography and geopolitics, concerning the spatial requirements of politics, spatial conditions of space and political aspects of space and spatialization of politics. Even the medieval literature contains vivid descriptions and narrations of boundaries, location, shape, size, capital cities resources, particularly those resources, which had immense strategic relevance and importance, and quality and competence of population, according to their religious and caste affiliations. These vivid descriptions and narrations, which the medieval and the Mughal literature contain, usually refer to the successive empires, which were founded by the Arabs, the Afghans, Turks, and the Mughals, who descended down on the Indian land from West Asia, and Central Asia and for centuries ruled over India, and led the foundation of a complex fabric of interwoven Indian culture with geographical and political strands.

The purpose of this lengthy discourse is to show that India is a rich rather potential field of politico-geographical and geopolitical research, as the problems, mentioned and discussed above clearly reveal the expressiveness of the geographical background behind each of these issues and problems, but unfortunately no substantial and fruitful research works on these issues have been done by Indian geographers. However, substantial research works have been done by Indian geographers in other branches and sub-branches of human geography and the process has been still continuing in a wider perspective, but in case of political geography, the research process is in a very painful stage that is evident in the number of papers, published in political geography, and in allied areas, during 2012-2015, in different geographical journals of India and abroad. Altogether 27 papers, including a book in different aspects of political geography,
and electoral geography of India, besides some conceptual ones, have been identified to have appeared in different geographical journals of India, and abroad during 2012-2015. However, the oft-quoted phrase of Brian Berry (1969) about political geography as a moribund backwater has been mentioned in the concluding remark of the present account to see whether the phrase could be applicable to the present state of condition of political geography in India?

**Identification and Contents of Papers, Published during 2012-2015**

The papers under review, though very meagre in numbers, have shown some wider variation in contextual term, as they range from modern and post-modern geopolitics to locational conflicts, with regard to land acquisition by the state, and between the two ends of the spectrum, there are papers of varied dimensions, dealing with ethnicity, conflict and federation of India, urban locational conflict, evolution of political frontiers of India, geopolitics of the Indian Ocean, strategic rivalry in the oceanic region, the SAARC, geopolitics of Indo-Nepal border, concept of North East South Asia (NESA) as geographical region, involving the frontier areas of north east India, China, Burma, Bangladesh and West Bengal, inter-state water disputes and conflicts in India, locational relevance of South Asia in terms of the SAARC, geopolitical and geostrategic significance of the Straits of Malacca, geopolitics of Indian Ocean in the post-Cold War politics, impacts of India-Pakistan borders in the neighbouring districts of Rajasthan, political and economic opportunities and possibilities in the Indian Ocean Rim, changing nature of Indian federalism, territorial reorganization of Indian State, with reference to the proposed divisions of Uttar Pradesh into four political regions, regional vitalities of India and emerging state-nation, relevance of neo-liberalism, voting patterns in Assembly elections in Haryana in 2009, and the performance of Congress in the election, and the process of delimitation of assembly constituencies, including the ST constituencies in some districts of Rajasthan, the impact of globalisation on political, social and cultural arenas of India, locational relevance of Jammu & Kashmir in regional and continental geopolitics, challenges before Indian Army in the contemporary regional geopolitical pattern, particularly in terms of growing terrorism, and parliamentary democracy in India, and emergence of new political pattern in India. Following discussion makes a critical review of the content of the papers, published during the period (2012-2015).

**Review of Papers**

Adhikari (2013) distinguishes between modern geopolitics and post-modern geopolitics, highlighting their theoretical and applied characteristics, with academic and practical relevance in contemporary power-politics. There is no end of geopolitics as critics point out rather geopolitics as a political paradigm in world politics, has emerged more vigorous than before. The information technological revolution in the 80s and 90s of the last century has heralded a new era in geopolitical researches and studies, and out of which has appeared post-modern geopolitics, nevertheless, there is no dichotomy between the modern and the post-modern geopolitics, because both emphasised upon spatialisation of politics.
Adhikari (2013) studies the spatial relationship between ethnicity, conflict and federation, and opines that the pattern of ethnicity, particularly that which occurs in north-east India is the principal reason of the territorial pattern of conflict in the region. Over generations, these migrants developed the sense of ethnicity in the form of distinct social groups. North East India is such a region where the major conflict is between the social groups of the primordial / absolute ethnicity, and the social groups of the constructionist ethnicity.

Adhikari (2014) traces out the fact that development often leads to political conflict between the state and the citizens, particularly when the interests of the citizens of a place or location are affected by the process of landscape change and resource-orientation, initiated by the government for local / regional development. The author finds that development and conflict proceeds together i.e. development at a site causes conflict in the neighbourhood, in the form of protests by the citizens of the locality that often turn into political conflict. Development is seen in terms of location of the place or site, so the nature of conflict becomes locational. Locational conflicts are more common in urban areas, the NIMBY, an acronym of Not In My Backyard as a colloquial expression of locational conflict, is often heard in the cities, when the development works pile up building materials and other materials on the approach roads, in the backyards of residential colonies, obstructing mobility, and other creating problems of pollution. Conflicts also develop between the residents and between the colonies over constructions and alterations of buildings. Locational conflict comprises an important aspect of urban political geography.

Adhikari (2015) traces out the evolution of political frontiers of India in historical perspective. He points out that the evolution of political frontiers of India in the Trans-Himalyan and Himalayan region during the nineteenth century and early twentieth century necessarily manifested the British frontier philosophy that sought for security of their northern peripheries. As a part of their frontier philosophy, the British had created so many buffer regions in the Trans-Himalayan and Himalayan regions such as Nepal, Bhutan, Sikkim, Jammu & Kashmir, North West Frontier Province and Baluchistan. The delineation of the Durand Line in 1893 and McMahon Line in 1914 was part of the British frontier diplomacy, but the British left out the frontier-making processes incomplete, creating perpetual border and / or frontier disputes in South Asia.

Bhardwaj (2015) studies the geopolitical and geo-economical implications of the Indo-Nepal open border, with the help of field surveys, conducted in the eastern sector of the border i.e. West Bengal and Sikkim, particularly in the Mechi zone of Nepal, and in Geyzing and Dentam in West Sikkim, and Mangan in North Sikkim and Gangtok in East Sikkim, and Darjeeling, Sukhlapokhari, Kalimpong, Naxalbari Bagdogra and Siliguri in Darjeeling district of West Bengal, and concludes that open border between the two countries, over centuries, and more particularly, since the conclusion of the India-Nepal Peace and Friendship Treaty in 1950, has been contributing in strengthening mutual socio-cultural relations as well as economic development of the borderland people of the two countries. The study also highlights the view of the border people of
both the countries who strongly favour in the continuity of the Indo-Nepal open border system, despite some odds in the open system. The study reveals that the border people, by and large, have opposed the transformation of the open border system into restricted one.

Chapman and Mipun (2014) have imagined of a new geographical-political region to be called ‘North-East South Asia’ (NESA), which would include the frontier areas of Burma (Myanmar), Tibet, Yunnan, and North-Eastern States of India, including West Bengal and Bangladesh, and the formation of which shall be based upon the new seven agenda of the UNDP of 1997. The concept of political sovereignty shall not be applied in the conceptualization and delineation of this new geographical region rather the involved states (China, India, Myanmar and Bangladesh) would cooperate in the material improvement and human development of the people of proposed geographical region. The people of the frontier areas (to be included in the region) are the regular victims of poverty, and economic deprivation, lack of physical infrastructure and social infrastructure, political instability, insurgency, terrorism, narcotism and smuggling, and human trafficking. The authors contend that once such a region comes into being it would, then witness not only development of the region and well-being of the people, but also enduring political stability and peace in the neighbourhood of the frontier areas of the involved countries. The authors, however, have used two more terms, besides North-East South Asia (NESA), to signify the proposed geographical-political region as the North West South East Asia (NWSEA), and the South West East Asia (SWEA).

Goel (2012) studies the spatial pattern of social tensions, political instability, and inter-state conflicts on account of fast deteriorating situation of availability of qualitative water in adequate quantity in some areas of the country, where river water conflicts between the co-riparian states have taken the form of ethnic conflicts, creating uncertainty in the political structure. He presents an overview of basic objectives, political controversies and conflicts, social and ecological impacts, and also offers suggestions to overcome the blockades through the Inter-basin Transfer of Water (IBTW), now commonly called Inter-linking of River (ILR).

Jalan (2013) presents a case study of the assembly constituencies of Alwar district of Rajasthan, wherein she critically studies the territorial changes in the assembly constituencies of the district in the light of the political viability of the delimitation of the boundaries, and the resultant nature of the delimited-constituencies, and their impacts on the nature of geography of representation.

Jalan (2015) evaluates the status and efficacy of the Scheduled Castes’ electoral representation, demographic composition, administrative configuration, and location of boundaries of pre-delimitation and post-delimitation ST assembly constituencies of 5 districts located in north-eastern part of Rajasthan, in the context of constitutional mandates, and prescribed guidelines for delimitation of reserved constituencies as per the Delimitation Act, 2002. The author expresses her concern for not following the prescribed criteria for boundary delimitation of ST constituencies in the districts under study, as per the Delimitation Act, 2002.
Jalan (2015) identifies the potential areas of research in the field of electoral geography in India, and also asks for methodological shift in the geographical study of political choice. The author strikes a difference between the studies of electoral geography and those of geographical studies of political choice. There are structural, philosophical, and methodological differences between the two. She identifies several socio-economic determinants, which necessarily impact the voting pattern, and which she makes known through a case study, conducted in north east Rajasthan, in which, she has applied the areal ecological approach.

Kanan (2013) demonstrates the locational vitality of India, in terms of her military, economic and political prowess in South Asia, and explains India’s participatory capacity in the regional decision-making processes, particularly with regard to the SAARC.

Kanan (2013) highlights India’s locational relevance in South Asia as being on the threshold of the major stake-holders of the SAARC, and opines that on account of this locational suitability, and convenience, particularly, in terms of its east-west and north-south spatial pattern in sub-continental scale that India holds a pivotal importance in the regional framework of the SAARC.

Kanan (2013) emphasises the geo-economical and geopolitical significance of the Malacca Straits in South Asia’s emerging economy on account of its location on the crossroads of the Indian Ocean and the Pacific Ocean, besides being situated in the midst of the Eastern Archipelago, which provides safe passage to the connectivity between the Pacific Ocean region and the Indian Ocean region, in terms of trade and commerce. She concludes by saying that Indonesia and Malaysia, particularly must guarantee the integrity of the Straits.

Kanan (2014) discusses the post-Cold War geopolitical situation in the Indian Ocean region in the light of the growing presence of the US and its NATO European allies, in the Persian Gulf-Arabian Sea areas, which she feels, creates sense of insecurity not only in the minds of the African littoral countries, but also in the minds of the West Asian littoral countries. She wants that the UN resolution of 1971, declaring the Indian Ocean as a zone of peace must be strictly adhered to.

Kanan (2015) interprets the political implications in some border districts (Ganganagar, Bikaner, Jaisalmer and Barmer) of Rajasthan, lying in the neighbourhood of the India-Pakistan border, in the light of the growing illegal cross-border movements of the Pakistani nationals and smugglers, with the intention of creating political, social and economic impasse not only in these border districts but also in the entire state of Rajasthan. The author intends to measure the geopolitical impact of the Radcliffe Line, (part of the India-Pakistan border), upon the political landscape of the border districts of Rajasthan, whether the impacts threaten the territorial peace in the districts.

Kanan (2015) demonstrates the future and/or the emerging nature of distribution of power systems in the Indian Ocean Region, and maps the nature of rivalry between India, China, South Africa, and Australia in the oceanic region for space, power and domination.
Kanan (2015) highlights the geopolitical significance of South Asia in the post-Cold War world, particularly in the light of India’s changing and challenging local and regional geopolitical codes towards her South Asian neighbours, including China also. The author points out that India has acquired the capability of dominating the South Asian polity, in the rapidly changing regional and global geopolitical orders, by its economic and military prowess, which together makes her a leading regional power. India is one of the few countries in the post-Cold War world, which plays a pivotal geopolitical role in the emerging world order.

Khinchi, Kanan and Pachouri (2014) highlight the resource-rich littoral lands of the Indian Ocean region, which they think, could provide the region with lot of possibilities and opportunities for development and investment. Identifying the nature of regional diversity in culture, religion, resources, economic development, strategic interests, however, varying in size of population, quality, competence, technical development, and GDP and GNP, the region offers possibilities and opportunities to the developed countries for direct investment. The Indian Rim has several regional organizations, such as the ASEAN, GOC, SAARC, and the SADEC. Under the Capitalist System of privatization, and liberalization, the political economic situation of the Indian Ocean region witnessed more openness in its economic and political fronts that tend to make it an open and outward looking economic and political realm, but the existence of the non-tariff further enhances the opportunity for development, the authors added.

Kant (2014) examines the implications of the ‘new economic policy vis-a-vis economic liberalism’ as enunciated by the Government of India in 1991 on the nature of Indian federalism, besides its spatial consequences. Indian federalism was born as a cooperative federalism, and for forty years, it functioned on the principle of cooperation between the federating states, particularly during the pre-reform period. With the execution of the new economic policy, lifting of economic restriction and abolishment of industrial licensing, and opening the door for foreign direct investment resulted in the beginning of competition among the federating states to seek foreign investment and private capital to meet their development requirements. Cooperation changed into competition. Southern states of the federations, particularly the coastal states, were benefited more than the northern states, particularly those states, which had law and order problems, with poor physical and social infrastructures. The author opines that the change over from the cooperative federalism to competitive federalism has resulted in widening regional and socio-economic disparities in India, and asks for cooperative partnership rather than competitive partnership between the federating states.

Kant (2014) makes an analytical study of the territorial reorganization of the Indian State, with special reference to the successive proposals for the division of Uttar Pradesh into small rather discrete political regions – politically and territorially organized. His analysis touches upon the three distinct areas, which includes discussion on the constitutional provisions and politico-geographical validity of the territorial organization of the Indian State, linguistic reorganization of the federation, with ongoing debate and fresh wave for further reorganization of the Indian State into small and discrete
politically organized regions, and the politico-geographical viability of the proposed division of Uttar Pradesh as resolved in the UP Assembly in November 2011. The resolution mooted in the Assembly called for the division of Uttar Pradesh into four new states, or politically organized regions: Paschim Pradesh, Awadh Pradesh, Purvanchal, and Bundelkhand. The author highlights the political viability of each proposed state, and finds that Paschim Pradesh, if created, will be a developed one, because of its close proximity to the National Capital Region (NCR), besides being agriculturally developed, while Purvanchal and Bundelkhand will suffer economically and socially, because of geographical problems. Awadh Pradesh, with Kanpur-Lucknow urban-industrial units, is uniquely rather transitionally situated between the developed Paschim Pradesh and underdeveloped Purvanchal and Bundelkhand, but the peripheral areas of Awadh Pradesh are poverty-stricken. The author doubts the viability of the smaller administrative units, because they cannot guarantee good governance and effective development.

Krishan (2014) laments that no comprehensive work has been done in India to ascertain the vitality of the Indian nation-state, as has been done on the vitality of Great Britain, Japan Netherlands, China and Russia. Although several publications of the nature have come up in recent years, but none of them attempt to look into this aspect of vitality in true sense of the term in the context of India. Defining the concept of vitality of a nation-state, the author, however, says that it is imperative for any nation-state to appraise itself of the way people perceive the vitality in different parts of the nation-state. The author lists several criteria to compute the ‘vitality index’ of various regions. The term ‘region’ in this context is being politically viewed and conceptualised as ‘state’ in India federation, or the word ‘region’ is taken as a synonym of a ‘state’ with a premise that a region, in ultimate analysis, is a political concept in a discourse of the present kind. So, the ‘vitality of India’ is essentially a function and synthesis of its ‘Regional Vitalities’. The regional vitalities of India are now being reflected in the growing power of the states, whereas the ethnic-linguistic basis of the past has subsided proportionately. Different states of the federation are in competition with each other on development agenda, and this process of competition between the states leads to a transitional phase wherein the Indian-nation-state is transforming into a ‘state-nation’, which in no way poses threat to the raison de etre of the Indian nation-state rather it is a healthy trend.

Lawal (2013) traces out the root of political geography, particularly, since the publication of the book *Politische Geographie* in 1897. The author studies the relationship of environment and political process, and identifies the spatial attributes of political processes. He interprets the political relevance of city-states, and geographical significance of the capital cities. He also discusses the concept of organic state, and evaluates the role of geopolitics, space and state relationship.

Singh (2013) traces out the circumstances under which the neo-liberal politico-economic ideology, focusing upon de-regulation, liberalization and privatization of economy, private property right, and individual liberty has led to a paradigm-shift in global political economy from welfare commitments to market commitments, with
challenges to the established norms of welfare economy. However, the author questions the usefulness of the neo-liberal ideology world over.

Singh (2013) enquires into the causes of relatively bad performances of the Congress Party in 2009 Assembly election in Haryana as compared to its comparatively better performances in the 2009 Lok-Sabha (Parliamentary) election, held few months before the Assembly election. Haryana had always been a Congress strong-hold ever since the state was created, and in the successive elections, the Congress Party had done fairly well, but what happened that the party could not secure the absolute majority in the 2009 Assembly election? The author, however, could not explain the reasons of the bad performance of the Congress party, but expresses his doubt over the future prospect of the party.

Singh (2013) highlights the changes in India’s cultural genre de vie on account of the impact of globalization in certain specific cultural traits, and political attitudes which has caused de-territorialisation, re-territorialisation and fragmentation of certain specific cultural areas, especially in dress codes, food habits, perception, behaviour and political attitudes in those areas. The author, however, seeks to give a post-modern and post-structuralist orientation to the paper by using words like de-territorialisation, re-territorialisation, and fragmentation of cultural areas, with political implications.

Singh and Raj (2013) analyse the geopolitical locational characteristics of Jammu and Kashmir in terms of the conventional strategic models of Mackinder, Spykman and Cohen, and pointed out that it (Jammu & Kashmir) holds tremendous geostrategic implications in regional geopolitical rivalry in South Asia.

Sukhwal (2013) examines different structures and branches of the Indian Army, in the light of the emerging geopolitical realities of the post-Cold War world, and identifies security challenges that India presently confronts with. The author, who is a diaspora, living in the USA, has always shown his interest in Indian geopolitics, and in the present paper, he has asked for a balanced defence policy through the military cooperation, with the Western countries that India must pursue in order to strengthen her defense preparedness. The author has favoured India-US defense and/or strategic partnership in the larger interest of the two countries. He points out that in the last two decades, India’s geopolitical codes have changed from non-alignment to regional power-balance game, given persistent threats and security challenges from Pakistan and China. He urges for modernization of the armed forces not for offensive purposes, but for defences purposes. He makes it clear in the paper that India has never invaded any country throughout her long history, but has never missed any chance to give befitting reply to the enemies when being invaded, both in the past and present.

Sukhwal (2015) highlights the salient features of India’s parliamentary democracy, with a chronological account of the development of parliamentary institutions in India since the beginning of the federation in 1950. He highlights the electoral characteristics of successive parliamentary elections, with the party-wise strength, and seeks to identify the spatial pattern of voting behaviour in terms of stability and realignment in successive parliamentary elections, with the Indian National Congress, mostly dominating the
electoral scenario, however, with some reverses, on account of the rise of alternative political grouping of the non-Congress political parties. In the paper, the author outlines growing importance of the coalition politics in Indian electoral scenario. The author points out that the results of the 2014 parliamentary election were a watershed in the history of contemporary parliamentary elections of India, particularly in terms of the fact that quite after a long time that a political party, i.e. the BJP, the major partner of the alliance, could secure absolute majority in the election, and never before in the decades’ old of electoral annals of India that a political party could master majority in the parliamentary election. Even the Indian National Congress could not achieve this distinction in the previous parliamentary elections in India. The author of the paper is Diaspora, settled in the USA, and the paper, therefore reveals his perceptual expression of India’s democratic systems and electoral politics.

Verma (2014) with the help of so many examples has attempted to map out the spatial pattern of conflict in different states of India, with regard to land acquisition, where farmers and citizens have protested against land acquisition, which in several incidences, resulted in violent movements. She also traces out the history of the land acquisition act in India from 1825 to 1894, and says that for long the land acquisition act of 1894 continued in independent India, and it was only in 2013, she says that a new initiative in the form of Land Acquisition Rehabilitation and Resettlement (LARR) Act was passed in the Parliament. She expresses the hope that this act will have far reaching spatial consequences in the mitigation of land- acquisition based locational conflict in the country.

Conclusion

The above review of the papers, published during the period (2012-2016) in different journals of India and abroad, reveals the fact that most of the papers touch upon some dominant and sensitive issues, concerning the politico-geographical realities of India, and also show that the papers under review discuss some of those aspects, which have already been raised and mentioned in the introductory discourse of the present analysis. There is a need for more such research works of exploratory nature in the field of Indian political geography and geopolitics. Similarly, India-China border disputes in western and eastern sectors remain unresolved for decades. Trafficking along the entire India-Nepal border has raised manifold on account of the porous and open boundary system. Much of India’s federal stability appeared to be disturbed by the increasing number of incidents in interstate river water disputes across the federation. There are so many such political problems in contemporary India, which have geographical background, and Indian geographers, trained in political geography and geopolitics, could provide sustainable solutions to these political problems. Thus, this sub-branch of human geography needs to be encouraged, because the application of its skill, concepts, techniques, and overall its newly evolved paradigms could be useful. Another flourishing area, where political geographers of India, and for that matter the Indian geographers, could undertake research works, is the area of ‘foreign policy’ practices, which now come under the domain of practical geopolitics and / or critical geopolitics, pertaining to geopolitical codes. Similarly, India has moved ahead of many developed
countries in the field of information technology, so another area of research frontier has opened for Indian (political) geographers to work on impacts of informational technological development in terms of a new visionary, particularly in the discourse of strategic analysis and global power today, and telemetrical visualization of local, regional, continental geopolitical situations and contemporary world politics in the context of growing terrorism vis-a-vis spatialisation of threats.

Nevertheless, research in political geography in India is yet to pick-up momentum; as it is apparent in the above study that only 22 papers could be identified to have been published in different journals during 2012-2015, in political geography, and its allied areas. It is a matter of serious concern to all professional Indian geographers - why this sub-branch of human geography in India is lagging behind the other sub-branches of human geography in terms of qualitative and quantitative researches and other studies? The reason of political geography getting marginalized in India, over years, must be enquired into. Here, in the Indian context, the state condition of political geography appears to approximate of what Brian Berry (1969) had once said about the state of political geography in 1969, as a moribund backwater. Indian geographers have a greater responsibility to bring out political geography from the state of moribund backwater, and to place it at a respectable level, at par with other sub-branches of human geography, through promoting and encouraging research projects and works in the various aspects of the field. Political geography has a wider scope in India rather India is a fertile and potential field of research in political geography and geopolitics, and in allied areas because of ever-changing political phenomena within, and the changing strategic assumptions, with regard to the political happenings in the territories beyond the borders in the neighbourhood.

References


Introduction

Rural development denotes economic betterment of people and greater social transformation. Regional development refers a quality of life in a region in terms of economic growth, social development, political maturity and environmental conservation. Rural and regional development as a theme of this chapter is quite challenging. The regional development is inclusive of rural development. Rural is segment of a region. Separating it will invite injustice with urban segment of the region. In fact, regional development subsumes both rural and urban development. The overlap between rural and regional development cannot be fully avoided.

The period 2012-15 was the last lap of Millennium Development Goals (MDG). The Sustainable Development Goals (SDG) for next 15 years have been prepared by the United Nations for the world. There were eight goals in MDG whereas there are seventeen goals in SDG. Where we live is environment and what we do in attempt to improve our lot within that abode is development (Jog, 2014). Geographers in India like elsewhere were guided by goals set at international level. Many chose to work keeping the national level initiatives for rural and regional development.

The present report is based on the research articles published in the nationally recognised journals and books pertaining to geography. In spite of efforts, all that has not found place was inadvertent. Research published during 2012-15 period related to rural and regional development is presented below in chronological order.

Regional Disparity

Joshi (2012) in his presidential address focusing on central tribal belt of India stated that the economy of the tribal in many parts is still based on survival compulsions. The ratio of families living below poverty line is very high and a significant area is in the
grip of chronic poverty. In spite of improvement in economy of the tribal, the gap between them and the other section of the society and even within their different groups has widened.

India is transiting from a phase of ethnicity based organisation of states to a phase of development-centric demand from carving of new states out of the existing ones (Krishan, 2013).

Regional disparity widened consequent to New Economic Policy (Singh and Gurjar, 2012). The ratio between the per capita income of the state at the top, Goa and the one at the bottom, Bihar was 5:1 in 1993-94. This widened to 9:1 in 2009-10. However, every state became conscious of its development agenda more than ever before. While regional disparities increased at national level these decreased virtually internally in every state (Krishna, 2013; Sen, 2014).

Misra (2014) in his presidential address in 35th Indian Geography Congress held at Madras University highlighted that there is a very high degree of disparity in regional development. A number of regions in the country have traditionally remained backward. Some of these are the ones populated by various tribes; others are isolated regions like north-east India and the islands; still others are agricultural regions like north Bihar, Jharkhand and Chhattisgarh. Geographers must pay attention to these regions and them in depth, with a view to suggesting policies and strategies for natural resource development, human development and infrastructure planning. The time has come when greater attention should be paid to micro level regions. Ideally speaking, each micro region of the country should be studied in a systematic way, making micro regions building blocks for meso regionalization. He further pointed that the time has come for promoting regional studies and publishing regional monographs which can be utilized for future development.

Mohan (2014) pointed out a general lack of spatial perspective in our planners. Reflecting on the backward regions grant fund, it was suggested that relative backwardness of districts must be taken into account for the allocation of funds. One size fits all is not valid. It was suggested that the coverage of area under backward area development programme are criteria/indicator driven, but the core regions will qualify in any way. Hence these core areas need special attention.

While explaining the socio-economic disparities in Koppal district, a set of 32 indicators was taken and concluded that it is necessary to reduce the gap of disparity of development from one taluka to another in order to reduce the disparities in the levels of agricultural development (Tallalli and Nagaraj, 2015).

Regional Development

While reflecting on Kerala’s development experience, Chattopadhyay (2012) concludes, learning from achievements and ensuing problems, that appropriate public action is an important ingredient and this is possible with literacy, social consciousness and vibrant democratic organizations. Interplay of environment and society is spatially
differentiated due to cultural variations and diversity. This dimension is often overlooked and normative solutions are prescribed.

Rapid population growth has been neutralising the gains accruing from development is a myth. During 1951-2001, India’s population multiplied almost three times, with an average annual population growth rate of 2.1 per cent. Meanwhile the annual rate of increase of net national product was 4.1 per cent. The per capita income of an Indian in 2010 works out as 4.5 times of that in 1950, at constant prices (Krishan, 2013).

Globalisation is spatially spreading. However, developed countries are often investing in polluting industries, such as chemicals, oil refineries, and cement in developing countries. They also seek land, forests and mines for their installations which cause massive displacement of local populations, apart from causing land degradation. Developing countries have a limited choice between a faster rate of growth and deterioration of environment (Krishan, 2013).

Thakur (2012) in his presidential address entitled research perspectives on natural resource management in India suggested direction for future research in India. He pointed out identification, development and management of scenery resources in the Western Ghats and Himalayan region. Further, he stressed on detailed regional studies in understanding the distribution, utilization, and measures for rational use of resources for integrated resource development.

Dealing with concept of development from a cultural perspective, it was concluded that the concept of development is very comprehensive and inclusive, and encompasses the balanced development of the physical, mental and spiritual aspects of human life. While promoting economic growth, it should attempt to ensure that economic growth paves the way for distributive justice, social harmony, economic equality, environmental quality and good quality of life to everybody regardless of caste, creed and religion. The basic spirit of development is to promote the elements of humanism and sustainability in human culture and civilization through economic growth. It is not aimed at promoting human welfare through economic growth alone, because this is not possible due to the fact that economic growth is a means to achieve the valued objective of human welfare i.e. promotion and development of cultures and civilisation. If cultures perish humanity will also perish, hence the means (economic growth) should be subordinated to values and goals (preservation and promotion of human cultures and civilization) (Mishra and Mishra, 2013).

Evaluating the concentration of growth centre for balanced regional development in Belgaum division, it was concluded that spatial distribution of growth centre in the region is uneven. It varies from one physiographic division to another. The analysis suggested that the distribution pattern of higher order growth centers should be brought towards more or less uniform distribution by upgrading another 6 or 7 growth centres (Nayak, 2013).

Referring to development without destruction, Misra (2013) pointed out that geography aims at developing the resources of the earth to remove the inequalities but
the development so initiated and carried forward must ensure that they do not disturb the natural balance that support life on the planet earth.

Misra (2014) while dealing with globalization and its implications for India reflected that economic development is must. How else can people lead a dignified life? Hungry, ill clad, ill housed, illiterate and unhealthy people can never live in dignity. Nature has given enough to India that it can not only meet the needs of its inhabitant well but also can contribute to the welfare of people in other parts of the world as it had done in the past. All this can be done only if Indian economy is buoyant and well developed. He further reflects on spatially skewed development in India. It is a sort of anarchic development of select geographical pockets neglecting the industrially backward areas. Most of the Industrial Entrepreneurs Memorandums from multinationals have gone to industrially developed states such as NCR, Gujarat, Maharashtra and Tamil Nadu.

Sivaramakrishnan (2014) dealing with trends in geographical research in India comments that studies in the field of regional development become more pronounced after introduction of the policy of liberalization, privatization and globalization post Rio Conference in 1992 on Environment and development.

Kaushik and Rai (2014) in their paper on food security in drought prone regions of India analysed the impact of drought on food security and find that there are regional and cross sectional differences in the availability and accessibility of food items (Singh, Singh and Jit, 2013). The regional variations are caused by agro-climatic differences and cross sectional variations are based on occupation, caste, class and gender. The study brought out regional variations in storage of food grains which are important strategy to cope with drought prone regions.

Misra (2014) in his paper on mega spaces of twenty first century, a comparative study of India and China indicates that Indian economy is growing at the rate of 8-9 per cent per annum. The growth is, however, inequitably distributed both interpersonally and inter regionally. It is stated that Multidimensional Poverty Index (MPI) is more broad based than Human Poverty Index (HPI). Based on MPI, more acute poverty is found in India than in many African countries combined. Among the poor states are: Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and West Bengal. Within a state, 81 per cent of people are poor in Bihar as per MPI. Uttar Pradesh is the home of the largest number of poor people. In fact 21 per cent of the India’s poor live in Uttar Pradesh. While summarizing the emerging regional scenario in India, states like Gujarat and Maharashtra have consistently performed well ever since 1950-51. Gujarat has moved further up the ladder of development. States where agriculture predominates have slid downward. Even Punjab, which once used to be a forward state, has now joined the rank of the slow growing states. Apparently, there is something fundamentally wrong with development policy pursued in India. If Cities become the engines of growth, the villages will turn into cesspools of poverty; and if secondary and tertiary sectors get priority in development policies, chances of agricultural diversification and transformation recede. A society marked with mal-distribution of life support systems among peoples and regions is more often than not a violent society.
Kumar and Sen (2014) highlighted the role of road transport in regional development. They found in their case study of Gaya district in Bihar, that there is a positive relation between road transport and regional development. Region with good transport connectivity and accessibility has high potential for development. Road transport provides a number of opportunities for development as it opens development process through connectivity and opening up the backward regions to trade and investment.

Focusing on Trans-Yamuna region of Allahabad district, the significance of micro-level planning was highlighted. Micro level findings paves the way for better utilization and management of human resources, development of agro-based industries and formulation of comprehensive micro-level plans to create more opportunities of employment in these areas, so that the work force may be qualitatively developed and utilized for the balanced socio-economic development of the area (Mishra and Mishra, 2015).

**Rural Development**

Sajjad (2012) attempted to analyse the gender sensitivity in the status of women workers, working conditions and health in the rural areas of Meerut district of Uttar Pradesh. It was concluded that relatively greater poverty and depressed castes made women workers more vulnerable to economic exploitation. The women workers households’ backwardness was reflected in low levels of housing facilities. There was lack of drainage, toilet and drinking water, electricity and kitchen facilities and the houses of women workers were characterised by dirt and filth with garbage pilfered everywhere. The shift from subsistence to a market economy has resulted in a dramatic negative impact on women workers.

Tiwari and Sharma (2012) have critically evaluated different rural development programmes launched by government of India during pre-independence and post independence period. Rural poverty in India is very much historical but now it has multiplied with the population explosion and unemployment situation. They concluded that development planning, especially at the grassroot level, can realize its full potentials only if the people are motivated and actively involved in an organized way. Participatory planning process is one by which individuals lowest in the organizational scale are enabled to have effective voice in decision making. Anti-poverty programmes cannot be expected to remove poverty by themselves on a sustainable basis, but it can only in the framework of an expanding economy and dynamic agricultural sector.

Rajeshwari (2012) studied the socio-spatial pattern of health and nutritional status of women in rural Haryana. She also studied the determinants of women’s nutrition in relation to socio-economic characteristics of the households. She explores a disquieting pattern of women’s nutrition and health in the state of Haryana which is economically developed. It was found that chronic energy deficiency (CED) malnutrition is high in all 16 sampled villages. Nutrition and health status vis-a-vis socio-economic characteristics however indicate that caste in itself is not a determining factor. At the
same time, it is also true that levels of CED malnutrition are relatively high among lower caste groups, which is largely due to the fact that majority of them are still landless labourers and hence this may be related to their poor economic status. However, the high level of CED women in other economic categories point to prevalent insensitivities towards their nutritional needs.

Reflecting on dynamics of the peri-urban interface, it was concluded that such unique areas are neither purely urban nor completely rural deserves a different approach for planning. It is necessary to go beyond the conventional ideas of urban or rural planning to bring about proper development of the peri-urban interface. The fringes must not be treated as dumping grounds of all urban wastes to make the lives of the residents miserable. The rural greens shall not be sacrificed for creating space for any displaced industry considered harmful for city life (Sarkar and Bandyopadhyay, 2013).

Analysing the existing regional distribution of rural male agricultural labourers and levels of socio economic development in West Bengal, it was found that there is wide geographical variation among the districts. It was observed that the high concentration of rural male agricultural labourers were found in central districts and the northern plain districts. The analysis further revealed that the high level of rural male agricultural workers with medium grade of socio-economic development was found in the central districts. It was revealed that number of middle schools per lakh of population, number of colleges per lakh of population, percentage of net sown to total reporting area, percentage of total workers in agricultural labour, percentage of workers in other works, number of beds in hospitals per lakh of population and per capita income are the main determinants for regional variations of rural male agricultural labourers (Mustaquim and Khan, 2013).

Nayak (2014), using a set of 13 indicators surveyed in five villages of Dharwad district, reflected on measure of poverty and concluded that the quantification of poverty and deprivation of households require multidimensional approach. He mentions that successive national governments in India have developed and modified methodologies to identify the poor and to extend them various facilities under such schemes like Bhagya Jyoti, Ashraya Yojana, Niraml Yojana, MNREGA etc, but the methodologies to identify the poor have remained controversial. The scheme appears good on paper but their implementation leaves many loopholes and the planned benefits do not necessarily reach the poor. The Human Poverty Index (HPI) criteria are not suitable for measuring the poverty estimation as it failed to prove the real pattern of poverty. BPL is one of the important criteria to estimate poverty struck families.

Akhtar (2014) in his study of 100 households in four randomly selected villages in Bandipore district of Jammu & Kashmir highlights the food insecurity in rural areas. It was found that agriculture does not produce enough food for the population of the villages studied. It resulted in food shortage and malnutrition. It is suggested that the agriculture situation in the region can be improved and food security achieved through regular supply of food from outside. The non-agricultural activities need to be promoted in areas where land is unable to support people.
To understand the cultural landscape of Phek district, Nagaland, a study selecting 12 villages was done. It was found that security concerns led to settlement on hill top and side of slopes (fortified Naga villages). Wet point settlement might have emerged due to practice of wet paddy cultivation as rice being the staple food of the people. Horn house is a symbol and prestige for rich people. Phek district is a multi-dialect but a mono-religious district. There are churches in every village. Wrestling is a traditional sport (Lohe, 2015).

Conclusion

The concern of geographers for rural and regional development is evident in the published research work during 2012-15 period. Based on it following conclusions are drawn:

The economy of tribal areas is still based on survival compulsions. A very high proportion of population is living below poverty line particularly in central belt of India. There is a need to address the widening gap by policy makers.

Instead of normative solutions, there is a need for appropriate public action for development. Social consciousness and vibrant democratic organisations are required.

Caste still plays a very important role particularly for the vulnerability and exploitation of women workers. The shift from subsistence to a market economy, contrary to common belief, has dramatic negative impact on women workers in Meerut.

Rural poverty with historical roots has multiplied with population explosion and unemployment situation. Anti poverty programmes will yield in the framework of an expanding economy and dynamic agricultural sector.

The chronic energy deficiency malnutrition was found very high in women in villages of Haryana. The caste factor is not the determining factor for malnutrition in women. This invites a serious concern towards insensitivities and nutritional needs of women in rural areas.

Studies do not support the commonly accepted belief that rapid population growth neutralises the gains of development. Rather, it was found that net national product in India grew faster than population growth. The development in India is driven by development centric demand. Nevertheless, regional disparity widened. The investment in India by developed countries in industries that are responsible for increase in pollution indicated the need for attention of policy makers.

Use of rural land as dumping ground by urban centres was highlighted. The rural greens need not be sacrificed for creating space for displaced industries in the peri-urban locations.

The balanced development of the physical, mental and spiritual aspects was pointed. Economic growth must pave way to distributive justice, social harmony, economic equality and environmental quality.
The unevenness of growth centres must be avoided for balanced regional development. At the same time development must not disturb the natural balance that support life was the message from another research.

The spatially skewed development in India was considered as anarchic development. The industrial investments in select states such as Gujarat, Tamil Nadu and Maharashtra and around NCR reflect the concentration of development in few pockets.

A general lack of spatial perspective in our planners emerged where identification of backward areas were found to be criteria and indicator driven. The relative backwardness of districts was found missing. The core backward areas will qualify any criteria and hence need special attention.

The methodology for identifying the poor remained an important research issue. At the same time, a need was felt for micro-level planning to promote regional studies.

The transformation phase in India begins with formation of National Institution for Transforming India (NITI) Aayog on Jan 1, 2015 when Planning Commission after serving 64 years was replaced. It envisaged a renewed vigour and opportunities for research in the field of rural and regional development.

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Land Use and Agriculture

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Introduction

Land is the most significant among the natural resources of the country. Land use is mainly used for urban and rural activities. Main components of the rural land use, is the Agricultural land use. Land utilisation survey provides relevant information related to Agriculture that is the crops and crop land use patterns. The basic aim of the land use study is to know and record the distribution of land under various uses in different socio-economic and environmental conditions (Singh and Singh, 2013; Singh and Kumar, 2013a and 2013b).

Land Use Land Cover Change

Tripati and Kumar (2012) have studied land use and land cover dynamics in Takula block, Almora district (Uttarakhand) by using Landsat TM satellite (1990) Landsat ETM + (2005) images and found out that water bodies, crop land and built up area has increased over a period of 10 years, whereas the forest land and fallow land has decreased notably due to human intervention.

Kumar and Rajan (2014) have studied “Land use modelling changes in Godavari river basin: A comparison of two districts in Andhra Pradesh”. This work explored the use of agent based models. Agents are land owners, farmers, migrants and policy makers. The study was conducted between 1985 and 2005. The application of Agents Modelling reveals that the accuracy in land use change in major classes like agriculture, forest and urban areas is higher than in the other classes.

The analysis of Land use and Land cover changes in Dehradun, applying RS and GIS technologies, Srinagesh and Baktula (2014) brings out that the agricultural area has shrunk by 12 per cent, the area under high dense residential uses only increased by 1.2 per cent, while the medium dense residential uses has increased 7 per cent reducing the low density residential uses to 20 per cent. Forest land also has declined by 1.1 per cent.
Neelakantan and Jayadev (2013) analysed wet land changes in Kollam district of Kerala between 1974 and 2004 using a statistical technique namely Markovian conditional probability. This toll was successfully applied by the authors in predicting the changes like the wet lands in the district got reduced to half in three decades period.

Singh and Suresh (2013) studied the roll of wet lands in sustaining water supply in coastal wetland to the south of Chennai city. They identified the decline of wet lands in the study area because of the city sprawl and how the NGOs bring awareness among the public to safeguard wet lands to sustain the ground water resources of the city for drinking and different land uses.

Sujatha, Chendrayudu, Reddy and Veerannachari (2013) studied the landuse changes like cultivation of garden crops instead of traditional ones. The major change is with Mango cultivation for better crop and yield in Chittoor District of A.P., which has better market for mangoes. The market facility plays a major role in promoting fruit gardens in the study area. Setting up of pulp processing industries in the district will be an added advantage for growth and development of orchards particularly Mango gardens.

Chendrayudu et al. (2013) studied the roll of farmers perception about the land use change towards commercial cropping in Chittoor District of A.P., this reports a significant increase under commercial crops like Mango tree crop. He quotes that the changing perception of the farmers is due shortage or absence of labour, uncertainty of water for irrigation, lower market prices for the farm goods and unwarranted socio-economic changes in the house hold domain.

Akhil and Jayapal (2015) studied the land use made on the watershed region of Sreekandapuram river in Kannur district of Kerala, Watershed management is primarily concerned with planning the land use to suit the land scape. Identifying the land use change matrix from 1969 to 2013 for understanding the pattern in land use conversion is the main objective of the study.

Veerannachari, Chendrayudu and Madhumathi (2015) explored in their study the types of land uses like agriculture, industrial, residential, vegetation and other land use information and land evaluation that is assessment of land performance when used for a specific purpose, involving the extension and interpretation of surveys and studies of landforms, soil, vegetation, climate and other aspects of land in order to identify make a comparison of promising kinds of land use in terms of applicability to the objects of evolution (FAO, 1976) in Kurnool district.

Rao and Bhaskara (2015) worked on “Land Evaluation and Land use change in Garladinne mandal of Ananthapur District of A.P.” Land evaluation was carried taking characteristics like Relief, Slope, Landforms, Soils and Erosion Susceptibility. Land capability was detected by using the above (parameters) evaluation and classified into several classes suitable for different crops. The major change in land use is noticed along the new ayacut areas of North and South Mid Pennar Canals by about 3400 hectares.
Arulmani, Manonmani and Valarmathi (2015) in their study brought out the significant land use change between 1990 and 2014. The Melur Taluk of Madurai district of Tamil Nadu flourished with significant agriculture a decade back along with dense scrub, open scrub and water bodies. During the decade of the study lot of change in Land use and Land cover in lower Vaippar sub basin occurred that is conversion of potential agricultural lands to barren land, built-up land, salt pan land, salt affected area, damaging the living standards of the local people. The investigation reveals that the area is presently suffering with high level, unwarranted, illegal, very dangerous mining and quarrying activities which should be paid an immediate attention.

Reshma, Sheheersha and Saravanabhavan (2015) stated that the land use is dynamic in nature and also it is constantly changing its status in various dimensions over a period of time. The study of land use in its spatial context is essential to understand the area of optimum land use and degraded areas. The comprehensive study of land use is of immense value to ensure better returns from the land to meet future requirements of food and industrial raw materials and for successful planning to find out land use and land cover pattern of the Thrissur district for the year 2014.

**Cropping Pattern**

Kumar et. al., (2013) have studied “Agricultural production trends and cropping patterns in Uttar Pradesh”; findings reveal that during the period form 1950-51 to 2011-2012, production of wheat has increased and production of pulses show a negative trend, during the entire period.

Chandramohan and Vijaya (2015) focused in their study on the variation of agricultural land vegetation growth based on the climatic factors like temperature, humidity and rainfall in Sivumalai and Waguthumalai valley region in Tamil Nadu.

Geethanjali (2015) made a temporal study of change in cropping pattern considering 2011 data, selecting nine crops namely Cholam, Paddy, Pulses, Fruits and Vegetables, Cotton, Groundnut, Coconut, Gingely and Sugarcane to analyse the spatial changes in cropping pattern and crop combination in Dindigal district of Tamil Nadu state.

Anbalagan, Yuvaraj, Bhanukumar and Swaminathan (2015) worked on cropping characteristics. The findings of the study provide the changing nature of cropping characteristics on a large level due to various reasons such as physical and anthropological influences over the last few decades.

Khanna, Emayavaramban and Kannadasan (2015) analysed the crop combination and diversification in Paramavathivelur block of Namkkal district of Tamil nadu. The Bhatia’s method is used to study the concentration of selected crops and Gibbs – Martin’s diversification. The analysis shows that approximately 75 per cent of the cropped areas are diversified for other reasons.

Scaria and Vijayam (2015) conducted a micro level study to understand the changing cropping pattern and its impact on paddy fields and its response on groundwater recharge.
and water quality in Karrimpuzha watershed, situated on the north western parts of Palakkad district in Kerala state. The findings show that during 1973-74 the paddy growing area under this watershed was 53 per cent, by 1990-91 it declined to 18 per cent and by 2013-14 it further decreased to 12 per cent. Within this time span, there is a considerable variation in the cropping pattern of paddy fields and are transformed into different land use systems like combination of cash crops and urbanisation. The present analysis reveals that paddy land conversion alone contributed to 70 per cent of reduction in the groundwater recharge and water quality around the locality of paddy fields due to the depletion of the water table.

Veerannachari and Chendrayudu (2014) studied the land utilisation and the spatial distribution of all crops in the Kurnool district of A.P. and mentioned the sources of irrigation also suggested to adopt latest irrigation and mechanisation techniques to improve land utilization to the present needs. Also the study suggested to go for plantation crops and afforestation at the places of water scarcity to maintain ecological balance.

Saha (2013) felt that crop diversification, during last 20 years has been providing large-scale boost to Indian agricultural economy in terms of income, employment and security. Obtaining required secondary data on area under crops this paper attempts to explore levels and trends of crop diversification and identify major emerging crops. Results show that high crop diversification has taken place in western and south-western states, whereas crop specialization has occurred in the state of West Bengal, Assam, Manipur, Mizoram etc. Among the highly diversified states, oil seeds, pulses, rice fruits and vegetables have come out as “emerging crops” (in terms of cropped area). Crop diversification continues over the time period associating the most of the states. Though food crop dependency persists strongly in the study area, horticulture and commercial crops are emerging significantly to bring in economic development of the area.

Raju (2012) attempted to analyse the crop concentration and diversification regions (at mandal level) in Vijayanagaram district. The secondary data is collected and used S.S. Bhatia’s index of concentration for all mandals for major crops like Paddy, Groundnut, Sugarcane, Mesta, Black gram, Green gram, House gram, Sesamum and Maize. Crop diversification indices have been computed for all mandals with the help of Gibbs and Martin index of diversification.

Sandhu and Kaushik (2014) revealed that over the last 20 years, major changes in cropping pattern, crop combination and land use in Bibipur villages of Yamuna Nagar district. Due to expansion of Ply board industries in the region, the area under wheat and rice has been replaced by new crop named Poplar (tree). The crop combination of the village i.e., Sugarcane-Wheat-Rice in 1990-92 has been replaced by Sugarcane-Wheat-Poplar in 2010-12. Increasing cropping intensity has experienced a change in accordance with the waterlogged area. The intensive cropping with a change in crop combination has reduced the soil fertility with low Organic carbon, Phosphorus, Sulphur and Potash contents.
**Land Suitability and Agriculture Production**

The study by Abhay (2015) on “Land degradation and its impact on Agricultural production in Kendujhar plateau of Odisha”, explores the impacts on agricultural production and resultant benefits caused by in land degradation process. Land degradation is positively related with susceptibility and negatively with resilience and also worked out levels of land susceptibility to degradation and levels of land’s resilience.

Prasad and Ghosh (2013) identified the study area as a rural backward area. The land users are illiterates and have no practical knowledge about the land capability of the area. Hence followed the haphazard, unscientific land use practises irrespective of the susceptibility of the land results in either over utilisation and consequent land degradation or under utilization of existing resource base. The ultimate result is lowering of the carrying capacity of land. Therefore the need for land capability assessment in the study area. The authors analysed the methods of land capability assessment and classified the land in to capability classes. Based on physical and socio-economic land attributes the study area has been classified to 7 land capability classes shows which class is useful to particular land use to increase the productivity and maintain the land susceptibility on long term basis in the south west Birbhum District.

Kumar, Masilamani and Nagarathinam (2015) studied Land suitability following the land suitability index, land capability by considering Rainfall, Slope, Soil Texture and applied to study Land use/Land cover changes and their Variations.

**Agriculture Typology**

The article on “Influence of Agricultural practices on Soil Health and Human Health” authored by Babu, Mohan, Reddy and Paramesh (2013) envisages that how soil health and human health are related. The interesting observation is that food produced today contains less minerals and nutrients because of depletion of soil fertility thereby causing damage to human health.

Manimaran (2015) in his investigation states that around the world, agricultural practices have developed as a function of Topography, soil type, crop type, annual rainfall and tradition. Remotely sensed images can be used to identify nutrient deficiencies, plant diseases, water deficiency or surplus, weed infestations, insect damage, hail damage, wind damage, herbicide damage and plant populations. Study also explains that information from remote sensing can be used as a base maps invariable rate of application of fertilisers and pesticides so that formers could treat only affected areas of the field.

Chendrayudu, Mamatha, Veerannachari, and Reddy (2015) studied the Agricultural Typology for food security in Rayalaseema Region. The work identifies agricultural types at agricultural holding level and find out differences from one holding to another, finds the week links in agricultural among the farmers, suggested ways and means to minimise disparities and develop agricultural and achieve food security through the advantages of agricultural typology.
Masilamani, Rahman, Durga and Aruchamy (2015) studied the Koraiyar Watershed in the South Western part of Coimbatore District of Tamil Nadu and determined the suitability of agricultural land use by evaluating the climate, soil and topographical, environmental component and understanding of local biophysical restraints. Collected many variables, each one should be weighed according to their relative importance on the optimum growth conditions for crops through weighted overlay process in GIS. This resulted in 63 per cent area is highly suitable, 34 per cent is moderately, 30 per cent is marginally and 21 per cent is not suitable for groundnut cultivation. In all majority of the area is moderately suitable for groundnut cultivation.

Chendrayudu, Mamatha, Reddy and Veerannachari worked out on Agricultural Typology at Micro Regional scale in Rayalaseema region employing the method and techniques of the typology of world agriculture as suggested by the IGU commission on Agricultural Typology (Kostrowieki). Brought out most interesting research in the field of agricultural geography which focuses on the systematic classification of agriculture by grounding the inter-related and inter-connected attributes of agriculture for its modernisation using the most recent methodological tools namely agricultural typology.

**Agriculture Development**

Dutta (2012) assessed the agricultural efficiency and productivity in Hugli district of West Bengal and said that India has been facing two most vital problems which are directly related to agriculture, the first one is to meet the swelling demand for food and other agricultural products and the second is enervating the wide spread poverty in rural areas by the ever increasing population.

Tallali and Nagaraj (2015) in their study of Koppal district of Karnataka state brought out, how the regional disparity levels will influence the Agricultural Development positively and negatively.

Maniyosai and Suvetha (2015) studied the diminishing mental attitude of agriculturalists as on date in this occupation and also in future with prevailing vagaries of monsoons, posing threat to agriculture and related activities. The youth is not interested in this occupation hence became a neglected one because of the natural and humanly disadvantages and dis-encouragement. To solve the problem the study suggests to provide financial assistance for investment, quality inputs and technology, reasonable wages to the agricultural labourer, assured irrigation facilities, crop insurance, reasonable rates to the crop yield. If provided the youngsters will come back to agricultural profession leaving behind the sub-standard, temporary under employment from the towns and cities to the newly formed Kannur district of Tamil Nadu.

Amarjothi and Thamilarsi (2015) reviews the generation and adoption of the new technology in agricultural sector. The post-green revolution period has experienced sustainable technological transformation to meet the needs of ever growing population. The study reveals the various types of new technologies and how to adapt them, what are the steps followed to bring up the agricultural development.
Nayak (2012) to analyse in food sufficiency, deficiency and severity of 29 districts of Karnataka. 13 components of food availability, stability and accessibility have been considered. The food security regions have been identified with the help of food balance sheet and Z score technique for the year 1997-98 and 2007-08 data. Standard deviation and Co-efficient of Variation applied for grouping data and to know the variability among the variables. Most of the districts in Southern Karnataka showed food sufficiency and high level of food security because of the existence of water resources. It is observed that in middle and North Karnataka the food security levels reduced because of the diminishing levels of different variables selected for the study.

Bharambe and Bhole (2013) analysed arable land resources in association with the spatial characteristics of the selected Tehsils having varied quality of percapita of arable land. The study shows that the distribution of arable land (cultivated land) is uneven and indicates marked changes during 1961-2001. The Jalgaon district accounts for 80.52 per cent of total geographical area under arable land. But the Taluks of Southern part have higher per cent than the Northern part.

Suresh and Hurakadli (2012) studied the significant disparities in the levels of agriculture development in the Malaprabha command area. These disparity levels existed in all Taluks in the study area over two time periods i.e., 2001 and 2011. They also studied in depth, the problems of the dimensions of the development and typology of backwardness.

Britto and Singaram (2015) compared the Land use pattern in India and Tamil Nadu by analysing the agricultural activities of both the areas. Indian agriculture is now undergone technical transformation for ensuring food security, export earnings and decentralised development to reduce rural poverty owing to the severe population pressure on the natural resource base of land, water, bio-diversity and other resources to meet its growing food and development demands (Wani et al., 2009). The comparison of growth rate and ratio of horticulture area increased significantly against net area sown in India as well as Tamil Nadu. In a critical evaluation India has more net area sown and Tamil Nadu has horticulture more than India.

Nithya and Rose (2015) studied agricultural drought vulnerability using remote sensing images, numerous indices were developed to describe the state of the land surface, mainly vegetation, with the potential to detect and monitor anomalies such as droughts. The result of the indices is compared with the Land use/Land cover data derived from remotely sensed images acquired for selected years under study (2000, 2005, 2009). The techniques like Normalised Difference Vegetation Index (NDVI), Normalised Difference Water Index (NDWI), Normalised Difference Moisture Index (NDMI) are used to assess the agricultural drought vulnerability on Tiruchuli Taluk in Virudhunagar district of Tamil Nadu.

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Geography of Himalaya

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Introduction

Geography of the Himalaya is inimitable. The lofty and snow-clad mountain peaks, alpine pastures, picturesque landscapes of mid-altitudes, perennial rivers, dense coniferous forests and the river valleys make the Himalaya distinct from the other parts of the world. Its world famous highland sacred places – pilgrimages and various tourists’ destinations have further enhanced its significance. Being as an underdeveloped and remote region for the centuries; the Himalaya is largely unexplored and is very little known. Similarly, geographical writings on the Himalaya are unobtainable. Yes, of course, it gives me an immense pleasure to review the Geography of Himalaya whereas; it seems very incomprehensible because of the limited access to literature. In this article, the physical and cultural aspects of the Himalayan geography are illustrated in detailed.

The term ‘Himalaya’ is derived from the Sanskrit word which denotes the abode of snow. The Hindus believe it as the symbol of divinity, an abode of the Lord Shiva. Being as a source of the pious river Ganga and a land of the world famous highlands and valleys pilgrimages to Hindus, the Himalaya has tremendous cultural significance. It has also natural, economic and geo-strategic importance. It is inevitable to present here the major characteristics of the Himalaya. Its panoramic landscape makes it as the world famous tourism destination. Nonetheless, it protects India, in security point of view, from its two neighbouring states viz. Pakistan from the northwest and China from the north and northeast; regulate the climatic conditions of the Ganges Valley and the Central India and supports livelihoods for over 50 percent of the total population of India. The Himalaya also protects the mainland of India from the severe cold waves that origin from the Tibetan plateau.

Scholars from worldwide have conducted studies on the various aspects of the Himalaya such as orogeny, geography, geology, land, people, occupations, farming
systems, culture, tourism and human races. Most of the studies were carried out on the bases of its horizontal and vertical dimensions. As the Himalaya is divided into four horizontal divisions viz. the Western Himalaya, comprises of Jammu and Kashmir Himalaya, Himachal and Uttarakhand Himalayas; the Central Himalaya includes Nepal Himalaya; the Eastern Himalaya, consists of Sikkim and Arunachal Himalayas and the eastern extension of the Himalaya comprises of Nagaland, Manipur, Mizoram, Tripura, Meghalaya and the hills of West Bengal and Assam; the scholars of different disciplines working in the Himalaya have conducted studies on particular aspect or on particular region. The whole Himalayan region from west to east has numerous universities and educational institutions and some substantial research have been produced by the scholars working in these universities and in the higher learning centres.

The main purpose of this study is to review the work, carried out on the Himalaya, particularly on biogeography and biodiversity, climate change, environment, food security, agriculture, socio-economic and cultural development during 2012-2016.

**Development of Geographical Studies in the Himalaya: A Review**

In this paper, literature is reviewed on the various aspects of the Himalayan Geography and the review period is from 2012 to 2016.

**Biogeography and Biodiversity**

The Himalaya is the home of many cultivars/races and a hotspot of global biodiversity. It is a repository of faunal and floral resources. Distribution pattern of these floral and faunal species is determined by the climatic conditions, as the whole Himalaya obtains subtropical to temperate, cold, alpine and frigid cold climates. Lots of work has been carried out by the academicians and scientists on ecology, ecosystems and biodiversity of the Himalayan region. Further, a study on distribution on flora and fauna and climate change impacts on them has also been carried out by these scientists. Meanwhile, the role of geographers in studies of biogeography in the Himalayan region is limited. During the recent years, a limited work on Himalayan biogeography was conducted by forests scientists. Tree line dynamics in northwestern Indian Himalaya (Negi, 2012), timberline ecotone in the Himalayan region (Peili et al., 2012), changes in floral species (Singh et al., 2014), managing ecosystem services for enhancing climate change adaptation (Nakul, 2014), ethno-medicinal plants and use pattern in the Garo hills (Singh et al., 2014), geographical extension of Lycophyta and Fern in the Eastern Himalaya (Singh et al., 2014), monitoring ecosystem boundaries in the Himalaya (Rawat, 2012), glimpses of forestry research in the Indian Himalayan Region (Negi and Dhyani, 2012), soil-vegetation ecosystems (Sharma, 2013) and valuation of forest ecosystem services (Negi, 2013) are amongst the major significant works carried out on the Himalaya. Forest diversity, use pattern and management (Sati, 2014) and altitudinal zonation of floral biodiversity and conservation pattern in the eastern extension of the Himalaya (Sati, 2015) are the other major contributions to biogeography of the Himalayan region.
Environment and Climate Change Issues

Environmental Geography of the Himalaya is burning, very comprehensive and a centre of discourses amongst the all stakeholders, mainly environmentalists worldwide. The whole Himalayan region is ecologically fragile, geologically sensitive and seismically and tectonically active (Sati, 2014). The global changes on the landscape and on the atmosphere of the Himalaya can be noticed everywhere. The Himalaya is more sensitive to environmental pollutions – water, air, soil and noise. Tourism activity and increase in infrastructural facilities have accentuated environmental degradation. High growth in population, shrinking agricultural land, depletion of biodiversity resources and increasing number of vehicles has altogether enhanced environmental degradation. These drivers have also influenced the climate regime as climate change has become the major issue and phenomenon in the Himalaya. The whole Himalaya is so sensitive and highly vulnerable to climate change (Singh and Mal, 2014). Further, climate change implications on the whole landscape in general and fauna, flora and on the Himalayan glaciers in particular has become an emerging concern particularly after IPCC (2007) report which says the climate change impact on the Himalayan glaciers is higher than the other parts of the world. It further says that the Himalayan glaciers are melting so rapidly (Thakur and Singh, 2014).

In the Himalayan region, many governmental and non-governmental organizations are dealing with the issues of changing environment. Surface ozone concentration and its behavior with aerosols in the northwestern Himalaya (Sharma et al., 2013), black carbon concentration and its apportionment in particular matter in Mohal Kullu (Sharma et al., 2013), distribution of source particulate matter in Kullu valley (Sharma et al., 2013), ambient air pollution and its sources in the semi-rural sites in the northwestern Himalaya (Chand et al., 2013), reviving dying springs: climate change adaptation experiments from the Sikkim Himalaya (Sandeep et al., 2012), hydro-geological studies and action research for recharge and development of hill top lake restoration in Sikkim (Mahamuni and Kulkarni, 2011), local perception of climate change in the Himalaya (Chaudhary and Bawa, 2011). Consistency of local perceptions of climate change in the Kangchenjunga Himalaya landscape (Chaudhary et al., 2011), climate change accelerating hydrological hazards and risks in Himalaya (Rawat et al., 2011), rapid cost effective and high resolution assessment of climate related vulnerability of rural communities in Sikkim Himalaya (Tambe et al., 2011), global warming, glacial lakes and cloudburst in Garhwal-Kumaon Himalaya (Pranab, 2015), Himalayan tsunami: cloudburst, flash flood and death toll (Pranab, 2013), impact of climate change on Himalayan glaciers and glacial lakes (Bajracharya, 2014) and black carbon measurements during winters in an environmental observatory at Mohal-Kullu in the northwestern Indian Himalaya (2013) are amongst the major contributions in the field of environment and climate change during the recent period. The present author also published substantial research on climate change impact on agriculture (2015), socio-economy (2015) and food security (2015).
Food Security, Agriculture and Development

Food security, agriculture and development are the major issues of discussion in the whole Himalayan region. The reason of this is that agriculture is the main base of income and economy. Meanwhile, mode of practicing agriculture is traditional and output from it is less (Anand, Chandan and Singh, 2012; Mahoa, Singh and Heitala, 2012). Although, the natural resources availability is abundant in the Himalayan region yet, these resources are widely unused (Singh and Heitala, 2014). Thus, the Himalaya is called ‘a rich land of the poor people’ (Sati and Kumar, 2004). Climate change has a greater impact on rural livelihoods and it has been found during the recent past that dependency on traditional agriculture is decreasing. The Himalayan region has several limitations in developing land resources. The main drivers of these limitations are terrain, slope and climate. These issues were raised from time to time and addressed by the scientists, working in the Himalayan region. During the recent past, geographers carried out several studies on the agricultural practices in the Himalaya. A study on rural livelihoods in Eastern Himalaya (Umdor, 2013), ecology and agriculture in the Himalayan region (Hanafi, 2012), livelihood security in northwestern Himalaya (Singh and Hietala, 2014), development in hill states (Planning Commission, 2013), towards sustainable livelihoods and ecosystems in mountain regions (Sati, 2014) and adaptation options to improve food security in a changing climate in the Hindu Kush Himalayan region (Nischalke, 2015) are some of the major studies conducted by researchers. Similarly, studies on population, urbanization, migration and there implications were carried out (Sati, 2013; Bawa and Kadur, 2012).

Natural Hazards and Disasters

Natural hazards, both terrestrial and atmospheric, are very common phenomenon in the whole Himalayan region. In terrestrial hazards, earthquake is prominent as the Himalaya that lies in seismic zone 4th and 5th. There have been many severe earthquakes of above 8 magnitudes, occurred during the past. Atmospheric hazards include cloudburst triggered debris flow, flashfloods, mass movements and landslides. They can be noticed everywhere in the Himalayan region mainly during the monsoon season. During the recent past, their intensity and frequency has been increased. Since, the landscape vulnerability of the Himalaya is quite high thus; the impact of hazards is enormous. Further, anthropogenic activities have accentuated the magnitude of these hazards (Sati, 2014). Although, lots of studies on natural hazards and disasters in the Himalaya were carried out yet, I could review few of them. On landslide hazards, Chamling (2013) and Bhattacharya (2012) published papers related to the Eastern Himalayan part mainly in landslides of Darjeeling. The whole Himalayan region, vertically and horizontally, is vulnerable to weather induced disasters. There are many instances when the whole Himalaya or a part of it was affected by the natural hazards. One of the disastrous events was the Himalayan tsunami of June 2013 (Sati, 2013).
Education and Gender

Education and gender issues in the Himalaya have also remained pivotal in the domain of the academic discussion. The whole Himalayan region is economically underdeveloped and its economy is largely women centric as women participation in socio-economic development is considerably very high (Sati, 2014). Education is another issue as most of the people of remote mountainous regions are uneducated. Due to many hindrances mainly natural constraints made these regions inaccessible and thus, educational facilities are largely unavailable. These hindrances put lots of pressure mainly on the working women. Meanwhile, during the review period of this paper, I could review few works although, lots of work has been carried out. A review note on girls’ education in the Indian Himalaya (Jeffrey and Dyson, 2014) and practices of women’s right in Himalayan region (Kafle, 2012) are some works were done in the Himalayan region.

Glaciers and Water Resource

Water is abundant but at the meantime most unused resource in the Himalaya. Since, the rivers of the Himalaya are glacial fed, they are perennial in nature and feed a half population of the downstream regions (Mal and Singh, 2013). The three river systems – the Sind system, the Ganga system and the Brahmaputra system, are world largest river systems. In the academic fields, lots of work has been done by the researchers. The recent development in the field of water resource is also enormous. Estimating the variation in glacier area over the last 4 decades (Ghose et al., 2013), Himalayan glaciers: climate change, water resources and water security (National academic press Washington, 2012), impact of transient groundwater storage on the discharge of Himalayan Rivers (Andermann, 2012), hydrology: Himalayan groundwater (Bookhagen, 2012), signatures and evidences of Surging Glaciers in Karakoram Himalaya (Tangri et al., 2013), Deglaciation of the Satopanth and Bhagirath Kharak glaciers in Chamoli district (Singh, 2012), Himalayan glaciers, climate change, water resources and water security (National Research Council, 2012), impact of climate change on the hydrological regime of the Indus, Ganges and Brahmaputra river basins (Nepal et al., 2015) and modeling glacier change in the Everest region (Shea, 2015) are some of the recent works carried out by the hydrologists and climate scientists. Most of the above cited works are related to glaciers, water resource and climate change impact on them. In fact, the climate change impact on the Himalayan glaciers is a global issue as these glaciers are vulnerable to climate change and are in critical situation due to their melting (Singh, Schikoff and Mal, 2016; Mal and Singh, 2014).

Conclusion

Although, lots of studies have been conducted on the various aspects of the Himalaya yet, very few studies are reviewed here. It was largely due to limited access to literature and the review period is from 2012 onwards. This review paper reveals that there are some issues such as climate change, environmental conditions, food security, livelihoods and hazards and disasters are largely taken up for the scientific analysis by the climate
scientists and the environmentalists. It further states that lots of issues are required to be addressed on the Geography of Himalaya.

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Remote Sensing and GIS

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Introduction

Remote sensing has emerged as an important tool for the spatial and temporal analysis of the environmental factors of earth. The new wave of geographic technology has enormous potential for capacity building in the developing countries to map and monitor the health of the Earth (Singh, 2014). In present time; series of different remote sensing satellite from space agencies across the world (different countries along with India) made rapid growth in both the sensors and the platforms which has provided motivation for use of Remote Sensing and Geographical Information System (RS & GIS) in different aspect of environmental science and other areas (Srivastava et al., 2014). The high resolution of remote sensors has evolved to capture the fine details of the Earth surface features in remote sensing data (Rao et al., 2014). Satellite remote sensing images play an important role in environmental monitoring for different industries. There are a number of environmental variables, soil and surface variables, associated with mineral activities that are to some extent detectable easily with satellite earth observation data. Remote sensing and GIS can play an important role in assessment of the activities occurring on earth surface; enhance the understanding about the environmental problems and management for the better future. During the period of 2012 to 2015 there are number of studies conducted which have enhanced the understanding and logical thinking towards the environmental problems.

Nath (2014), highlighted the basic and advances of remote sensing and GIS in book entitled “an introduction of remote sensing”. He has covered the different aspects of the use of remote sensing processes in disaster response, land cover, geological structure, and dynamic earth systems.

Urban and Regional Planning

History of urban growth and urbanization reveals that urban areas belong to the most dynamic land cover types on earth. The population living in urban area is increasing
in Indian cities and other developing counties too. Urbanization is a process, which is manifested in the growth of population living in towns and cities. This process is interlinked with the economic advancement and involves the multiplication of points of population concentration as well as increased in the size of individual urban concentration (Sharma and Sharma, 2012). The urban growth towards fringe areas have considerable impact (Singh, 2012) on the environment, natural resources (Sharma and Saikia, 2012), land use/cover (Vaidaya and Nannaware, 2013; Gupta, 2012; Srinagesh and Baktula, 2015), water, wetlands (Nagabhatla et al., 2012), land cover, vegetation cover at large (Sharma and Jalan, 2015). The population of the urban area is rapidly increasing, forcing change in housing transport, water supply, health, power supply education etc. So it is necessary to map and analyze the land use and land cover of urbanization and its surrounding and offer ways and solve the emergent problems while at the same time create option for future development. Remote sensing and GIS are most efficient technologies for identification of any change on surface of earth. Lallianthanga and Sailo, (2013) have analyzed the site suitability of the Champhai town of Mizoram. Kumar and Shaikh (2013) illustrated the use of Geographic Information System (GIS) and multi-criteria evaluation technique for selection of suitable sites for urban development in Mussouri municipal area. Toposheet and IKONOS satellite data have been used to generate various thematic layers using ArcGIS software, five parameters, i.e. slope; road proximity, land use/land cover, land values and geological formation have been used for site suitability analysis land evaluation. Sharma and Joshi (2013) analysed the process and pattern of urbanization in Delhi from 1998 to 2011 in both quantitative and qualitative domains. This study quantified the urban expansion of Delhi from 1998-2011 by using the urban landscape analysis tool from Landsat TM/ETM satellite data. The study shows strong positive trends for urban built-up, suburban built-up, urbanized open land and strong negative one for rural open land through trend analysis for various urbanized area and urban footprint.

Mozumder, et al. (2013) examined the air pollution from Remote Sensing data acquired from IRS P6 LISS IV and Landsat ETM+ images to develop regression based models with Air Pollution Index (API), which have been calculated from in-situ air pollutant information. The study reveals that multivariate regression models are more promising and yielded better results for both the cases of IRS and Landsat and also described a methodology to obtain air pollution from images directly.

Urban areas have developed a distinct microclimate and elevated temperature due to their unique environment, climate, anthropogenic activities and land use land cover change. Thermal remote sensing data is being used widely to analyze the thermal character of urban areas (Singh and Grover, 2014). Kumar et al., (2012) have analyzed the impact of urban growth on surface temperature in Mumbai city and research found that the urban development between 1999- 2011 gave rise to an average of 0.8°C in surface radiant temperature and showed a tendency of decline as the distance increasing while going away from a major road. Singh and Nath (2012) have calculated the Urban Heat Island (UHI) in Kolkata city and categorized the different UHI risk potential zones based on correlation. Study found that 45 per cent area (Chitpur, Bagbazar, Kasba,
Ultadanga) of Kolkata city come under the low UHI risk potential zones, 30 per cent area (Entally, Beleghata, E.M.P by pass, Hasting) under the moderate UHI risk potential zone and only 25 per cent comes in the category of high UHI risk potential zone and these area are Jadavpur, Behala, Taratola, Topsia, Park circus and Bhowanipore.

Singh et al. (2014) have done a study on seasonal variation of surface temperature in Delhi and identified that Delhi has significant diversity in the temporal and spatial pattern of distribution of temperature. The difference between maximum and minimum temperature for the sandy areas and agricultural land is the highest for all seasons largely corresponding to the peripheral areas of Delhi. North-south and west-east temperature gradient demonstrate that the core Delhi has a much lower temperature than its periphery and thus the here is the weak Urban Heat Island (UHI) phenomenon. The presence of ridge and Perennial River flowing across the middle of the city has a significant influence in weakening the creation of prominent heat islands. Grover and Singh (2015) in their comparative study on relation between NDVI and Urban Heat Islands (UHI) of two megacities (Delhi and Mumbai) of India found that in Mumbai absence of the tree cover along with other factors has led to increased land surface temperature and Urban Heat Island phenomena but Delhi has a larger green cover area so the Urban heat island is diminished. They found the strong negative correlation between NDVI and Urban Heat Island (UHI) of the Mumbai.

Amin et al. (2014) assessed the effects of the land transformation on lake water quality and result revealed that significant land use changes have been occurred during the 3 decades (1981-2011). Along with this due to different land use classes, this has been resulted into lake water pollution by addition of various nutrients/pollution discharges from local community of Hanjis near Dal Lake. Study averred that lake area has reduced considerably and is rapidly shrinking due to illegal expansion of Hanjis localities, siltation, weed invasion, discharge of domestic sewage, surface runoff carrying pesticides and other chemicals used in agricultural activities by this community. The overall impact of these activities has resulted in the reduction of lake capacity, deterioration of lake water quality, and loss of aesthetic value of Dal Lake.

Shekher and Diddee, (2015) have captured the transformation of Balewadi village of Pune from rural to urban through the topographical maps and the satellite images for visual understanding and found that the whole process of the urbanization in the Belawadi village gone through four stages; first is the initial stage from 1980-1995, second stage is 1995- 2000, third stage is 2000-2005 and fourth stage is final stage. This study tried to explain the process that lead to spatial and temporal changes that happen in an urban fringe. Kuchay and Bhat (2014) examined the impact of urban expansion in Srinagar (Himalayan urban area). They found that city has been growing at an alarming pace and urbanization in the city has taken place either in ribbon sprawl, in a linear direction along the highway and other transport corridors of the city or in the form of leapfrog, occupying certain suitable patches as per the accessibility and proximity. This urbanization had led to different environmental problems like fragmentation and loss of productive agricultural and horticultural land, encroachment of the wetland (Dal, Anchar, Hokrasar, Narkara etc) and human wildlife conflict in Zabarwan hills and
Dachigam catchment area. Mishra and Balaji, (2015) have brought out the study of the land use and land cover changes along the shore line of the coastal region of Gujarat. This study has been found that the spatial extent of the aquaculture, barren land, urban built-up have appreciated over time. Whereas the coverage of mudflats has depreciated due to rapid urbanization and significant changes are found in the form of shoreline erosion in the three districts (Surat, Navasari and Valsad) of Gujarat. Chaturvedi et al., (2014) evaluated the nuclear power plant site in Rajasthan with the help of Satellite and geospatial data set.

**Land Use/Land Cover, Land Resource Degradation and Management**

Land use and land cover pattern of a region gives information about the natural and socio-economics factors, human livelihood and development (Rokde et al., 2015). Both Land degradation and deforestation are complex problem in India; these are dependent upon the anthropogenic and natural factors. Land degradation is the function of the susceptibility and resilience; and measures of the vulnerability of a landscape to land degradation (Singh and Kumar, 2012a; Singh and Kumar, 2012b). Land degradation is positively related with susceptibility and negatively related with the resilience (Abhay, 2015).

Priya and Pani (2015) have done a study about relationship between land degradation, deforestation and rainfall. They found that there is a direct impact of deforestation on land degradation and cause effect relationship between rainfall and land degradation. Most significantly this study has investigated the relationship among area without forest cover and population density and the analysis suggested that degradation of the land increased with the decrease of forest cover land and increased population density. Saini et al., (2015) have used the GIS based Multi Criteria Evaluation Approach, Analytical Hierarchy Process, Matrix analysis for understanding the soil erosion problem in Himalayan region. This study demonstrates that geo-spatial techniques are indeed valuable tools in assessment and mapping of areas vulnerable to soil erosion hazard. Research revealed that about 8 per cent of total area of watershed is found under severe risk of erosion. Around 60 per cent of watershed lies in high to very high risk of erosion and 33 per cent of area shows slight to moderate risk of soil erosion.

Singh and Talwar (2015) examined the change vector analysis as the change detection techniques for extracting and identifying land cover change information from satellite imagery data set. In this paper different threshold techniques such as empirical strategies manual trial, error procedures and Double Window Flexible Pace Search (DWFPS), have been implemented to evaluate a method for change vector analysis which could more effectively distinguish the change pixels and no change pixels on snow cover area. The experimental result of research showed that a semiautomatic Double Window Flexible Pace Search (DWFPS) has greater potential than trial and error and empirical procedure to determine the specific threshold value for change vector analysis techniques that minimize the overall change detection error probability and maximize the overall accuracy.
Rahman et al. (2012) have done a study about the land use and land cover in North-West Delhi, and study revealed that total urban area in NW district was 1374.24 ha (3.09 per cent) in 1972 which increased to 12631.23 ha (28.40 per cent) in 2003. This shows there is a lot of land use/land cover change in the NW part of Delhi. The study further shows that 27.35 per cent of the fertile agricultural land has been transformed to other land use classes including urban built-up during 1972 to 2003. The highest land use/land cover change is observed in the southern part of the district which is mainly due to its proximity to the south central part of the Delhi.

Remote Sensing and GIS are extensively used tools in prioritizing watershed for conservation and development by studying factors responsible for planning and development (Varade et al., 2013). Singh and Kumar (2012) used the Remote Sensing and GIS for generating a sustainable development plan suited to the terrain and the productive potential for the Ganga plain (Son-Karamnasa interfluve). Shanwad et al., (2012) carried out a study of land use and land cover in Karnataka watershed Development Project Karalahallihalla sub watershed in Sindagi Taluk of Bijapur district of Northern Karnataka and they have found that the results revealed that there has been no major shift in cropping patterns over a period of 7 years (1997–2004). However, Rabi cropped area has decreased drastically (187 ha), which might be due to the continuous droughts that occurred during the implementation period. On the other hand, Kharif and double cropped area have increased marginally (103 ha and 96 ha, respectively). Increase in double cropped area showed that there is increase in irrigated land, which were earlier being used as rain-fed and wastelands turned in to cultivated lands as seen in scrub lands and Rabi cropped areas of the sub watershed.

Rawal et al. (2014) have traced that the land use and land cover pattern of any region is an outcome of various physio-cultural factors and their utilization by the human in time and space. Researchers tried to understand the interaction of human activities with the environment in Kail watershed region of Himalaya. He also suggested the importance of change detection techniques in changing environment. Patel, et al., (2012) in their study focused on the identification of suitable sites for positioning of water harvesting structure such as check dams in Varekhadi watershed, based on Geo-visualization concept with watershed prioritization using morphometric analysis.

Behera, et al. (2012) studied the wetlands of Samaspur, Uttar Pradesh to analyse the land use change with help of satellite remote sensing. Any change in the wetland ecosystem leads to the change in the socio-economic and ecosystem changes. This study has been done by using LANDSAT and RESOURCESAT-1 temporal data, examine the dynamics of wetland by classifying data into Normalized Difference Water Index (NDWI) and Normalized Difference Vegetation Index (NDVI). The index based classification gives best result about the land use change in the wetland area. The study extract that effects of land use change on wetland ecosystems can be observed through the process of wetland monitoring which help in the wetland conservation and management.
Singh and Kumar (2013) used the geo-informatics for analysing the land use planning for sustainable development in dry part of the middle Ganga Plain (Son- Karamnasa interfluve). Study reflected Son-Karamnasa interfluve has the rich potential for land resources development. There exist 75 per cent of the lands that can be used either for agricultural or horticulture, or both use to increase the productivity of the land in a sustainable manner and would reduce the wasteland from 24 per cent to the 0.6 per cent. Study also revealed that about the 66 per cent in the double crop area, 7.7 per cent in the agro-horticulture, 0.4 to 3 per cent in the horticulture and 7 to 16 per cent in the forest cover could be increased in different sites of the watershed region of the Son-Karamnasa interfluve.

**Disaster Monitoring and Mitigation**

Earthquake creates the negative impact on the liquefaction of soil. The local and geological soil conditions have a great influences on the amplification of earthquake ground motion which may result in the serious seismic liquefaction hazard which is site specific (Reshma and Deepanker, 2015). They presented the liquefaction hazard zonation and contour maps for Mumbai city using open source of GIS and Quantum GIS.

Singh et al., (2012) tried to find out the reactivation of Loriya fault and its impact on the Kachchh main land fault by analysing the satellite imagery (LISS-III images) of pre and post 2001 Bhuj earthquake. This has been explored by geomorphic and co-seismic changes and geophysical signatures with the help of digital imagery, ground checks, magnetic and gravity survey respectively. The study exhibits that a segment of the Kachchh mainland fault between the Kharoi transverse fault in the east and Loriya transverse fault in the west reactivated due to 2001 earthquake.

Narayana and Hanjahi (2015) have analyzed the urban suitability analysis of Bangalore city by Multivariate Index Model (MIM) and Matrix analysis. They have done their work on different parameters (soil depth, soil texture slope, land use, and surface water body). It has been found that only some pockets of Bangalore are suitable for the urban construction. Most of the places where today people reside are not favorable in terms of soil depth. The soil depth is good in the southern, northern and western part of the Bangalore. Soil texture of Northern part of the city is good, western and southern part have the unfavorable slope. There are 1043 water bodies, which are more than 350 m. These sites cannot be used for the construction. Study suggested that urban planner should concern about variability of expansion of urban spaces on scientific analysis not just the socio-economic grounds.

Jana and Bhattacharya (2013) examined the coastal erosion vulnerability around Midnapur-Balasore coast. In this study, coastal erosion vulnerability has been assessed by combining coastal retreat with land use type and population density using simple vector algebraic technique. This study shows that the study area is highly erosion prone zone. Major portion of this part of eastern coast of India, bordering Bay of Bengal has been subjected to considerable erosion; there has been accretion only in small parts.
Medhi and Saha (2014), have used the remote sensing and GIS in Rhino habitat suitability mapping of Kaziranga National Park. The study has proved the importance of application of remote sensing and GIS technologies in monitoring different bio-reserve and national parks.

Kundu, et al. (2013) carried out a study about the landslide susceptibility assessment in the Ganeshganga watershed. The study presents detailed discussion about landslides adjoining to Ganeshganga River, the conventional multivariate statistical approaches and logistic regression model. It describes that, due to advancement of geospatial technology and extensive computational facilities, landslide susceptibility assessment become more convenient. The study also revealed a strong agreement between distribution of existing landslides and predicted landslide susceptibility zones.

Patra et al. (2015) found four linear pattern of landslide in Himachal Pradesh, these are north western part along a metalled road which is parallel to river Ravi, second one is along with National Highway 20 parallel to Dharang thrust on Dhauladhar range ridge line, third one is the along the National highway 22 parallel to the river Satluj and last one is found in central part, along the River Vyas, parallel to which an important metalled road passes. Main causes of landslide in these regions are steep slope, heavy rainfall and flash flood during summer and development of infrastructure (roads).

James and Sitharam (2014) have assessed the seismic landslide hazard for the entire state of Karnataka and quantitatively in terms of static factor of safety required to prevent landslide based on the Newmark Sliding Block Model (NSBM). Slope map derived from the ASTER digital elevation model. Peak Horizontal Acceleration (PHA), obtained from deterministic hazard analysis considering linear sources, is used as critical acceleration for which the static factor of safety required to prevent landslide. Micro-level analysis shows that districts like Chikkamagaluru, Chamrajnagar, Dakshin Kannada, Kodagu, Shimoga, Udupi and Uttar Kannada have a large number of grid locations, where landslide hazard value are found to be high. Western Ghats is the most sensitive region in the Karnataka state where the seismic landslide hazard value is high. High landslide hazard in this region is also due to very high PHA value. Southern regions of the Chamrajnagar district of Karnataka are also found to have a high seismic landslide hazard. The rest of the region in the Karnataka state is having low seismic landslide hazard values. Ghosh et al., 2013 assessed the landslide risk in Dhalai district, Tripura and he found that only 0.45 per cent region of the district is under the very high risk zone other part comes under the category of very low and low risk zone. The risk assessment map indicates that about the 50 per cent area of road sections is prone to high or very high landslide risk. Researchers also suggested that this study is not sufficient to minimize the risk directly but it can be helpful as data to assist the slope management, road construction and land use planning of the region.

Bandyopadhyay and Saha (2014) have analyzed the metrological and vegetative drought in Gujarat. Normalized Difference Vegetation Index (NDVI), Rainfall Anomaly Index (RAI) derived through CRU Global Climate Dataset and NOAA-AVHRR data respectively for the period 1982-2001 were used for monitoring and comparison of
meteorological and vegetative drought situations. Study avers that meteorological and vegetative droughts occur in Gujarat frequently, but in the uncertain manner. Meteorological drought does not necessarily reflects the actual vegetation health and thus, only on the basis of meteorological parameters, it is incorrect to define a drought situation. Chaturvedi and Mishra, (2015) made a study about the flood susceptibility zones for the Allahabad district with the help of remote sensed data of IRS-P6-LISS III data. Study has been found that Saidabad, Handia, Hanumangang, Jarsa are located in the high flood susceptibility zone, some patches of northern and southern part of the district come in moderate flood susceptibility zone, Shankargarh, Meja, Manda, Jarsa and some portion of the Karachhana and Kaundhiyan blocks of Vindhya upland come under the very low flood susceptibility zone in Allahabad district.

Participatory Geographical Information System as a concept is new in the field of disaster management. The local knowledge about the disaster is gathered by the participatory of communities on the infrastructure and socio-economic characteristic is regarded as an important input for assessing the vulnerability of the community as a whole. Participatory GIS can be effective tool for inventory of Glacier Lake, identifying its potentiality and mitigation the adverse effect in downstream region (Singh and Kumar, 2014). Nongkynrith, et al., (2015) has done a study on the participatory GIS approach in special reference to landslide problem in Guwahati city. This study revealed that the Guwahati city areas around the high slopes are occupied by weak building and high population highly vulnerable to landslides hazards. Landslide hazard in Kamakhaya ward of Guwahati city is a severe problem. Community based vulnerability and adaptations assessment awareness programme can be helpful for decreasing the impact of disaster in any region (Singh et al., 2014).

Environmental Change

Climate change is emerging as threat for the planet earth, more than any other environmental problem. Singh, et al., (2014) have given the comprehensive remarks on the improved data and upgraded models for analyzing the impact of land use and land cover on the surface climate. They covered the different aspects related to progress in research and innovation in surface climate change like; datasets (MSS/TM/ETM+, SPOT, MODIS etc.), different regional climate models (empirical statistical model, econometric model, agent based model, coupled econometric and ABM model etc.) and different case studies related to the climate change and its impact surface climate. Singh and Kumar (2012) have analyzed the climatic variability in the dry land of Rajasthan in India. Study presents that climate of western Rajasthan has shown changes and an average rise of 0.5 °C in temperature has been recorded over the 1976-2006 period in the region. The annual average rainfall has increased in the western part of the Rajasthan but at the same time it has decreased in eastern part of the region. Researchers said that main source of the variability of the temperature and precipitation is rise in the Global GHGs concentration, increased cloud cover, water vapors ratio and dust particles in the atmosphere.
Water Resource/Water Quality/Water Recharge

Major rivers in India originate from the Himalaya. These rivers have the significant contribution of snow and ice which makes those rivers perennial. More than 3 billion people are benefitted by the food and energy produced in these river basins. Soni, (2015) analyzed the snowmelt runoff of Sharda river in Himalayan region at Tanakpur barrage and avers that the average snowmelt to the total stream flow computed is about the 16.5 per cent at the Tanakpur barrage. Ground water is the largest reservoir of fresh and clean water on the earth. In many areas of developing countries, increasing groundwater use has led to depleted aquifers. Artificial groundwater recharge using rain water is a basic concept for the sustainable management of vital freshwater resources.

Jasrotia et al. (2013), explored the delineation of the groundwater potential and groundwater quality zones suitable for domestic purposes based on the integrated use of Remote Sensing and Geographical Information Systems (GIS). With the help of satellite data of IRS-1D, land-use/land-cover and overlay index method of GIS, depth to water table of pre-monsoon and post-monsoon periods (unconfined aquifer), water table fluctuation, static water level (confined to semi-confined aquifers), specific capacity and discharge have been mapped and assessed to examine the groundwater potential. Jebamalar and Ravikumar (2014) did a study about the ground water modeling and assessed the impact of rain water harvesting in urban area. Authors have used the calibration model to simulate the regional groundwater head and it has been compared with the observed data (natural and artificial) of 15 walls for different time scenario (1995-2000) (for calibration process), 2001-2003 (for validation process) to 2004-2012. In the study it has been found that there is a difference of 2m in depth of water table in each scenario for 20 per cent increased or decreased in pumping and recharge rate. The impact of the rain water harvesting simulated through modeling shows the improvement of water table, but the result will go down if the pumping is increased and rainfall is decreased.

A study done by Gontia et al. (2012) revealed that the water harvesting structures constructed in Jamka micro-watershed played an important role in increasing the groundwater recharge in the region and improved the water table. In this study groundwater recharge of Jamka micro-watershed has been estimated and natural groundwater recharge through rainfall also estimated using empirical equations and the artificial groundwater recharge through water harvesting structures, which has been estimated using remote sensing and GIS. The area under submergence due to water harvesting structures has been estimated using remote sensing images. The spatial distribution of data related to land use land cover has been analyzed with the help of thematic map prepared and the assessment of ground water recharge by use of PAN+LISS image of November 2002. Sethi et al., (2012) examined the geochemical characteristics of groundwater to assess its suitability for domestic and irrigation purposes. It assess the ground water quality in pre and post monsoon season with the help of data collected from wells of Yamuna Nagar district by calculating sodium adsorption ratio, total hardness, residual sodium carbonate and per cent sodium. The
data is being represented in thematic map and is compared with national and international standards. The study shows that the ground water is within the permissible limit to be used for domestic as well as irrigation purposes and there is no health concern.

Narasayyaz (2015) has used different model and satellite image analysis for estimation of stream flow. In his study, he has estimated the stream flow and comparison with different routings and loss methods for the Gumani catchment using RS and GIS based Hydrological model. Pal (2015) has done a study about the assessment of spatial hydrological potentiality of Mayurakshi River in West Bengal, and has found that the one pocket in the upper catchment, parts of middle and lower catchment along the very vicinity of large stream are hydrologically potential corridor. Hydrological hot spot are mostly concentrated on the lower part of the basin, where higher order streams merge with each other.

Bhadra et al. (2013) used Advanced Space-borne Thermal Emission and Reflection Radiometer (ASTER) SWIR bands in identification of alteration zones which have developed during hydrothermal activity. ASTER data has been analysed for discrimination of rocks, altered clay minerals and gossans with identification of base metals. The other methods which have been used are hyper-spectral data analysis, Principal Component Analysis and Relative absorption-Band Depth technique. GIS layers have been created for lithology, structures, geomorphology, soil and base map information by image interpretation from LISS-III, LISS-IV and ASTER images to delineate mineral potential zones for base metal deposits.

Sinha et al. (2015); Sitender and Rajeshwari (2015) proved that remote sensing GIS technologies can be efficiently used to develop water resources. Sitender and Rajeshwari, (2015) compiled the 103 suitable sites for artificial recharge in Mewat District of Haryana by analysis of different variables like landforms, Lineaments of secondary rock, slope, velocity of runoff, drainage density and percolation rate of rain water of soil.

Hangaragi (2015) has identified waterlogged areas of Bagalkot district of Karnataka. They found waterlogging in Jamkhandi, Mudhol, Badami, and Bilagi taluka, due to presence of surface depression with internal drainage as well as occurrence of clay bed near the ground level, which is hinder and horizontal movement of surface water.

Tejpal et al. (2015) has done a study about the consequences of sand and stone mining on groundwater level in Narnaul block of Haryana. He used the different remote sensing and GIS techniques to identify the extension and direction of sand extraction and change in land use and land cover pattern. Study found that the study area has experienced the constant and drastic decline in the depth of the ground water during pre and post monsoon seasons and water table has sharpen declined at the rate 1.05 meter/year. Over period 1975 to 2009 ground water table has declined by 58 meters.

Nilarekha et al. (2015) found that although in the coastal region complex sources invariably influence the ground water flow and its quality but ground water quality in coastal region is independent of shrimp farming through the multi-criteria evaluation techniques of GIS.
Vegetation Cover/Forest Management

Climate change is a greatest challenge of this century. Among different land-use systems, forests are particularly sensitive to climate change because the long life-span of trees does not allow for rapid adaptation to environmental changes. Chandrashekhra (2015) has done a study about impact of climate change on the tree species, growth and production in different tree species in Kerala. This study presented that increase in temperature with decreased wet days during southwest monsoon and post-monsoon seasons can affect both productivity and phonological patterns of the forest negatively. Rainfall is the major climatic factor that affects the growth and distribution of natural vegetation at a regional scale. For understanding the relationship between vegetation greenness and rainfall Nischitha et al. (2014) have done a study in Tungra and Bhadra basins of Karnataka. The result showed that rainfall exerts seasonal control on vegetation greenness. A significant negative correlation has been observed for the monsoon season and a favorable positive association for the rest of the seasons. It has been found that a maximum amount of vegetation greenness in the post monsoon season (Oct-Dec). The availability of enough soil moisture from the southwest monsoon increased greenness amount during the post monsoon months.

Mukherjee and Joshi (2015) have made a study about the thermal image downscaling algorithms use a unique relationship between Land Surface Temperature (LST) and Normalized Difference Vegetation Index (NDVI). The LST- NDVI correlation and regression parameters vary in different seasons depending in land use practices. This study has been evaluated three main downscaling algorithms, first is disaggregation of radiometric surface temperature (DisTrad), second one is sharpening thermal imagery (TsHARP) and third one is local model using seasonal thermal images. In this study, it has been found that the seasonal variability of the LST-NDVI relationship affects the accuracy of downscaling model. The accuracy of all algorithms is higher for the growing seasons. The model are least suitable in water body and dry river bed sand areas, however, the down scaling accuracy is higher for NDVI>0.3. The study is useful to understand the applicability of the downscaling models in seasonally varied landscaped and different NDVI ranges.

Manjunath et al. (2013) tried to develop a spectral library of Himalayan plants species based on spectral reflectance from plants though the Hyper-spectral Remote Sensing Applications. The spectral library has been developed in net programming environment. The graphic user interface of library aids in viewing of all the information related to plant species such as spectral details, spectral graphs, general information of species, observation details, plant photographs, species spectral narrow band indices, species biochemical parameters, export options and help through menus and sub menus. Author said that information provided in the library may also be used to explore the application potential of Hyperspectral images by studying chemical constituents, growth behavior, and ambient ecology of plants on a regional scale in Himalayan region.
Mountain Region/Glacier/Slope

Mountain region is very fragile. Climate change, increasing population, slope, remoteness, socio-economic and technical backwardness make these areas more vulnerable.

Mal and Singh (2014a) have done a study on the changing glacial lake and outburst floods risks in western Himalaya. The study found that climate change has de-glaciated the higher elevation of the mountains of the Himalaya and across the world (Mal and Singh, 2014b). Glacial lakes have been increasingly observed breach out and cause unprecedented damage to society. Two unnamed lake on the East Kamet glacial, Sitkeng, Geldhura and Hemkund lakes in the Uttarakhand region are increasing in size during the 1976-2010 periods and increasing the potential of GLOFs sites. Kalbhusandi and Hemkund lake’s extent and size are also changing and it could be a Himalayan tsunami (flood) for the downstream area of Ghangaria, Bhundyar, Pulna and Govind Ghat.

There are so many models available for the Digital Elevation Model (DEMs) for studying the different aspects of the environment like topology, estimating elevation differences over time and runoff modeling, soil erosion estimation and so forth, including vertical change in glacier. But the elevation derived from Geoscience Laser Altimeter System/Ice, Cloud and land Elevation Satellite (GLAS/ICSat) data is one of the most reliable globally available data (Rastogi et al., 2015). The steep slope, stony and rocky surface, different agricultural practices are the main reasons of soil erosion in Himalaya, (Sajjad et al., 2015).

Govil (2014) has done a study with help of Hyperion image of the EO-1 satellite contains 220 unique spectral bands spanning region from 355 to 2577 nanometer (nm) at 10 nm bandwidth. The study proved that Hyperion data can be used effectively in the formidable and rugged terrain of Himalaya for contrasting field visit for mineral exploring. And Kumaoun region reported mineral are in good confirmation.

Glaciers are natural reservoirs of fresh water in frozen state and sensitive indicators of climate change therefore it is necessary to monitor the health of glacier. Climate change/variability in recent decades have made considerable impact on the glacier lifecycle in the Himalayan region (Kumar and Singh, 2013). Brahmbhatt, et al., (2012) discussed the annual mass balance approach for monitoring the health of glaciers of Warwan and Bhut basins. Mass balance of glaciers of these two basins has been determined on the basis of extraction of snow line at the end of ablation season. This research paper revealed that there is negative mass balance of glacier in most of these two glacier basin. It also finds that accumulation area ratio approach is quick and reliable for the assessment of health of glaciers.

Pandey et al. (2012) used the morphometric parameters for measurement of glacier thickness. Data derived from the satellite image based glacier mapping and their comparison with similar parameters obtained through topographical maps, it has been provided comparative assessment of elevation changes vis-à-vis area changes over the glacier of Pensilungpa Glacier of Zanskar valley in Kashmir Himalaya. Riyaz et al.,
(2014) has taken up a study on change detection of glacier mass balance in Western Himalaya. Himalayan glaciers are poorly imbalanced based on the LANDSAT Data of ETM. As based on Mann Kendall Test, the negative mass balance of the glaciers since 2000 correlates well with the increasing trend of annual mean temperature and decreasing trend of precipitation (Snow Water Equivalent (SWE) and rainfall). Due to climate change, shrinkage of glaciers, decrease in winter precipitation, increase in summer precipitation and change in atmospheric temperature have been taken place. The study implied that the effect of rising temperature and decreasing precipitation (SWE and rainfall) on mass balance has been significant. The extent of glaciers is being decreasing and the overall mass balance found to be negative and showed that glaciers in the basin are melting more than accumulation of snow. Sharma et al., (2015) has made study on thermal structure over two different places, first is mount Abu and another one is Gandanki with help of coordinated Lidar observations. They found significant difference in the temperatures over the both locations. The researchers have done comparison among Lidar and other temperatures, observed by different satellite data like, the Sounding of the Atmosphere using Broadband Emission Radiometry (SABER) onboard Thermal Ionosphere Mesosphere Energetics and Dynamics (TIMED), and Halogen Occultation Experiment (HOLOE); onboard Upper Atmosphere Research Satellite (UARS). Differences has been found in temperatures observed by the Lidar and other satellites. Wavy type fluctuations have been noticed in the upper stratosphere and in the lower mesosphere over both the locations.

Mal and Singh (2013) have done a study on land use and land cover in mountain region of Himalaya. Study has found that there are so many reasons of the major land use land cover changes in Himalaya and those are rapid population growth, tourism and infrastructure development. The changing climatic condition has led to reduce the snow and glacier cover. And change in climate has led to degradation of ecosystems services and has negative implication on human wellbeing of Himalaya (Singh et al., 2013). In the study by Singh and Singh (2013), has been validated by GIS modeling, that 75 per cent of total land seen redesigned by the man-made activities in the Himachal Pradesh and that is transforming the livelihood pattern directly as well as indirectly, providing further scope to work on human induced biome and climate change.

Sen et al. (2015) carried out a study on the morphology of Tilla (up land)-Lunga (low land) in west district of the Tripura district. The pattern of the topography has been studied from satellite image (STRM-DEM) and dumpy level survey. The slope profile of the Tilla land revealed the rhythmic repetition of convex and concave shape, indicating the rain wash slope. According to the study slope of the Tilla is suitable for different plantation, which required less stagnation of water in the surface soil and Lunga being a low land is suitable for paddy cultivation and unsuitable for the settlement due to marshy land and waterlogging problem. In urban area, the Tilla slope is generally used for the urban forestry, eco-park, residential purpose, orchards and gardens. The slope of Tilla land is unsuitable for the settlement because of physiography hindrance, like unconsolidated soil and seepage.
Shanmugam and Srinivasan (2014) have provided a review and up-to-date information about the past and current role of the spectral matching approaches adopted in hyper spectral satellite image processing. Shanmugam and Srinivasan (2014) inferred that continuous improvement in the matching techniques over the past few years is due to the need to handle and analysis hyper spectral image data for various applications. Author suggested the need to develop a well built and specialized spectral library to accommodate the resources from enormous spectral data. This may improve the accuracy in mineral, soil mapping, vegetation species identification, health monitoring and target detection. This paper also point out the requirement of ideal algorithms. Jalan (2012) in her paper investigates the performance and potential of object based image analysis technique for land cover information extraction from high resolution satellite datasets. For this purpose author assessed different urban land-cover situations using merged CARTOSAT-1 and IRS-P6 LISS-IV image subsets of Dehradun, India. The study discovered that object based classifier and proved to be a fast, simple yet efficient semi-automated method of generating visually appealing thematic outputs for urban as well as suburban areas, with minimum manual intervention and very close approximation to results produced by visual analysis. Kumar and Roy (2013) examined the utilization of the potential of World View-2 for discriminating urban and vegetation features. Dehradun, the capital of Uttarakhand has been chosen for assessing the potential of World View-2 satellite. In this study it has been established that object based techniques are useful in extracting building’s shapes and in discriminating different vegetation types using high spatial and spectral resolution data of World View-2.

Biswal et al., (2013) explored the potential of open source data mining software support to classify freely available Landsat image. The study identified several major classes that can be distinguished using Landsat data of 30 m spatial resolution. Study conducted a separability test considering all the bands of different land use classes that mapped to study the disjunction. Biswal, et al., (2013) used Iterative Self-Organizing data Analysis clustering, maximum likelihood and decision tree classification to extract the land use/land cover information from satellite data.

Arun (2014) has done a study on comparative analysis on the applicability of entropy in remote sensing. He highlighted the measure of entropy, which is adopted for maximization of mutual information in many remote sensing operations like threshold, clustering and registration. The following methodologies have been evaluated with reference to the study area using different statistical parameters. Two entropy methods have been used, Renyi’s entropy has been found to be suitable for image registration purpose followed by Tsalli’s and Shannon; whereas Tsalli’s entropy has been found preferable for thresholding and clustering. It is also observed in the practice that Renyi’s is the simplest entropy method and is computationally simple as it avoids parametric estimation. Shivakumar et al., (2012) tried to use Digital Elevation Model (DEM) of Chandrayaa-1 TMC Triplet image without the projection parameter and ground control
points for understanding the lunar surface. Author said that it is possible to generate DEMs for Lunar surface using Rational Function (RF) model, without ground control points.

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PROGRESS IN INDIAN GEOGRAPHY

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TO WHOM IT MAY CONCERN

REPORT from Italy on the occasion of IGU Congress Beijing, China, August 2016

Geography in Italy

Prepared by Maria Paradiso

(University of Sannio and CNR-National Research Council)

National Chair, Italy

1 Approach and aims

The report is conceived on the basis of a specific scientific approach not merely a technical one. The approach is about reporting on the state of our discipline in light of grids of power struggle and control under both internal and external conditions.
State of art is meant in terms of conditions where our field of knowledge can reproduce/change and those ones which affect the healthy conditions of Geography.

The rather open and critical approach to the state of art of geography in Italy is oriented not only to explain current circumstances but it is aimed at future-building and action. It is critical because we need to realize new paths for the best of our community. It was conceived in a frame of a call of collaboration initiated by Italy National Chair to Agel-Association of Italian Geographers, AIG-Association of Teachers of Geography, SGI-Italian Geographical Society, Society of Geographical Studies (Florence) and some individual Colleagues in order to share on views and provide data. Association of Italian Geographers was not able to send updated data on the occasion of this report. They are going to be finalized and discussed on the occasion of the yearly AGeI Conference in upcoming September.

2 Positive factors and trends of Geography in Italy

A good number of Italian geographers attend regularly IGU Conferences despite national constraints.

National community is informed about IGU via AGeI-Association of Italian Geographers and SGI-Italian Geographical Society on the basis of my updates, of those ones who are active in the international arena and via IGU websites. They are normally now well-known and consulted by those who are willing or able to join IGU events. National associations rapidly circulate provided information.

Indeed Italians, despite difficulties, are cooperating in a sound and solid way to IGU in several Commissions (Mediterranean, Human Mobility, Political Geography, Toponymy, Global Information Society, Modelling, Gender, History of geographical thought, Water sustainability, to quote some of them, and IYGU). Italian Geography cooperate well in Eugeo and EUROGEO too.

The National Chair, Maria Paradiso initiated and instructed the Italy National Committee how to try again to have an Italian candidacy for IGU EC and in the last ballot, it was decided that Elena Dell’Agnese as candidate to IGU and Maria
Paradiso continuing as National Chair. Dell’Agnese was elected after Giuliano Bellezza expired his mandate.

The National Chair has been attending all IGU Conferences, Congress and meetings in the reporting period and ensured effective communication with IGU President and General Secretary as well as interested Colleagues.

From Italy, the undersigned tried to open a IYGU Centre in Rome with a Mediterranean focus under the auspices of CNR-National Council of Research. However, it turned out after the initial approval of CNR President, because of some internal problems to CNR that: 1. without available funding -beyond what is considered good enough by IYGU (half time position of a secretary and a room)- it is not feasible a regional center in Italy. SGI-Italian Geographical Society suffered a severe crisis all fronts. Thus there was no chance to think about such an effort based in SGI 2. in such a short time (less than one year of IYGU) CNR did not judge existing a solid terrain to move ahead in a short delay, with its previous commitments and under financial constraints to achieve IYGU goals (communications with Earth Sciences Department Dr Brugnoli and President Luigi Nicolais).

Personally I did committed a lot in CNR in order to avoid ITALY (CNR) withdraw from ICSU. Myself as Representative in IGU and the Colleague of Geosciences were successful with CNR President in this regard and with the National ICSU Committee.

Italian Geographical Society during past Presidential turn occurred a severe crisis and risked closure. It was avoided and we are committed to counter it into a positive turn with a new presidential ad interim mandate.

In 2017 Italian Geographical Society is committed in carrying out a celebration of an important anniversary which is going to be connoted under an international orientation.

We are working as a group of truly international geographers in internationalizing our national associations and community to change the dominant tradition of ‘localist’ approach and not general attitude to recognition of merit for promotions. Altogether now it became even more serious for general lack of
funding since the most brilliant scholars cannot progress or promising young scholars cannot enter the system (see next section).

In terms of academic practices, there is a growing example of scholars committed in a third way between research migration and the reproduction of localistic/nationalist academic practices, which are main problematic issues of Italian geography so far (see Celata, AAG 2015 presentation also for the following discussion which is based on Celata 2015). This problems has been defined by Claudio Minca (2005) as the ‘double absence’, i.e. the inexistence of a strictly codified Italian tradition of geographical studies (this happens in my opinion also because the majority is not formed in Geography Degree programs), and the distance from the canons of Anglophone (its critical essence and the need of challenging statu quo) geography. This opens a space, again following Claudio Minca, for the emergence of moments of exceptional brilliance on the part of small groups of individuals, in a broad context of rather not good scholarship.

Additionally, Celata surveyed the emergence of a new academic subject which may be defined as the *Anglophile*: a substantial and recent increase of articles by authors affiliated to Italian universities in top Anglophone geographical journals (Figure 1). This important finding however has to be complemented, for a fully satisfactory approach, by assessing participation thru more general international standards publications and research data bank; such those which cover also interdisciplinary and niche specialization journals and not only main stream geographies; as well as the assessment has to be enlarged to important geography and interdisciplinary journals beyond the Anglophone arena (see par example IGU statement endorsing the San Francisco Declaration).

Fig. 1. Articles by authors based in Italy in top Anglophone human geography journals

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Following Celata’s paper presented in 2016 AAG panel session on Geography in Italy, Italian geographers are already contributing to Anglophone geography: first by the work of those Italian geographers between academic scholarship and political activism. The second approach refers to the role Italians in ‘translating’, in a broad meaning, the growing body of work referred to as “Italian theory”, (specific approach to radical political philosophy which has its latest expression in the study of biopolitics i.e. Esposito 2012, Gentili 2014, Giorgio Agamben, Roberto Esposito or Antonio Negri who have already inspired several interventions and collaborations from geographers based in Italy (names are not quoted to avoid missed quotations). This is also the case of, for example, research at the intersection between geographical studies and literature studies. Another peculiarity of Italian geography, particularly evident in the so-called ‘Turin school’, an attempt to reconcile what within Anglophone geography is usually regarded as irreconcilable: policy-oriented research on the one hand, and a critical perspective on place and politics on the other.

Whether those Anglophile authors will bring a specific Italian perspective to Anglophone geography or just add a few voices to an already orchestrated choir, is an open and problematic question.

However, the discussion should take into account not only the top journals but also the journal of special reference for new specialties in geography or multidisciplinary journals; as well as the discussion should take into account those papers published in high reputation journals France or at a large beyond the
Anglo-Saxon contexts. For example, it can be quoted the Italian contribution in the global arena, not only the Anglophone one, to new fields of geography in international specialized journals like the field of Geography of Information society and Internet geography studies (Paradiso and her work as Associate Editor of France based bilingual journal NETCOM, in Journal of Urban Technology, Future Internet also as Vice chair of the IGU Commission till 2012).

In this regard another approach emerged beyond individual activity: it should be observed a bridging role between national and international community beyond the individuals’ re-positioning which has been provided in this field by the undersigned; Maria Paradiso established a specialty group on Geography of Information and Communication Geography in the Italian Association of geographers, Marcella Schmidt consolidated on international basis of the Gender Specialty Group in Italy in AGeI, Elena dell’Agnese (media studies), Cosimo Palagiano (toponymy).

This international approach in bridging the national and international community, especially oriented to the younger colleagues, enabled international publications for some Italian younger colleagues since 2010 and bridged to IGU Commission Geography of Global Information Society.

In 2012 Italian National Committee issued a book gathering a large group of Italian geographers entitled ‘Mediterranean lexicon’ and edited by Paolo Giaccaria, Maria Paradiso which was presented in an IGU 2012 Cologne parallel event. Editors gathered a large group of interesting Colleagues in a national proposal for the international geography arena.

Indeed, Italy is substantially contributing to establish first, then developing, an international IGU geography community and studies regarding the Mediterranean Basin with and after the MRP-Mediterranean Renaissance Program initiated by Adalberto Vallega and coordinated by Maria Paradiso. This turned out in the first Commission in the IGU history with a regional focus chaired by her, an Italian geographer since the inception in 2012 which reached now circa 200 members.

In terms of International conferences in Italy, an Italian group of Colleagues under the auspices of all geography association in Italy held the EUGEO 2013 Conference in Rome which proved a very successful one in the hosting premises of University of Rome LA Sapienza and in particular thanks to the endless devoted efforts by
Massimiliano Tabusi (coordinator of 8 colleagues) and Filippo Celata. This endeavor was backed by all geography associations in Italy.

The Italian Association of Geography Teachers (AIIG), founded in 1954, (chair Gino Devecchis in collaboration with a group of younger Colleagues) keeps contacts and exchange experiences with other similar associations in Italy and abroad, with a special attention to those ones located in EU Member States; it encourages transnational projects, especially those aimed at developing the European dimension; promotes citizenship education in all geographic scales, studies of different cultures and the right of all peoples to sustainable development. The Association of Italian Geographers on next September it is going to have its first National/International Congress UNEQUAL GEOGRAPHIES Geographical education for inclusion Rome, 29th September – 3rd October 2016. Professor Joop van der Schee (Utrecht University, co-chair of the IGU Commission on Geographical Education), will provide a keynote ‘Earth and Sustainability. A Geographical Education.

Specifically in this reporting period, and being since 1979 member of the European Standing Conference of Geography Teachers Association (later EUROGEO), AIG participated in international projects such as (2012/3013) "How to teach geography through remote sensing", commissioned by the educational sector of the ESA-ESRIN, which coordinated the survey on the status of teaching of geography in secondary schools and second degree in France, Spain, Belgium and other EU countries.

It recently launched a half-open access journal J-Reading (Journal of Research and Didactics in Geography) to expand even further its international scope while working from Italy, to encourage meetings and exchange of ideas among geographers and to support geography teaching in schools and on a world scale, under the IGU auspices linked to San Francisco Declaration IGU official position. The journal’s site (www.j-reading.org) is a further locus to spread news related call, conferences and events of international importance especially those of IGU in coordination with the Italian National Chair too.

The AIIG have stable relations with national offices of organizations, associations and international agencies such as UNICEF, WWF, the Committee for the Decade of Education for Sustainable Development (UNESCO), participating in environmental education campaigns in the field of network that supports the implementation of the agreement on climate change in Paris.
The upcoming Italian Geography Congress under the auspices of AGeI-Association of Italian Geographers and Scientific Coordination of all Geographers based in Rome will held in June its first International Conference truly open to papers from other countries’ geographers.

Società di Studi Geografici is now issuing its journal quoted rank A in Italy as a member of Scopus databank thus fulfilling the recent Ministerial criteria for scholars publications’ evaluation. It has now a yearly scientific conference on innovative topics which is now considered of national reference in Italy.

### 2 Weakness’ factors of Geography in Italy

Despite all good progress, situation of Geography’s vitality is quite critical in Italy for a series of reasons both internal and external ones to our national community.

**Internal reasons.** The first one is a scientific one, since several Colleagues of previous generations and of the current ones did not updated their descriptive approaches in favor of more theoretical ones or did not carry out empirical research which have to be effectively grounded on solid theoretical updated basis. As Franco Farinelli Chair of AGeI writes in response to the call for collaboration to this report: “The situation of the Italian geography is characterized by a peculiar status: that one of a discipline which has not been able to catch the wave of "spatial turn" that hit a dozen years ago the social sciences in the international arena; therefore it suffers now such a delay as a boomerang, since it sees its ‘discourse’ transmigrated to other fields, impenetrable for geographers. The reasons for this paradoxical situation in many ways are to be found in the closure, which goes back to the fifties, with respect to the themes and methodologies of other disciplines (only one reference: the Gambi-Gribaudi controversy in the mid-sixties) and the consequent choice a defensive strategy rather than attacking with respect to them. The result is now an obvious inability to continue to defend (in every respect and in every sector) the specific geographic identity, that it is not rebuilding as the exclusive field of interest (it would be totally useless to say the worst) but in the thickness of its point of view. After all, the "spatial turn" it is stated precisely when the spatial model (meaning its space in the ‘Ptolemy’ geographical sense) is in crisis, thus,
geography does have to invent a geography ‘without’ space. This is the challenge on which depends the survival (in Italy but not only) of the geographical knowledge”.

Definitely, it must be noted that a not good reputation of discipline have be understood not only on the basis of scientific terms. Actually it must be coupled by a clear reference to decades of career promotion which had not be truly based on scholars’ quality vita records and their overall maturity or capabilities. Several cases of recruitments or progressions have not been based on recognition of merit, recognition of international capability and scholarly standards and scholarly personalities. A different orientation could have better matched the goals of pushing ahead science frontiers, innovating them beyond the tradition of ‘ipse dixit’ and keep high geography reputation vis à vis competition with other disciplines locally and nationally.

*External reasons.* Additionally and severely especially in the last decade, Geography vulnerability in Italy occurs for national reasons of:

- very poor funds for posts in Universities at a large (and even worse for geography) and consequently just a fewest recruitments occurred in the last decade as well as promotions.

- economic and public debt crisis implied turnover blockages; retired people are not replaced. Posts in geography are lost.

- national policy-making of different political orientations are fully inadequately funding Education and Universities.

- regional levels are narrowly linked to research showing an immediate interest for regional plans and concrete impacts in terms of innovation and profit. It is quite impossible for independent researchers from political ties to win bids at a regional level.

- several University Reform Bills increased the role and recognition of hard sciences and applicative ones towards social sciences and humanities. Moreover they pushed in favor of the issues of economic relevance of sciences which can prove an immediate economic spill over in society. Geography teaching has been also severely reduced in school thus affecting all knowledge chain and recognition in society in favor of history or natural sciences.
Basically, in the past twenty years Universities underwent deep reforms. Law ‘Gelmini’ canceled the role of lecturer and required that after two terms of a grant researcher position, one person should quite fast win a national competition as Associate Professor. Second step, he/she has to find an University available to open a position and a competition. Otherwise he/she is forced to leave the system. In a cadre of very low funding to Universities it is unlikely to have chances for recruitment and additionally blockages occur for career promotions.

State funded bids occur only every two years; funds are extremely inadequate for social sciences and even worse for geography. Last time no bid has been won by geographers. In the bid before the latest one only one project in geography turned out approved for funding. Geography is included in a class with other disciplines and assessors stem out from other disciplines, thus this can impact on assessors’ understanding and closeness to geography topics and goals.

Prospections in recruitment and public awareness of the Geographical knowledge potential for society are also linked to educational offer in Geography curricula. It looks like only one full degree program (BA and MA) in Geography (Rome) and a second is likely to miss the MA (Milan-Genoa) because of Ministry of Education requirements of ratio of professors/students.

Moreover the reform of high school in Italy (2010-2011 school year), greatly negatively affected the discipline, making Geography disappear in most schools educational system’s curricula. The Association of Italian Teachers of Geography (AIIG) has promoted an appeal in favor of geography. The appeal has crossed the Italian borders, thanks to the support by IGU and EUGEO which had been promoted by Italian geographers active in the international arena. It was successful to reach out much of the world geography community with about two thousand applications received in a few days from about 70 countries.

All disciplines are forced by the Ministry’s regulation to set up multidisciplinary PhD where generally grants are given to disciplines which bring money for grants thanks to external sponsors. Other disciplines are perceived better than Geography for getting sponsorships and normally they refer to more ‘hard’ or technical or business oriented disciplines. Generally PhD encounter difficulties in Italy for lack of funding and administrative burdens.
In a cadre of no career progression, blocked or semi blocked turnover, not satisfactory recruitment over decades and career progression in the past 15 years, multidisciplinary PhD and practically no more PhD in Geography, the cancelation of lecturer’s role as a fixed job and initial not precarious position in geography, thus we are facing serious problems of 1. attracting and keeping young scholars in Italy, 2. to make progress mature geographers 3. provide all basic conditions for research especially for those geographers linked to fieldwork research and participating in the international arena.

In 2015 a Ministerial Group for Geography was set up with the participation of chairs of association and the undersigned as representative of Italy in IGU and an internal detailed report was submitted to the Minister. Ministry’s improvements in favor of Geography are still pending so far.

Humanistic approach geographers are favored in this frame since they generally publish conceptual papers after reading other papers, and they have a lower need of fieldwork (national and international) and team’s activity to provide original data and a fresh knowledge.

There is an increasing tendency of young scholars to neglect fieldwork and pay importance to research on the basis of journals ranking. This is also a consequence of national and on campus evaluation of research on the basis of statistical approaches of quantitative ranking linked to the major commercial publishers. Therefore the 'Anglo-Saxon' arena of geography is preferred in case of international publishing scholars.

Most Colleagues however suffer of practically no funds. Most of us join international Conference on own salaries and personal money.

IGU suffers competition of AAG or UK RBS Conferences in Italy. Many regional geography association also complicates the fragmentation of international Geography events offer. Lack of funding prevent in most cases scholars’ participation to international conferences or priority is accorded to AAG Annual Conference; there is an increasing tendency of participation only in own small networks.

There is a ‘fluid’ Italian diaspora of geographers in UK, France and Scandinavian countries whose contours are hardly to be calculated since diaspora is mobile.
Stakeholders in Italy provide funding mainly to technical or hard scientist whose research can reveal immediate profit. Regional funds normally pass thru Presidents or Department Directors. Currently, Armando Montanari and I undersigned are the only one to win and coordinate an EU FP7/H2020 project as Italian geographers.

**Suggestions/Comments for IGU EC**

The 'ontological' status of geography research linked to fieldwork (which has to be well informed of general theories) should be communicated better and encouraging young generations of human geographers to practice of fieldwork by special initiatives in IGU events or written notes.

The Italian community is fully aware that the close collaboration between geographical associations and societies can produce beneficial results to the various national scales in the enhancement of geography in schools and academic/research loci. We do encourage EC to launch and coordinate further initiatives in this regard to help promotion of Geography with policy makers and events for public awareness of Geography’s importance for a more equitable sustainable society.

Hopefully IGU EC can invest even more time and activities in networking with Donors and Sponsors, Foundations for research projects grants and awareness events of importance of Geography for societies.

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Maria Paradiso
Chair, Italy National Committee
(University of Sannio, Italy)
1. Institutional Frameworks and Geography

The period 2012-2016 has been one of slow rather than dramatic change during which there have been some moments for celebrate, for instance, the research quality of university geographers in New Zealand had been highly ranked in the National Performance Based Research Fund evaluations (2006-2012), while over other issues progress has been disappointingly slow, for instance over achieving parity between the credits earned for some geography assessment compared to that of allied disciplines in the secondary schools. The investigation of the Productivity Commission into the tertiary sector seems to hold the prospect of a further round of transformation change from 2017.

1.1 The Productivity Commission

The New Zealand Productivity Commission - Te Komihana Whai Hua o Aotearoa - is an independent Crown Entity established in 2011 to advise government on 'improving productivity in a way that is directed to supporting the overall well-being of New Zealanders, having regard to a wide range of communities of interest and population groups in New Zealand society.'

In November of 2015 The Government asked the Productivity Commission to investigate how trends in technology, internationalisation, population, tuition costs and demand for skills might drive changes in models of tertiary education. This has been followed by the circulation of an issues paper early in 2016. The thrust of the document seems to be that the levels of government funding to the Tertiary sector are not providing a sufficient return on investment in productivity terms and that new models need to be explored. It is difficult to second guess what the Commission might recommend, but the key moment will be the release of its draft report in November of 2016.

1.2 Royal Society of New Zealand

The Royal Society of New Zealand is an independent statutory organisation that promotes and advances science, technology and the humanities in New Zealand. It dates, through predecessor organisations back to 1868, and it now operates under the Royal Society of New Zealand Act 1997. Under a 2012 amendment act the humanities have now been incorporated Royal Society of New
Zealand. Under the present legislation its stated purpose now is for ‘advancing and promoting science, technology and the humanities in New Zealand’.

The Royal Society of New Zealand is important to geographers in several ways that are not always fully appreciated. In terms of research the Society manages the Marsden Fund which was established by the government in 1994 to fund excellent fundamental research. This is a highly competitive and prestigious contestable fund. Human geography applications go to a Social Science panel and those in physical geography to an Earth Sciences and Astronomy panel. The Royal Society of New Zealand has long since recognized research excellence through the award of Fellowships. A small number of geographers have been made Fellows since Professor Kenneth Cumberland (Auckland) was elected in 1973.

As an affiliated member of the Royal Society of New Zealand since 1969, the New Zealand Geographical Society is part of the system of national delegates to the Royal Society of New Zealand and linked to the International Council Science of Unions. In addition the Royal Society of New Zealand is able to meet the International Geographical Union subscriptions as well as assist with delegate travel to International Geographical Union Congresses and to support Olympiad competitions for secondary school teams including geography.

In 2015 Emeritus Professor RD Bedford (Waikato University and Auckland University of Technology) was elected as President of the RSNZ for a three year term. A population geographer, with long experience as a migration specialist and government advisor Professor Bedford is the first social scientist to serve as President for 60 years. Another geographer Professor Richard Le Heron has served as Vice President Humanities and Social Sciences (2013-2016).

1.3 International Geographical Union

New Zealand has been a member of the International Geographical Union since around 1930, before university geography was established in New Zealand. Academic involvement really only began with the 1949 Lisbon Congress but has expanded steadily since the 1960s. A key event was the hosting of a regional conference in New Zealand in 1974.

Currently New Zealand geographers are involved on the steering committees of five IGU Commissions, these being the

Olympiad Commission
Lex Chalmers (Waikato) Co–chair

Dynamics of Economic Spaces Commission
Professor Michael Roche (Massey) Steering Committee

Commission on Gender and Geography
Professor Lynda Johnston (Waikato) Steering Committee

Indigenous Knowledges and Peoples’ Rights
Dr Brad Coombes (Auckland) Chairperson of Steering Committee

Marginalization, Globalization, and Regional and Local Responses
Professor Etienne Nel (Otago) Steering Committee
New Zealand bid unsuccessfully at Krakow for the 2018 Regional Conference which will be hosted by Laval University in Quebec. The Dynamics of Economic Spaces Commission will be holding a New Zealand meeting in November of 2016.

1.4 New Zealand Geographical Society

The New Zealand Geographical Society was founded in 1944. The Society is structured around a small head office, presently based at Massey University in Palmerston North. Office space for the Society's part time Administrative Assistant has been generously provided by the School of People Environment and Planning. The office holders are spread across the country. The current president is Emeritus Professor Harvey Perkins (Auckland University), the immediate Past President is Dr Ann Pomeroy and the Vice President (and president elect) is Professor Lynda Johnston (Waikato). Ms Sue Lynch is the Chair of the Board of Geography Teachers, a subcommittee of the Executive that specifically serves the needs of secondary school geography teachers. This points to a distinctive feature of the New Zealand Geographical Society in that it serves as a single umbrella organisation for secondary and university geographers and all others interested in the subject. The society is comprised of six branches (Auckland, Waikato, Manawatū, Wellington, Canterbury, and Otago) reflecting the early close associations of the society with the geography departments the universities. Branches run their own annual programmes. Activities include a mix of lectures, fieldtrips, post graduate presentations, and hosting of secondary school geography competitions.

The Executive committee holds regular monthly meetings (Via Scopia) which have enabled business to be dealt with efficiently. There is an annual face-to-face Council meeting in late May and in recent years this has been held in Wellington as the convenient central location.

A postgraduate programme was overtly included as part of the 2010 New Zealand Geographical Society conferences in Christchurch and this has been carried forward in association with subsequent conferences in 2012, 2014, and 2016. A conscious effort was made to make more provision for post graduates in the society from 2010. This has taken the form of a Post Graduate Network which has organised a serious of ‘webinars’ drawing participants from all the university geography units. The content and structure of the post graduate programme at the conference has been student driven and has included both thesis research related and transition to work sessions. With the turnover of student office holders necessarily being high the challenge for the society and post graduates themselves is to ensure that there is a succession of students to sustain the activities of the network.

In 2012 the society initiated some changes to membership structure including new membership classes for postgraduates. These also included new systems for subscription renewals reminders and payments, the latter to reflect the widespread switch to electronic banking. As part of the new subscription categories the society has created a new class of member – a Fellow of the New Zealand Geographical Society (See 1.6). Other business that has stretched out over several years has been revision of the Society’s constitution which had gotten severely out of date. New contract negotiations have been concluded with our publishers Wylie-Blackwell.

In order to facilitate wider New Zealand Geographical Society membership access to International Geographical Union materials (and for any other visitors to the New Zealand Geographical Society website) a specific International Geographical Union Tab has been created on the society webpages. Here International Geographical Union documents and resources are available. In addition a specific list server has been created for those on the New Zealand Geographical Society community list for direct receipt of International Geographical Union quarterly newsletters and the annual International Geographical Union Bulletin. Several dozen individuals across schools and universities signalled that
they would like direct receipt of these materials. The Royal Society of New Zealand has applauded this initiative in terms of the direct link it provides between New Zealand geographers and the International Geographical Union.

The New Zealand Geographical Society website has also been upgraded as the ‘face’ of the society. The Society is supporting the Institute of Australian Geographers in its bid to host the International Geographical; congress in Melbourne in 2024.

1.5 Study Groups

Around 2012 the New Zealand Geographical Society decided to support the establishment of study groups. This move was partly a response to the success of the Canterbury 2010 joint conference, where the sessions organised by Australian study groups was one of the features of the programme. Since then several study groups have been formed.

Freshwater Geographies: This group had a quite specific fixed term objective whereby sessions on Freshwater Geographies in New Zealand were organised at the 2012 New Zealand Geographical Society conference. These emerged from a series of conversations and a workshop about opportunities for more engaged public contributions from geographers about freshwater in New Zealand. These sessions gave rise to a Special Issue of the New Zealand Geography (70, issue 1), which comprised three research articles and two commentaries on the subject.

Mobilities Study Group: The ‘Mobilities Research and Study Group’ was ratified by the AGM of the New Zealand Geographical Society in September 2015 as the first study group supported by the Society; it was launched at the New Zealand Geographical Society conference in Dunedin on 2 February 2016 with two panel sessions on Mobilities Research in New Zealand. Convenors are Maria Borovnik, Tara Duncan and Gail Adams-Hutchison. Geography research was also supported at the 7th Mobilities Symposium of New Zealand/Aotearoa at Massey University, in June 2016, with a Transport and People-Centred Mobilities theme. The Society provided funds to one geography honours student from Waikato University to participate in this symposium in exchange to presenting on her mobilities research in her geography department and to at least one secondary school once completed. This Study Group is currently working on a special issue for the New Zealand Geographer. The Mobilities Research and Study Group also networks with the Engaged Social Science (ESocSci) Mobilities Research Network of New Zealand, with the Centre for Mobilities Research (CreMoRe) at Lancaster University, UK, and the European Cosmobilities Network. There are also strong links to the emerging Australian Mobilities Network (OzMob).

Women and Gender Geographies Study Group: In May 2016, the New Zealand Geographical Society Council approved the proposal to establish the Women and Gender Geographies Study Group. The Convenors of the Group are Helen Fitt (Canterbury) and Alison Watkins (Canterbury). The Women and Gender Geographies Study Group has its roots in the Women and Gender Geographies Research Network (WGRN), which began in 2013. The WGRN is an eSocSci network that runs bi-monthly videoconference meetings. Members of WGRN have organised conference sessions (Institute of Australian Geographers Conference in 2014 and the New Zealand Geographical Society Conference in 2016), and two national workshops (both in 2016). The formation of the Women and Gender Study Group provides a formalised arrangement to enable ongoing collaboration between members of WGRN and the New Zealand Geographical Society, and acknowledges the role played by the New Zealand Geographical Society and its members in establishing the WGRN. Future activities focus on workshops, writing retreats, publications and participation in conferences.
1.6 Fellow of the New Zealand Geographical Society (FNZGS)

Following on from discussions in 2012 the Society has reorganised its membership categories. This has enabled the society to recognise the efforts of some of its membership by enabling themselves forward or be nominated to be a Fellow of the society. This rearrangement has also mean that a number of Life Members, previously one of a small number of categories available to the society to recognize efforts and achievement have been redesignated as Life Fellows. These changes have been part of a larger reorganisation of membership categories as the journal moves to electronic only status (See 1.8).

1.7 New Zealand Geographical Society Conference

Since 1955 the New Zealand Geographical Society has held conferences, these were for a decade or so held every three years, but from 1977 have been scheduled biennially. Conferences are hosted by the regional branches of the New Zealand Geographical Society. In 1992 a joint meeting with the Institute of Australian Geographers was held in conjunction with the 16th New Zealand conference held in Auckland. Since that time joint meetings have been continued to be held at approximately four yearly intervals on alternating between New Zealand and Australia. The 2012 conference ‘Connecting Landscapes’ was held in December of that year, later than usual and thus falls into the 2012-2016 reporting period. This meeting for the first time featured a non-university city venue – that of Napier in Hawkes Bay. A public lecture was also re-instated as part of the programme in order to try and engage with the local community. While no conference proceedings were published, the society dispensed with producing these in 2003, an edited volume based on paper originally presented at the conference and entitled Engaging Geographies, Landscapes, Lifecourses, and Mobilities was published.

Nearly 20 people took part in a three day marae-based Indigenous geography pre-conference meeting between. The meeting was held at Matahiwi Marae, Clive, Hawke’s Bay, and brought together Indigenous and non-Indigenous geographers and whanau interested on Indigenous issues from around Aotearoa New Zealand, Hawaii, Oregon, Australia, Chile and Colombia. It was an amazing experience where, following a loose schedule allowing plenty of time for informal interactions, the group heard from people involved in Treaty claims in the area, visited places of significance for the local Iwi, and engaged in conversations about our interests and the challenges we face. With a wide range of participants, involving from Masters students to well-established academics, and people with little knowledge of Maori culture to a respected kaumatua, there was always something to share and learn. It was a wonderful opportunity to acknowledge the tangata whenua of the place where the New Zealand Geographical Society conference took place, and to strengthen Indigenous geographies in Aotearoa and beyond. At the end of the meeting, we all left feeling inspired and supported, gained new knowledges and made new connections. These conversations and connections carried on to the main conference, in particular the two Indigenous geographies sessions. We are very grateful of our hosts at Matahiwi Marae, specially Tom Mulligan, as well as the meeting organisers Marcela Palomino-Schalscha (Victoria University of Wellington) and Garth Cant (University of Canterbury).

The 2014 conference, a joint one with the New Zealand Geographical Society and Institute of Australian Geographers, was held at the University of Melbourne in July. Participation by New Zealand geographers from across all the university groups was good. The New Zealand Heads of Geography units also convened a meeting at the conference to discuss matters of mutual interest around post graduate examining and the new 180 credit MA/MSc proposals (i.e. a one year Masters including a reduction in the papers and thesis value as opposed to the existing two year model).

The 2016 conference was hosted by the Otago Branch of the Society at the University of Otago in Dunedin. The conference theme was ‘Geographical Interactions’ and the programme featured key note
speakers from Australia, GB and New Zealand. The organising committee for the 2018 conference is now in place and the Auckland Branch of the society will be hosting what will be another joint meeting with the Institute of Australian Geographers at the University of Auckland.

1.8 New Zealand Geographer

The first issue of the *New Zealand Geographer* appeared in 1945 a year after the society was founded. The Society regards the journal as a general purpose publication with a focus on ‘New Zealand the South Pacific, and the wider Australasian region’ although it does not limit itself to papers concerned with this part of the world. The journal publishes papers on human and physical geography as well as geo-education articles. In consequence, as a society based regional journal it will always suffer somewhat with respect to impact factor rankings. Since 1945 there have been six different cover designs and three different sizes until in 2015 the journal is now effectively available in only an electronic form. While there might be some regrets involved in moving to entirely electronic form this is compensated for by the increased reach of the journal which is now accessed much more widely than in previous years (some 200 overseas library subscriptions when paper based to over 4000 as part of the bundle of subscriptions provided by Wiley). The journal appears three times a year with one of these being a themed special issue.

Our publisher has readily supported the creation of virtual special issues. Those since 2012 have recognized the contribution to New Zealand geography of Emeritus Professor Kenneth Cumberland (University of Auckland) who died aged 97 in 2011, addressed the themes of the Krakow regional congress in 2014 by providing a commentary on papers in the journal over the previous five years that spoke to the conference theme of ‘challenges, changes, and responsibility’ and, in 2015 brought together a commentary and selection of papers from the first 70 years of the *New Zealand Geographer* as way of marking the work of over two generations of geographers.

Virtual special issues

Kenneth Cumberland (1913 - 2011) (Cumberland Commemorative issue 2012)

Karkow IGU Conference virtual issue

Seventy Years of the *New Zealand Geographer*


The Managing Editor is Professor Etienne Nel (Otago University) and remainder of the editorial team is for human geography Associate Professor Nick Lewis (Auckland University) and Associate Professor Juliana Mansvelt (Massey University), physical geography Associate Professor Mike Hilton (Otago) The book review editor is Dr Maria Borovnik (Massey University).
1.9 Asia Pacific Viewpoint

This journal was established as Pacific Viewpoint by Professor Keith Buchanan of Victoria University in 1960, and published by the Department of Geography at Victoria, in order to provide a home for research on the changing geography of the Asia Pacific world. From inception it had an interdisciplinary focus and for many years was edited by geography staff from the founding department. Pacific Viewpoint became Asia Pacific Viewpoint in 1996 and was published by Blackwell (now Wiley Blackwell). The name change brought the journal into closer alignment with its content the journal. Asia Pacific Viewpoint always had a critical interdisciplinary orientation.

Asia Pacific Viewpoint describes itself as publishing ‘academic research in geography and allied disciplines on the economic and social development of the Asia Pacific. Particular attention is paid to the interplay between development and the environment and to the growing interconnections between countries in the region’ (http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1467-8373/homepage/ProductInformation.html)

The Editor-in-Chief is currently Associate Professor Lisa Law (James Cook University) with Dr April Henderson (Victoria University) Dr Fiona Miller, (Macquarie University) and Professor Warwick Murray (Victoria University) as editors. The journal appears three times a year with one of these being a themed special issue.

The New Zealand Geographer and Asia Pacific Viewpoint are now both well-established journals that are complementary in character.

1.10 New Zealand Geographical Board Ngā Pou Taunaha o Aotearoa

The New Zealand Geographic Board in its present form dates back to 1946. The statute under which the Board operates was revised in 2008. The Te Reo Maori part of its name means “the memorial markers of the landscape”. The Board ‘is New Zealand’s national place naming authority responsible for official place names in New Zealand, its offshore islands and continental shelf, and the Ross Dependency of Antarctica’. The New Zealand Geographical Society has a representative on the Board alongside nominees from the Federated Mountain Clubs, Te Rūnanga o Ngāi Tahu, Local Government New Zealand, Ministry of Maori Development (2), and the Ministry of Land Information (2), the National Hydrographer at LINZ is also a board member. The Board is chaired by the Surveyor General. The Board has three sub committees, namely, the Antarctic Names Committee, the Māori Names Committee and the Undersea Feature Names Committee, which meet annually to advise and make recommendations to the Board. There is a considerable backlog of undersea names informally applied that now have to be ratified.

Since 2012 over and above its statutory functions, of assigning official names to features and places, approving recorded names (unofficial names shown in at least two publicly available authoritative publications or databases), altering official or recorded names by correcting the spelling or substituting a new name, discontinuing the use of official or recorded names, investigating and decides on the position and extent of named features, and reviewing and concurs with proposals for Crown protected area names from the Department of Conservation, the Board has been particularly busy particularly in terms of providing advice on Māori place names where these are part of cultural redress aspects of historical claims of breaches of the Treaty of Waitangi signed in 1840 and which opened the way for the British colonization of New Zealand. The Board is not a direct part of the Treaty settlement process but provides advice to the Minister of Treaty Settlements about names that claimants are bringing forward; on occasions the Board may have ‘concerns’ about the veracity of names that are proposed
for restoration. In most other instances the names have a clear historical provenance and conform to good naming principles and there are ‘no concerns’. In some instances the Board may have ‘no concerns’ that features may as part of the settlement have a dual Māori and European name or than a Māori name might replace a European one.

The Board since 2014 has also searched for World War One related names in New Zealand. This work has established that there are a number of World War One related names, mostly, but not exclusively, taking the form of features named after imperial figures. Many of these names on closer inspection have been found to be in recorded names but have not been officially gazetted. As part of the Board’s contribution to the WW100 programme these names are now being officially recognized.

1.11 Research

Since 2012 University geographers in New Zealand have had some success in a highly competitive national funding environment. Some of the highlights are listed below.

2014. Dr Frances Collins (Auckland) Rutherford Discovery Fellowship ‘Nation and Migration: population mobilities, desires and state practices in 21st century New Zealand.’ This is a prestigious five year fellowship for early to middle career researchers.

2014 Marsden Fund Awards
Professor John Overton (Victoria) Marsden ‘Educating for emigration? Searching for appropriate education policy in the Pacific Islands’
Professor Warwick Murray (Victoria) Marsden ‘Re-placing commodity dependence: alternative sustainable and ethical value chains in the resource periphery’
Dr Ailsing Gallagher (Massey) Marsden Fast Start ‘The business of care: constructing a childcare market in Aotearoa/New Zealand’.

2015 Marsden Fund Awards
Dr Karen Fisher and Dr Meg Parsons (Auckland): ‘Rethinking the future of freshwater in Aotearoa New Zealand’.
Professor Paul Kench (Auckland): ‘Putting the Pacific Ocean to the litmus test: resolving a multi-millennial record of ocean pH from corals with the boron isotope proxy’.

The results of the 2016 Marsden round will not be known until around September

1.12 Research and the Performance Based Research Fund

In the early 2000s the New Zealand government chose to unbundle the teaching and research money that it provided to the universities. The funding for teaching for a time was provided on the old basis of more students attracting more money, but was subsequently adjusted in favour of system of caps which if exceeded the institution can take the extra students but will not attract additional funding and likewise not reaching the cap can result in financial penalties. The research money, approximately 25% of the
total was to be reallocated on the basis of a national research assessment exercise, known as the Performance Based Research Fund (usually referred to as the PBRF). The actual assessment involves all eligible academic staff submitting portfolios to expert panels, listing four main research outputs, with some text situating the research along with a list of other research outputs and lists of peer esteem and contributions to research environment. Evidence of the latter have to be separately kept and a number of portfolios are randomly audited as part of the process. The portfolios are graded, new researchers’ apart, into three classes, ‘A’ international, ‘B’ national, and ‘C’ research active each of which attracts a different levels of funding. Aggregates of the scores along with some other weightings for external funding, graduate completions etc. enables each institutions share of the research money to be allocated. The intention was to reward research excellence. The system also ranks research areas across institutions and against each other across 42 subject areas. Not unexpectedly there has been some gaming at the institutional level around the construction league tables, which is often not that meaningful when there are only seven universities. That staff rather than academic units are individually ranked as researchers, although staff may request not to be informed of their scores, is a not uncontested feature of the New Zealand exercise. Geographers have been amongst those who have written of the scheme but who also see it as more than being just a Neoliberal audit exercise but one which opens up some new space for recognising and valuing geographical research.

The third PBRF evaluation round took place in 2012. Geography has been split between Social Sciences for human geographers and Earth Sciences for physical geography. It is also impossible to disentangle the research performance of the physical geographers from the other earth scientists. The 2012 results point, however, to the quality of geographical research being undertaken in New Zealand. Human Geography emerged as second ranked of 42 subject areas taught across the university sector, behind Pure and Applied Mathematics and immediately ahead of Physics, Philosophy, and Psychology. Earth Science was ranked 19 of 42 subject areas. Over 68% of the human geographers were ‘A’ and ‘B’ ranked i.e. internationally and nationally significant. This result is a long run consequence of the commitment of the founding generation of university geographers to research in the 1930s to 1960s. It also reflects the age structure of the discipline with a cohort of mid-career to senior researchers performing at the highest level. Although there was a concentration of A’s at the University of Auckland it was noteworthy that the ‘A’ grade researchers are spread across all the geography units in New Zealand which also indicates that the quality research is being done across all the programmes and is not just restricted to one or two institutions.

2 Geographical Education

This section briefly summarizes developments in secondary school and university geography.

2.1 Board of Geography Teachers

The Board of Geography Teachers, a sub-committee of the Executive of the New Zealand Geographical Society continues to act as the subject association for geography. There are also regional geography teacher associations across the country.

Board of Geography Teachers has made available funding to support teachers’ professional development and recognize excellence in geography teaching. In 2014 funds were set aside to create a conference attendance fund and in 2015 a small sum was made available for professional development. Board of Geography Teachers was a bronze sponsor for the Soc-Con – the teachers’ NZ Social Sciences conference in Nelson in September 2015. This meeting has now assumed some considerable importance on the teachers’ calendar.
During the 2015 there was been some useful dialogue with the Ministry of Education over aspects of
the new curriculum and about the realigned NCEA achievement standards. Progress has been slow.
National secondary school curriculum developments in 2016 include the laying down of various
‘curriculum principles’. One of these ‘future focus’ states that the curriculum is to encourages students
to look to the future by exploring future oriented issues such as sustainability, citizenship, enterprise
and globalisation. Geography teachers see all of these issues as relating well to geography and able to
be made explicit in classroom teaching. However, the Board of Geography Teachers is mindful that
Education Review Office inquiries have shown that ‘future focus’ is the least apparent of the curriculum
principles in class room practice. For all that the Board considers that this new curriculum principle
provides opportunities for the place of geography in the secondary school.

The Board of Geography Teachers quarterly newsletter ‘The Network’ is now a substantial document
that has actively promoted pedagogical discussion and circulates informed interpretation about the
curriculum as well as moderators’ comments on NCEA performance. Teaching material on
sustainability, in a number of contexts, which is one of the key concepts in the new curriculum has been
circulated. This has also included some ‘how to’ guides for GIS and accessing other infometrics (e.g
Statistics NZ) for map work.

The year 11 Maatangi Whenua competition remains popular. In response to the governments ‘priority
learners’ strategy the Board of Geography Teachers has explored ways in which the curriculum can be
made, by judicious selection of topics, more relevant to Maori and Pasifika learners. In 2014 many
teachers have also used Maori Language week as an opportunity to pay attention to the correct
pronunciation of Maori place names.

The performance of the New Zealand team at the Geography Olympiad in Krakow was meritorious with
two silver and two bronze medals. This was the most successful Olympiad performance so far easily
surpassing the previous New Zealand best of two bronzes at Cologne in 2012.

A ‘Geography Awareness Week’ usually held in the middle of the year is another promotional activity
that is part of the school calendar. Another offshoot of Board of Geography Teachers activities has
been the publication of Geography in Focus which fills a gap as far as curriculum and assessment is
concerned, but also considers the pros and cons of issues based approaches.

2.2 University Geography

University restructuring and the creation of schools has typically seen geography subsumed into larger
administrative units, based in Sciences or Social Sciences where the disciplinary name is not part of
the school title. One disadvantage of this is the comparative invisibility of the discipline and its
graduates. Despite these complications university geographers have continued to teach sizable
number of students and to be active researchers. All programmes offer bachelors and post graduate
degrees to the PhD level. The various geography programmes are beginning to position themselves
somewhat differently.

Auckland: Geography was established at Auckland in 1946. For some time Auckland geographers
have been part of a larger entity, the School for Environment. Professor Paul Kench is the Head of
School. They are still the largest geography group in New Zealand of over two dozen within a still larger
school. Geography at Auckland is presented as ‘exciting, challenging and relevant to today’s world.
Geographers study the natural processes of the physical environment, as well as the activities and
consequences of humans in this environment. Some geographers specialise in Coastal, Glacial or
Fluvial Processes and Landforms, Climatology, Biogeography, Hydrology or Environmental Change.
Others study Regional Economics, Population Change, the problems of rural or urban areas, or the experience of particular groups such as Māori. Still others, specialising in Spatial Analysis, bring the power of geographic information science to bear on a wide range of research problems. Increasingly, these varied interests are coming together in the study of environmental problems and Geographers lead the way in resource management.xiv

**Waikato:** The Geography Programme at the University of Waikato was established in 1964 and is distinctive nationally for being essentially a human geography group. They are committed to: understanding relationships between natural systems and human societies to inform collective futures; identifying interconnections between space and place, through creative, critical, ethical and reflexive thinking about geographical issues; integrating geographical perspectives on social, cultural and environmental justice to contribute to innovative problem-solving; analysing, evaluating and developing representations of space and place using a range of qualitative and quantitative methods; developing knowledge and appreciation of Māori geographies, feminist geographies, environmental geographies and geographic information systems; engaging with complex regional geographies and their national and global connections. The University of Waikato’s feminist geography, has, over the past two decades been at the forefront of human geographical research nationally and internationally. Waikato is the only University of offer Māori Geography and Māori Environmental Planning. Professor Dame Evelyn Stokes’ appointment as a foundation staff member at the University was vitally important as she established geographical scholarship on Māori and gender. Dr Naomi Simmonds now anchors Māori.xv Dr Colin McLeay is the Convener of the Geography Programme.

**Massey:** Geography at Massey dates back to 1960 and the days of Palmerston North University College. A series of Departmental mergers led to the establishment of the School of Global Studies in 1999 which expanded further in the early-2000s to become the School of People Environment and Planning in the College of Humanities and Social Sciences. Around 2011 the physical geographers joined the Institute of Agriculture and Environment in the College of Sciences. Geography at Massey University is described as ‘a study which examines the surface of the Earth as peoples’ home. Human geography focuses on social processes and people, and physical geography is concerned with patterns and processes in the natural environment’.xvi Currently the human and physical geographers continue to teach into courses that are part of majors in both the BA and BSc degrees. In 2015 Dr Jia Ye was appointed to human geography position at Massey’s Albany campus in Auckland. Dr Kat Holt chairs the cross- college Geography Discipline Committee.

**Victoria:** Founded in 1946 the department has been for some time part of a larger School of Geography, Environment and Earth Science. The discipline is positioned in the following terms ‘Geography at Victoria is about the place where we live and who we are, and the interactions between them. Our courses tackle the big questions that relate to our future and appreciation of local impacts, as well as a truly global knowledge base’.xvii Associate Professor John Townend is the Head of the School for Geography, Environment and Earth Sciences. The Director of our Geography Board of Studies is Dr Bethanna Jackson.

**Canterbury:** The University of Canterbury geography department is the oldest in New Zealand being established in 1937. Along with Otago it remains as a standalone department where it is based in the College of Sciences. At Canterbury geography is described as ‘a distinctive discipline and one with a special place in the university. It encourages students to take a holistic view of the world and their place in it: it’s about putting knowledge together, rather than taking it apart. It focuses on the relationships between people, their places and their environments, and the ways in which these can be made more sustainable for the future’.xviii Associate Professor Peyman Zawar-Reza is the Head of Department.
Otago: At Otago University Geography was established in 1946 and is based in the Division of humanities. The discipline positions itself as ‘Nau mai, haere mai ki Te Iho Whenua. Geography is an environmental science concerned with the causes and organisation of natural and human phenomena across the globe’. The department notes, ‘We live in an interdependent world caught up in chains of events which span the globe. We depend upon increasingly fragile human and physical environments, whose complex interactions require sophisticated analysis and sensitive management. These issues present intellectual and practical challenges of the first importance and they are amongst the central problems of modern geography. Te Iho Whenua – the connection between people and the earth. Our name in te reo Māori is derived from an important tikanga (custom). The identity it suggests, speaks of the pivotal relationship between people and the earth (Papatūānuku). Traditionally, it has been common to bury or return the placenta (whenua) of a newborn child to Papatūānuku, thereby connecting the child with the land (also ‘whenua’). This practice is known as iho whenua and is central to the concept of being tangata whenua (people of the land). For us as a Department of Geography, the name Te Iho Whenua symbolises our focus on the interwoven human and physical processes that together constitute the environment’. Professor Sean Fitzsimons is the Head of Department

3. Acknowledging Past Contributions

The New Zealand Geographical Society makes a number of awards to secondary and university geographers in the areas of teaching excellence, distinguished service, and research. Obituaries are also on occasion published.

3.1 Distinguished New Zealand Geographer Medals

This is the Society’s premier award. It has been awarded annually since 2001 and only a few occasions has more than one award been granted in a single year.

2013 Emeritus Professor Robert (Bob) Kirk (University of Canterbury): His research and publications as physical geographer specialised in the science of coastal landforms and lakeshores, and the physical processes that form and change them to the science of Coastal Geomorphology since 1965. He has a deep interest in the relationships individuals and communities have with the sea and coastlines and associated issues as concerns coastal management. He has published 86 papers in international and national peer reviewed scientific journals, such as Progress in Physical Geography, Coastal Engineering and Nature, books and conference proceedings and 145 technical reports. He has frequently appeared in Court as an expert witness leading to precedents that have influenced coastal management in New Zealand.

2013 Professor Philip Morrison (Victoria University): His research articles are in a wide variety of prestigious journals including Urban Studies, Housing Studies, Labour Economics and Geoforum. He also has an excellent co-edited book – Geographies of Labour Market Inequality, published by Routledge Press which followed his book, Labour Adjustment in Metropolitan Regions, published by the Institute of Policy Studies and Victoria University Press. His work on housing and labour markets is ground breaking and important, not just in Geography, but more broadly across the social science disciplines.

2014 Professor Robin Kearns (University of Auckland) His excellence as a socio-cultural geography researcher is exemplified in his remarkable publication record and in the high esteem in which he is held by the global geography community. Over the past 27 years, Robin has published more than 130
journal articles, two books, 39 book chapters, 14 papers in edited conference proceedings, and 30 significant other publications. Among other leading journals, Robin has published in Social and Cultural Geography, Antipode, Geoforum, Environment and Planning A, Journal of Rural Studies, Transactions of the Institute of British Geographers, Area, and Progress in Human Geography. He has explored the links between culture, health and place. His work is empirical and theoretical and ranges across rural, urban, coastal and health system spaces. It is given meaning by a deep humanist politics.

2015 Emeritus Professor John Flenley (Massey University): He has made significant contributes to scholarship in the field of biogeography and palynology in particular and he has continued to write and supervise after his formal retirement from Massey University in 2001. Using palynology techniques he has reconstructed the environmental history of Rapanui Easter Island and more recently been involved in refining the palynology techniques employed during this time, culminating in the development of automated means of identifying fossil pollen grains. Automation has the potential to revolutionize the field as it will significantly alter the time spend on identifying and counting fossil pollen grains in the lab allowing more time for interpretation. Several prototype machines have been sold overseas and the development is being carried further by some of former students.

2015 Emeritus Professor W.A.V Clark (UCLA): His work which is reported in more than 400 research articles, reports and 9 books examines the impacts of urban structure on population flows between cities and suburbs, white flight and the impact of legal intervention on the urban mosaic, and analyses of the local outcomes and impacts of large scale international migration, especially in California. He has combined his dual interests in geography and demography to study residential segregation in U.S. cities, as well as patterns of migration, mobility, and labour force participation, especially of two-worker households. Recent papers link mobility and migration in US and British housing markets and confirm much of the current research on why families and individuals move their residence. To the long-standing arguments about race and class in residential segregation, his recent papers demonstrate that class is a powerful explanation for patterns of separation for both the foreign born and native born residents.

3.2 Obituaries

John Ure Macaulay (1925-2014): DNZG 2001 John Macaulay gave meritorious service to successive generations of secondary school teachers and pupils in New Zealand. He completed a BA in geography from the then Canterbury University College in 1948 and graduated from Christchurch Teachers’ College. He combined teaching with part-time study for an MA (1952). After teaching in Auckland he joined the Christchurch College of Education in 1968, retiring in 1983. He wrote numerous school text books and played a pivotal role in the development and operation of the Geography Resource Centre (1974 to 2000) which supplied teaching materials to secondary school geographers. He was an active member of the New Zealand Geographical Society as a committee member, journal editor and member of the Board of Geography Teachers.

Emeritus Professor Harvey Franklin (1928-2015): He completed a BCom (Geog) at Birmingham and was appointed Junior Lecturer at Victoria University of Wellington in 1951 retiring as Professor in 1993 and becoming Emeritus Professor thereafter. He had an international reputation for his work on Europe (The European Peasantry- 1969) and his interpretation of New Zealand economy and society (Trade Growth and Anxiety - 1978 and Cul De Sac - 1985). He was elected a FRSNZ in 1995, one of only three at the time. Trade Growth and Anxiety offered some rich insights into the structural legacies of New Zealand’s colonial past as one of Britain’s overseas farms. His work was characterised by a command of an array of ideas many taken from beyond the conventional bounds of geography at the
time and by an ability to take the mundane events and interpret them in a much larger context. His work reached out far beyond the disciplinary boundaries of geography.

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i http://www.productivity.govt.nz/about-us/the-commission


iii http://www.royalsociety.org.nz/organisation/about/act/


v Text Provided by Dr Maria Borovnik (Massey University).

vi Text provided by Dr Karen Fisher (University of Auckland).

vii Text provided by Dr Marcela Palomino-Schalscha (Victoria University of Wellington).

viii http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1467-8373/homepage/ProductInformation.html


x http://www.linz.govt.nz/regulatory/place-names/about-new-zealand-geographic-board


xii PBRF 2012 Table A-3 Subject Area Results – all subject areas 2012 p. 89-10


xv Text provided by Professor Lynda Johnston (University of Waikato).

xvi http://www.massey.ac.nz/massey/learning/departments/school-people-environment-planning/study/subjects/geography.cfm

xvii http://www.victoria.ac.nz/study/programmes-courses/subjects/geography

xviii http://www.geog.canterbury.ac.nz/prospect.shtml

xix http://www.otago.ac.nz/geography/index.html

xx http://www.otago.ac.nz/geography/index.html

xxi These are condensations of fuller citations available on the New Zealand Geographical Society Website. http://www.nzgs.co.nz/awards/distinguished-new-zealand-geographer
REPORT OF THE
ROMANIAN NATIONAL GEOGRAPHICAL COMMITTEE (2012 – 2016)

The meetings of the Romanian National Committee of Geography were organized annually having been attended by representatives of each university center with a geographical profile, of Romanian Geographical Society and of other professional and scientific associations from geography (Geomorphological Association, Association of Human Geographers, Association of Limnology, Professional Geographical Association, etc.). During these meetings, the annual agenda of the geographical scientific events is agreed.

In Romania, three meetings of IGU-related commissions were held:


- Geography of Health and Health Care – Spatial Inequalities and Inequities in Health and Healthcare Provision: Embodied Landmarks for Territorial Systematic Development Workshop, organized by the University of Bucharest, Faculty of Geography in collaboration with the IGU Commission for Health, Environment and Development.

Romanian National Committee of Geography helped the highly graded pupils to participate in the first edition of the Geographical Contest in the Balkans, held during June 24-30, 2015 in Belgrade. Also, it contributes annually to the preparation of the group of pupils that represent Romania to the International Geographic Olympiad.

In collaboration with the Future Earth National Committee there have been organized national and international conferences focusing on transdisciplinary aspects.

The Romanian National Committee of Geography has been involved in the organization of inter-regional conferences (Romania – Bulgaria – Hungary - Serbia) and of scientific events of macroregional importance within the framework of European Union Strategy for the Danube Region.

Representatives of the Committee participated in the IGU Congress in Koln (Germany) and in the regional conferences in Kyoto (2013), Cracow (2014), Moscow (2015).
2012-2016 Report from Saudi National Committee –
International Geographical Union

As of the beginning of the year 2012, Saudi National Committee has amassed all its abilities to perform the outline of its activities that should attain its goals, basically to emphasize the role of geography as a development-directing science. These activities have increased in number to 37. Some of these activities are manifested in the following axes:

1- Strengthening relations and communications with International Geographical Union and its specialized committees:

This activity was manifested in circularizing all results, resolutions and recommendations taken by the Union, its committees and its specialized groups to members of Saudi Geographical Committee, and geographical society in K.S.A. Circulars sent within the period of 2012-2016 to Saudi geographers, individuals and institutions, amounted to (846) circulars.

Saudi national committee always emphasizes the significance of the activities of Union's committees and groups which are considered rich source for international expertise and most recent methodologies and applications on the international level, which should be emulated in the work of national committees and specialized groups. Therefore, we find that these reports of international committees and groups (especially those of CGE & IGU- Urban commission) represent rich sources for national committees and specialized groups. Several committees and specialized groups within Saudi geographical society did utilize the programs and researches of these international committees and action groups. It is hoped that this utilization should lead to new horizons of joint cooperation between Saudi national committee and I.G.U. committees, so that it can develop the concept of national geography into action utilitarian to individual and society. On our part, we have tried to continue that cooperation to contact the groups: The commission of Hazard and Risks to attend and participate in the eleventh symposium of geography departments at the Saudi universities entitled: "natural hazards and their impact on development", which was held at the University of Taiba in Medina City, Saudi Arabia during the period 11-13 March 2014. Two requests were received from Dr. M. M. Sheikh and Prof. Haruyama to participate in the symposium.

There were strong communications between Saudi national committee and I.G.U. during the office of Vallega, especially those concerning earth planet committees, however these communication grew less then totally stopped after his death. However, there are now
communications with the Saudi national committees such as those regarding details of I.G.U. executive committee's meetings, reports on joint action between I.G.U. and some international associations and organizations, such as social sciences international report, which we believe that they are very useful in highlighting world view about many topics that concern geographers. Therefore, in this concern, we would like to extend our thanks to Union's President, Professor Vladimir Kolossov, and Union's General Secretary, Professor. Mike Meadows for circulating such reports.

Continuing M.O.U. between Saudi Geographical Society and I.G.U., the Society has endeavored to translate the newsletter issued by I.G.U. into Arabic, and linking it with the SGS site. Number of newsletters translated and uploaded on the site amounted to 29 issues. Translating the new newsletter issue from I.G.U. website is underway.

Saudi Geographical Society has translated the first version of the International Geographical Union website, and after adjusting the Union site the SGS added the appropriate adjustments on the translation. But after the third amendment no changes have been done to the translation.

The SGS started a communication with the IYGU and a memorandum of understanding was signed to establish a regional center in Saudi Arabia, which began operations in the KSU and in Nepal, and we have a plan to continue the implementation of the program of lectures and seminars in Saudi Arabia, Egypt, Sudan and the Gulf states.

A Lecture entitled “The role of the Department of Geography at the service of society in America” was delivered by Dr. Vang Shaw - Head of the Department of geographic information systems at the University of Texas in the United States at King Saud University 25/1/2015.

2- Strengthening joint activities with Saudi scientific institutions:
Believing in the disability of achieving goals except through cooperation to change some negative images that geography faces, Saudi national committee has extended its arms for cooperation with individuals and institutions thus giving hope it will help in understanding geography, effecting the role of the committee (society) in participating in local, territorial and national development program.

National committee's International reputation has become an impetus for increasing the effectiveness of Saudi Geographical Society on the national level as it has become a resort for aid request in several causes that concern the Kingdom geographers such as responding to media campaigns against geography, discussing any results to shut down or shrink some geography departments in the Kingdom, or discussing the issue of recruitment of geographers with concerned governmental establishments. The national committee has even become a resort for
support of some international causes that concern geographers all over the world. The society has also become an intended place for geographers to activate their scientific accomplishments, and inventions and turning them into products that benefit the community such as Smart tools to determine the direction of Makkah for passengers out cities.

The society has managed to win the trust of some public and private establishments when they asked for advice for some of their work, such as Ministry of Education's request for "Society's view about geography education methodology in public education. A M.O.U. was signed between the SGS and the department of education Affairs in the Ministry of Education for cooperation in developing a training program for teachers of geography in Riyadh City.

3- Follow up the development of Geographers Number in the Kingdom:

The National Committee represented by the Saudi Geographical Society, before the end of the academic year, every four years, distributes questionnaire to the concerned department in ministry of Education and Geography departments in the kingdom to determine the status of geography in the kingdom. 2015 questionnaire results show that there is an increase in the number of geography teachers in education of all its levels (preparatory, primary and secondary) specially females, compared with a former questionnaire held in 2011 (increase percentage amounted to 12.4%), which requires more effort to communicate with these increasing numbers. However, for university education, geographers in all levels (faculty members, lecturers, demonstrators, technicians) reached 317 members, which indicates tendency towards decrease (39 members compared to 2005). This decrease may be related to the shutdown of some geography departments such as the Geography department at King Khaled University, or stoppage of admittance on bachelor level in Al-Qassim University). Coordination between the SGS, the concerned departments and the Ministry of Civil Service succeeded in the re-opening of these departments in 2015.

4- Building –up Bridges of Scientific Communication with National and International Academic Institutions:

The Saudi geographical society has cooperated with several establishments in holding public lectures, symposia or exhibitions as follows:

1-The SGS organized and effectively participated in organizing the symposium of Geography departments in the Kingdom universities in 2014. Efforts are going on to hold the next symposium in 2016 or 2017.

2-The Society has started making extensive contacts with the preparatory committee to view some opinions about the 6th Arab geographical conference which was supposed to be held at autumn 2011, in Damascus.
Efforts are going on to hold the next conference in 2016 or 2017 in Sudan.

3- The SGS continues to implement a national campaign to protect the environment in general education schools and social service centers in the Kingdom. So far 28 episodes and lectures were held in several regions of the Kingdom.

4- Scientific day: the development of human resources in spatial information technologies, organized by the Saudi Geographical Society in cooperation with the Idrisi educational company, 2013, was held at King Saud University.

5- A Panel Discussion: "Urban and demographic changes in the city of Medina," was held on the occasion of the selection of Madinah city as the Capital of Islamic Culture for the year 2013. The Discussion has been held in 2014 at Literary Club in Medina.

6- A Panel discussion on "the risk of floods" was held in 2014 at the University of Salman Bin Abdul Aziz at Al-Kharj city.

7- Scientific day: the development of human resources in spatial information technologies, organized by the Saudi Geographical Society in cooperation with the Idrisi educational company, dated 20/11/2013, was held at King Saud.

8- Holding a symposium under the title "Touristic Potentialities in Tabuk Region" in Mayslon hotel, Tabuk City.

9-Lecture: "Saudi relations and the European Union: the current situation and the future WHAT CHOICES", has cast a lecture by Dr. Valentina Kostadinova, the lecture was held on 30-4-2014 at King Saud University.

10- Lecture: "the objectives and results of the participation of King Saud University in the scientific journey to the South Pole," was delivered by Prof. Dr. Abdul Aziz bin Abdullah ben Laboon from the Department of Geology, Faculty of Science, King Saud University, the lecture was held on 28-5-20014, at King Saud University.

11-Lecture: "Strengthening the values of academic integrity (in coordination with the Department of Geography). The lecture was delivered by Dr. Falleh Rabiean al-Qahtani, dated 06/06/2014 at King Saud University.

12-Lecture: "Education and health services for the villages in the Saudi countryside: a model for the western region" has been delivered Dr. Mohammad Mishges, from the Department of Geography at King Abdulaziz University. The lecture was held on 07/05/2014 at cultural club in Al- Ghat City.

13- Holding a symposium under the title "Teaching Geographical information systems in geography sections in bachelor stage" at Faculty of Arts for Girls, King Faissal University, Faculty of Arts for Girls, Dammam
14 - Holding a symposium under the title "Dictionary of Geographical Terms" at King Faissal Center for Islamic Researches and Studies in Riyadh.

15- A Seminar on “geography education in Saudi Arabia” was held in cooperation with the education office in the ministry of education in Riyadh City, 2016.

5- Participation in some causes related to geography which the kingdom undergoes:

Saudi national committee exerts its utmost efforts to activate society's enlightening targets through familiarization with the related problems which the kingdom may undergo, explain the geographical aspects of these problems and show the best means for facing them. Examples of these are:

- A Panel Discussion: "The Future of the Arab countries in light of the Arab Spring: Cooperation or repulsion” which took place in 2013 at King Saud University.

- A panel discussion: "The role of geography and its contributions in the science of comparative religion", which took place in 2013 at Imam Muhammad bin Saud Islamic University.

- Holding a symposium on "Al-E'iss earthquakes-Medina region" in cooperation with Taiba University in Medina, in which specialized geographers, geologists and civil defense specialists participated. A program about the same issue was shown in Ektessadiya satellite channel under the title "Ecoes".

- Holding a lecture under the title "facing the natural risks" at prince Salman Social Center in Riyadh

- Holding a symposium on "An experiment of measuring rain water" in cooperation with prince Sultan Ibn Abd El-Aziz Center for water, environment, and desertification researches in King Saud University.

- Holding a symposium under the title "Ibn Khamis : a symbol of geography symbols in the Peninsula" in cooperation with art club in Riyadh city on the occasion of commemorating Sheikh Abd Allah Ibn Khamis.

- A lecture titled "Management of floods in Jeddah city" was delivered, by Princess, Dr./Mashael Mohammed Al-Saud, using space technology, and geographical information systems.

- The Iranian project and the Cooperation Council for the Arab Gulf States. A Lecture delivered by Dr. Ibrahim bin Abdullah al-Shaalan, King Saud University, 2015.

- The role of Individual differences for manpower strategy in assessing the value of the state: a study in political geography. A lecture delivered by Dr. Hosah Al-Saif at King Saud University, 2015.
6- The efforts on enrichment of scientific and cultural publication move:

Saudi Geographical Society releases many scientific issues as follows:
1- A series of geographical researches- its issues have reached 112 numbers up till now (at the average of 4 issues a year)
2- A series of geographical studies- its issues have reached 25 numbers (at the average of 2 issues a year)
3- Arab magazine for geographical information systems- Nine volumes including 17 issues, each issue includes three researches were released in addition to other chapters about conferences, book reviews, and related news.

Some of these issues numbers have obtained international and local prizes.

The Society also releases educational series as follows:
1- Geographical newsletter (two issues a year) which is concerned with geographical society in K.S.A.
2- Cultural newsletter (two issues a year) which is concerned with presenting vital geographical subjects in a simplified and easy way to educate the society with the concept of geography, its importance and subjects.
3- A series of informative books on the cities and countryside of K.S.A. and concentrate on the Kingdom's places of geographical and touristic attraction (Four Issues were released).
4- There is a new series under formation dealing with publishing thesis approved from geography departments in the K.S.A.

The Society issues from time to time, series and specialized books which are related to certain occasions such as:
1- Issuing cultural season’s series, this concentrates on publishing the books on symposia and lectures held by the society.
2- Issuing a series (every five years) on the results of scientific trips made by the society.
3- Issuing special books about Saudi and Arab geographical characters such as the book released about Professor/Abd Allah Youssef Al-Ghoneim, of Kuwait University.

7- Annual Cultural Programs:

Saudi geographical society has started since the year 1999 in organizing annual cultural programs which include public lectures, and symposia by the average of four activities per academic year that may be increased in some years. The period 2012 -2016 cultural program covered important topics such as:
- A lecture titled "Revival of manual industries in support of tourism and rural development: products of soap stone at "Awdhakh as an example".
- A lecture titled "Climatic changes"
- A lecture titled "National urban observatory: policies and indicators"
- A lecture titled "Electrical rationalization and its relation with thermal retention".

Often, each annual general assembly's meeting of the Saudi geographical society is accompanied by a scientific meeting specialized in one of the topics of general interest which emphasizes the applied, utilitarian and technological horizons of geography. Number of these scientific meetings numbered since 1990 till 2016 to 13 scientific meetings.
Faculty of Geography- University of Belgrade three years ago renewed Serbian membership to IGU after a discontinuity of few decades. Since then most of the activities among Serbian geographers were focused on Individual participation to Conferences, summer schools, meetings and seminars. Serbian geographers at great deal participated to IGU Congress in Krakow 2014 and made quite good collaborations with other colleagues.

- Having chance to get information on geographic activities abroad prof. Danica Santic participated in the third International Social Science Council’s (ISSC) Programme of World Social Science Fellows Seminars on the theme of Global Social Governance. The overall aims of the ISSC’s programme of seminars were to create the next generation of social science leaders, by focusing on global challenges and priorities with particular relevance to developing countries. At the London Seminar, the Fellows from across the world worked together with other participants, and with leading international specialists, policy advisers, practitioners and publishers, to explore different approaches to inter- and transdisciplinary research, their methodologies, the gaps and problematic of emerging themes. One of the outcomes of the Seminar was an organization of the International Scientific Conference: “Contemporary migration in a Changing World: New Challenges and Perspectives” organized by University of Belgrade/Faculty of Geography which will be held at University of Belgrade – Faculty of Geography from 18th till 21st Sept 2016.
- Membership to IGU also gave possibility to Serbian Center for Talented Students to participate to Geography Olympiad in Moscow on 2015. Even more, Serbia will be a host of the next Olympiad, which is going to be in Belgrade, 2018.
- In recent period there were two conferences organized by geographic Institutions in Serbia: Faculty of Geography and Institute of Geography of Serbian Academy of Science and Art “Jovan Cvijic” but had mainly local character and were dedicated to Serbian geographers. There was recently (June 2016) a Workshop and Conference on Geo-Machine Learning and Geostatistics that was of international profile co-organized by Faculty of Geography.

Membership of Serbia in International Geographic Union brought many possibilities for Serbian geographers to get information of what is going on in the IGU world. However, more active role of Serbian geographers in terms of specific project collaborations or inclusion in decision-making bodies is still missing. Regarding state of the Geography as a discipline, in Serbia Geography is still perceived as a compulsory subject in all schools. However, syllabus at all levels of education should be refreshed in most of the aspects. On the other hand, application of Geographic knowledge in Serbia is also missing.

Representative of Serbian National Committee

Jelena Lukovic

It is a pleasure to present to the Quadrennial Report of the South African National Committee (SANC) of the IGU to the 33rd International Geographical Congress, Beijing, China, 21-25 August 2016. South African geographers have continued to make notable strides in participating in IGU activities. The Year 2016 is a milestone as the Society of South African Geographers celebrates a century of Geography teaching and research at tertiary level in South Africa. This Report presents an overview of the activities of the SANC and the Society of South African Geographers (SSAG). There is a symbiotic relationship between the SANC and the SSAG, and a significant overlap in membership.

Terms of Reference: SANC of IGU

• To inform all South African geographers of the IGU research programmes and related matters. Where possible to direct South African geographical research to fit in with the appropriate commissions and study groups. To also keep geographers in the Republic of South Africa informed of important decisions taken by the Union.
• To advise the national adhering body to ICSU, the National Research Foundation (NRF), on matters relating to its membership of the IGU.
• Through the Secretary to be kept informed of the activities of the IGU.
• To make recommendations to the NRF on the most effective method of national cooperation and integration with the activities of the IGU.
• To make recommendations on delegates to attend General Assemblies of the IGU and to seek and advise on sources of funding if these are not otherwise available.
• Ultimately to expand representation on IGU Commissions and Study Groups.
• To liaise with ICSU-SA and other national committees associated with Geography (e.g. INQUA, IUGS, IGBP and ICA).

SOUTH AFRICAN NATIONAL COMMITTEE FOR THE IGU: 2010 - 2016
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South Africans on IGU Commissions

Professor ME Meadows, University of Cape Town, Secretary-General and Treasurer, IGU

Professor Brij Maharaj, University of KwaZulu-Natal, Steering Committee Member, Commission on Global Change and Human Mobility

Professor Maano Ramutsindela, Steering Committee Member, Commission on Indigenous Peoples' Rights and Knowledges, and Commission on Political Geography

Dr Teresa Dirisuweit, UNISA, Steering Committee Member, Commission on Cultural Geography

Prof Sanette Ferreira, University of Stellenbosch, Steering Committee Member, Commission on Tourism, Leisure and Global Change
Prof Werner Nel, University of Fort Hare, Steering Committee Member, Commission on Geomorphology and Society

Professor Roddy Fox, Rhodes University, Steering Committee Member, Commission on Marginalization, Globalization and Regional and Local Response

Professor Andre Horn, UNISA, Steering Committee Member, Commission on Urban Geography

Professor Gordon Pirie, University of Cape Town, Steering Committee Member, Commission on Geography and Transport

Professor Thandi Nzama, University of Zululand, Steering Committee Member, Commission on Geoheritage

IGU Commission Meetings in South Africa

The Commission on Indigenous Peoples' Rights and Knowledges and Commission on Political Geography held a meeting in conjunction with the Society of South African Geographers’ Conference at the University of Cape Town in June 2012.

The IGU Urban Commission Conference - Life in a changing urban landscape, hosted by the Department of Geography, Environmental Management and Energy Studies (University of Johannesburg) and The Department of Geography (University of Stellenbosch), 21 – 26 July 2013. The Organizers of the Conference called for papers that offer provocative, insightful and novel ways of looking at an ever changing urban landscape on the following themes:

- Technological innovations and creative activities in cities
- Contested social spaces
- Creating sustainability
- Dilemmas of aging cities
- Increasing insecurity
• Urban heritage and conservation
• Urban governance
• Complex urban systems.


Society of South African Geographers

The Society of South African Geographers is a democratic, non-partisan, non-racial and non-sexist scientific organisation. Its objective is to advance the research and educational activities of all South African geographers by:

• collectively representing the interests of South African geographers regionally, nationally and internationally;
• encouraging and supporting high quality research and teaching in Geography;
• providing a national geographic information resource for geographers and interested groups;
• stimulating awareness of geographic and environmental matters through academic collaboration with other intellectual communities and accountable interaction with the public at large.

The Society achieves these objectives by

• publishing and effectively disseminating scholarly research results in The South African Geographical Journal and other occasional publications,
• through the organization of prestige lectures,
• by encouraging regional and special interest group activities,
• by organising a biennial conference, and
• by performing other services such as representing geographers on various official Department of Education subject groups.
Membership of the Society is open to all who share its objectives.

The Society recognizes the achievements of its members through several types of award inter alia, the Jubilee Bursary (for an Honours Degree student), the Bronze Medal (for outstanding Masters’ Degree thesis), the Gold Medal (for outstanding service to the geographical community in Southern Africa) and the Fellowship (for outstanding and sustained scholarly contributions).

The Society also provides seed funding to support the Annual Conference of South African Geography students.

The SSAG also paid the affiliation fees of the

Research Output

The South African academic/research Geography community is relatively small, numbering about two hundred. Nevertheless, this is a vibrant and dynamic community, publishing their research in national and international journals and edited book collections that reflect the range of IGU Commissions. The list of published papers can be downloaded from the SSAG’s website http://www.ssag.co.za/# (under Reports).

South African Geographical Journal

The Society of South African Geographers (SSAG) in partnership with Routledge Taylor and Francis Group publishes the South African Geographical Journal which is peer-reviewed, twice per year – and with additional special editions on occasions. About 350 local and international institutions subscribe to the Journal. The Journal is also distributed to all members of the Society at no cost. The South African Geographical Journal considers publication of original material on all aspects of Geography, both physical and human, with particular relevance to southern Africa. Material published includes peer-reviewed research papers, review articles on specific topics of geographical interest and short research notes, and book reviews. The major requirement for publication is the significance and value of the work for the development for Geography and geographers.
SSAG Conferences

The SSAG hosts a Geography Conference on a biennial basis. The 2012 Conference was held at the University of Cape Town in June, and the 2014 Conference (also in June) at the University of Fort Hare. The Society will hold its Centenary Conference in September 2016 at Stellenbosch University, where the Society was founded.

South African Geography also prides itself in that annually, for the last 41 years, Geography students have held their own Conferences, with some support from the SSAG. In alternate years, the Students’ Conferences are held with the Academic Conference to foster greater student-academic interaction.

‘SSAG’ Centenary – Origin and Growth of Geography Discipline¹

Geography in South Africa achieved a very important milestone with the centenary of teaching Geography at University. The introduction of Geography as an academic discipline at the tertiary level in South Africa preceded the establishment of Universities and Geography Departments (Stellenbosch University the first in 1920), and the South African Geographical Society which a twenty-nine-year-old Scot, James Hutcheon, established in 2017 at the University of the Witwatersrand. The teaching of Geography in South Africa commenced in 1914 at Victoria College (the forerunner to Stellenbosch University), albeit by non-geographers. According to Barnard (2016) the earliest geographers who exclusively lectured Geography at universities were James Marnoch Hutcheon (1888-1921), who was appointed to the South African School of Mines and Technology (after 1922 known as Witwatersrand University) in 1917; Petrus Serton (1888-1963) at Stellenbosch in 1920; Francis Plummer (1892-1970) at the Transvaal University College (after 1930 the University of Pretoria) in 1923; and William John Talbot (1908-1995) at the University of Cape Town in 1936.

Four phases in the establishment of the South African Geography Departments can be identified. The first can be seen as the founding phase that led to the establishment of the pioneer Departments (three Afrikaans and one English-speaking) at Stellenbosch, Pretoria, Free State and Witwatersrand in the early 1920s.

The second phase extends from the 1930s up to the implementation of the historically white universities (in the 1960s) in terms of the state’s apartheid policy. The second phase constitutes the strengthening and consolidation of Geography Departments at four types of tertiary institutions: the English-speaking Universities of Cape Town, Rhodes and Natal; the establishment of the first Geography Department for black students only (at the University of Fort Hare); the introduction of Geography at the Country’s only distance education Institution (University of South Africa); and the institution of a Geography Department at the Afrikaans-speaking Potchefstroom University for Christian Higher Education.

The third phase saw the establishment of Geography Departments at the new Historically Black Universities (HBUs) within the apartheid policy frameworks that enforced separate development at all levels of society, including higher education. Apart from Fort Hare, the HBUs had their origins in the structuring of apartheid higher education as propagated under the provisions of the Extension of Universities Act of 1959. This Act led to the establishment of five rural-based Universities (and Geography Departments) in the former Homelands: The University of the North in Lebowa and a campus in Qwa Qwa; University of Zululand in Kwadlangezwa; University of Transkei in Umtata; University of Bophuthatswana in Mafikeng and the University of Venda in Thohoyandou. In addition, three urban racially-based Institutions were established: the University of the Western Cape in Belville, Cape Town for coloured students; the University of Durban-Westville in Durban, for Indian students; and the multi-campus mixed tuition mode Institution of the University of Vista with campuses in seven centres (Bloemfontein, Daveyton, Mamelodi, Port Elizabeth, Sebokeng, Soweto and Welkom) and one distance education campus in central Pretoria. In 1951, the National Party government established a Military Academy at Saldanha Bay (near Cape Town) where Military Geography was taught. In the 1970s the Rand Afrikaanse University (RAU) was established to cater primarily for the needs of Afrikaners in Johannesburg.
The final phase reflects the post-apartheid era, with a number of Departments from various institutions merging to reflect a radically re-imagined higher education landscape, posing different and new challenges for disciplines in a radically changed national context. In addition, there was the establishment of an international University in Johannesburg in the form of a branch campus of the Australia’s Monash University. The most recent Geography Department is at the University of Mpumalanga (UM) (which was established in 2014). Geography will be offered at UM within the School of Biology and Environmental Science, beginning in January 2017. Importantly, Geography was also taught as a discipline within the Faculties of Education at some tertiary Institutions.

Many themes of University Geography teaching were evident in different institutions. First, many Geography Departments concentrated on training students to become Geography educators, and for service in local governments, the former regional services councils, in the Bantustan Homelands and in provincial government. Second, in the 1990s, the Geography Departments repositioned themselves and adapted their focus to greater “industry relevant” and applied courses and programmes, such as environmental and resource management, Geographical Information Systems and Remote Sensing, climate change and sustainability.

The post-apartheid era has also witnessed an increased number of international geographical scholarly exchanges at the individual level, via collaborative research partnerships, and through attendances at international conferences, such as the International Geography Union meetings and Commissions, and the Association of American Geographers (AAG) Conventions. South African Geography has – since its inception - been characterized by paradigmatic shifts from Regional Geography to Spatial Science, Radical Geographies (Critical Geographies), and Cultural (Postmodern Geographies) and Feminist Geographies – all in tandem with the international developments. Moreover, in the midst of the 2015-2016 University students’ protests – epitomized by the ‘Rhodes Must Fall’ campaign - South African geographers are being increasingly challenged to reflect more seriously on, and embrace, the decolonization and the Africanisation of the Geography curriculum.
The Future

The challenges facing Geography and geographers in South Africa include the following:

i) Increasing SAAG membership (including students and educators);

ii) Supporting the development of emerging academics and researchers; and

iii) Increasing the public profile of the discipline and associated career opportunities.

However, geographical activities cannot be confined to ivory towers and they have implications for praxis beyond. There is a need for progressive geographers to put their talents at the service of disadvantaged groups outside the confines of the university. The ultimate challenge for Geography in South Africa is to maintain and sustain a critical intellectual agenda; survive as a discipline in an era of commodification, restructuring and institutional mergers; engage in socially relevant research that is sensitive to the stresses and strains of transformation; to ensure the Africanisation of the discipline, both in terms of institutional and organisational structures, as well as the curriculum. The responsibility of the university is to provide the space for critical intellectuals to develop and ideas to flourish in what some have described as the discipline for the 21st century.

Professor Brij Maharaj

Chairperson: SANC-IGU

4 August 2016
The first South African university lecturer in geography, James Hutcheon, was appointed to a position in the then South African School of Mines and Technology (later the University of the Witwatersrand, Wits) in 1917. A hundred years later, in 2016, there will be over 150 scholars teaching geography at 16 university departments across the country. The Society of South African Geographers (SSAG) invites you to join us in celebrating a century of geography teaching and research at tertiary level in South Africa by attending this historic occasion to be held at the STIAS conference centre in Stellenbosch (50km from Cape Town).

In the 2001 SSAG *State of the Discipline Report* it was said that disciplines of learning are at the base of human development and that they make fundamental contributions in determining the quality of human society. Their acceptance, role and continuity are determined by the relative contribution they make to development in both material and non-material contexts. At the 2016 SSAG conference we will celebrate, rethink and reinterpret the multiplicity of facets of geography, both in a historical and contemporary South African context. The five-day conference will host geographers (academics and students) from around the world and feature the following:

- Keynote presentations from distinguished South African and other international scholars and researchers
- The latest research: Presentations and posters by geography scholars and students from around the world who have a special interest in South African geography
- Exhibit hall: Booths and exhibits showcasing recent publications and new geographic technologies
- Workshops: A writing workshop for emerging academics
- Field trips: Attendees also will have several options to explore the rich human and physical geography of the Cape Winelands and the Cape Town metropolitan region through informative field trips and excursions during and after the conference
- Special events

More information about the conference, such as the timeline and key deadlines for registration and submission of abstracts, how to organize a special session and specific conference themes, will be announced in December 2015. Bookmark: www.ssag.co.za or get on our mailing list: SSAG2016@sun.ac.za
Report of the Spanish Committee of the International Geographical Union

In the period between the Cologne Congress in 2012 and the Beijing Congress to be held in 2016, the Spanish Committee of the IGU has carried out the work necessary to accomplish its assigned tasks of promotion and dissemination. To this end, the Spanish Committee has leveraged the websites and newsletters of each of the associations affiliated with the Committee, and has held regular meetings to coordinate the Spanish Contribution to the IGU Congress in Beijing.

The resulting publication, entitled “Crisis, globalization and social and regional imbalances in Spain”, comprises 20 chapters written by 40 Spanish geographers, and is organised into 6 sections as follows: 1. Environment and natural resources; 2. Landscape, territorial heritage and local development; 3. Rural spaces and development; 4. The socio-spatial and demographic effects of the crisis; 5. Innovation and new technologies for research and Education in geography; and 6. City and territory. Planning and government.

The Spanish Contribution to the IGU Beijing Congress provides an overview of Spanish geographical research on the spatial and social consequences of globalisation, the impact of the present crisis and the intensification of regional imbalances and the socio-economic inequalities this is generating. Another of the works that provides an overview of the field of Spanish geography is “La investigación geográfica en España (1990-2012)” [Geographical research in Spain (1990-2012)], Lasanta, T., y Martín Vide, J. (coord.), Association of Spanish Geographers; Pyrenean Institute of Ecology and The Centre for Human and Social Sciences of Spanish National Research Council (CSIC). 2013, 512pp. (http://www.age-geografia.es/site/wp-content/uploads/2015/06/Investigacion_Geogr.pdf).

This report describes the research that has been conducted at Spanish university geography departments and Spanish National Research Council centres with geographers on their staff, and which represents a considerable contribution to the literature.
It should be noted that the Spanish Committee includes the Association of Spanish Geographers (http://www.age-geografia.es/site/), which has held the presidency of the same, the Royal Geographical Society of Spain (http://www.realsociedadgeografica.com/es/site/index.asp), the Spanish National Geographic Institute (http://www.ign.es/ign/main/index.do), the Spanish Army Geographic Centre (http://www.ejercito.mde.es/unidades/Madrid/ceget/), the Spanish National Research Council Institute of Economics and Geography (http://iegd.csic.es/) and the Catalan Geographic Society (http://scg.iec.cat/). The result of their work reflects the situation of the field of geography in Spain, over the period indicated (2012-2014).

During this time, the Association of Spanish Geographers (AGE) has organised numerous research forums, creating a space for exchange between Spanish and overseas professionals. Specifically, the Association has carried out the following activities:

1. The organisation of two national conferences (in Palma de Mallorca, October 2013, and Zaragoza, October 2015), two Iberian congresses (in Santiago de Compostela, November 2012, and Guimaraes, November 2014) and thirty specific symposia, two for each of the fifteen thematic Working Groups that comprise the Association (http://www.age-geografia.es/site/category/congresos-age/). The Iberian congresses were organised in collaboration with the Portuguese Association of Geographers (Associação Portuguesa de Geógrafos- http://www.apgeo.pt/), reflecting the good relations between Spanish and Portuguese geographers.

2. Publication of the proceedings corresponding to each of these meetings (http://www.age-geografia.es/site/publicaciones-no-periodicas/), which indicate the main areas of work and scientific advances of the Spanish community.

3. In relation to scientific dissemination of geography, the Bulletin of the Association of Spanish Geographers (http://www.age-geografia.es/ojs/index.php/bage) is considered Spain’s best journal and is listed in the 2015 Journal Citation Report (JCR), where it is ranked 71 with an impact factor of 0.345.

4. Along with scientific dissemination of geography, the Association of Spanish Geographers has contributed to knowledge transfer through awards programs. Each year, the Association presents photography awards to secondary education students and teachers and university students. In addition, it has created the Manuel de Terán and Jesús García Fernández prizes, awarded to the best doctoral theses and unpublished works by young researchers, respectively, and the Roser Majoral Moliné prize awarded to papers by established researchers published in prestigious non-Spanish geographic journals.

5. Furthermore, in recent years the Association of Spanish Geographers has promoted the internationalisation of Spanish geography through collaboration with the IGU and
EUROGEO, and by signing agreements with overseas institutions such as the Russian Geographical Society, the National Geographic Society of Kazakhstan, the Interprofessional Association of Land Use Planning (FUNDICOT) and the French National Committee of Geography.

The Royal Geographical Society of Spain (RSG) is a founder member of IGU formally established in 1922 although before that time RSG had participated in their activities, nowadays it goes through the Spanish IGU Committee. The main objective of the RSG of Spain is to promote the advancement and dissemination of geographical knowledge in all its branches and in all its applications to social, political and economic matters. To achieve this goal the main activities of the RSG from 2012 to 2016 have been:

1. Promoting the study of geographical problems at around 40 conferences by relevant Professors, Teachers, Politicians, Professionals and Technicians.
2. Initiating, supporting and assisting with geographical research, both nationally and internationally, through the organization of congresses, conferences, courses and publications. Now it is involved in the organization of the EUROGEO 2016 conference.
3. Promoting and spreading the teaching of geography in all instances, whether public or private, through academic activities, visits to places of geographical interest and fieldwork research. Participating in several European projects and networks such as digitalearth.eu: geomedia in schools (d-e.eu) (510010-LLP-1-2010-1-AT-COMENIUS-CNW) (2010-2013) and currently on School on Cloud: connecting education to the Cloud for digital citizenship (543221-LLP-1-2013-1-GR-KA3-KA3NW) (2013-2016).
4. Facilitating the collection and dissemination of all kinds of documents and materials from geographical research and teaching initiatives.
5. Cooperating and coordinating international research projects and meetings, in particular with the International Geographical Union and its various actions.

The Society is has been publishing a journal, Boletín de la Real Sociedad Geográfica, since its creation in 1876. It is published annually, although the last edition was covered two years ago. The 2016 edition is now in press.

As a Research Institute of the Spanish National Research Council (CSIC), the Institute of Economics, Geography and Demography is a multidisciplinary organisation with researchers from diverse disciplines including geography, economics, agricultural engineering, sociology and demography. Its purpose is to conduct theoretical and applied research through its two departments, the Department of Population and the Department of Applied Economics and Geography.
The 2014-2017 Action Plan identified 7 research groups: Multiscale Geographic Analysis of Global Change; Sustainable Regional Development (DTS); Spatial, Economic and Cultural Dimensions of Human Mobility (DiMHU); Demographic Dynamics and Ageing (GIE-CSIC); Agricultural and Food Economics; and Transborder Human Mobility between East and West, in the European geopolitical context.

Some of the projects carried out within these research areas in recent years include the following: “Monitoring water and carbon flows in Mediterranean pasture ecosystems using remote sensing” (MINECO); “SOSTPARK. Analysis of the sustainability of protected areas in Spain. Implications for comprehensive sustainability of the territory” (MINECO); “The Longitudinal Study Ageing in Spain (ELES Project)” (MINECO); “LONGPOP. Methodologies and Data mining techniques for the analysis of Big Data based on Longitudinal Population and Epidemiological Registers” (UE); “ENCAGE-CM. Active Ageing, Quality of Life and Gender” (CM y FSE); “Migration from Eastern Europe in the geopolitical context of borders. Circulatory mobility and return” (MINECO); “TEMPER-Temporary versus Permanent Migration” (UE) and “Socio-regional effects of the economic crisis in Spanish urban areas: public policies and resilience strategies” (MINECO).

The Institute’s researchers are responsible for two laboratories: the Ageing Network (http://envejecimiento.csic.es/) and Environmental Spectral Radiometry and Remote Sensing (http://investigacion.cchs.csic.es/espectroradiometria/), as well as a unit associated with the Department of Geography at the University of Alcalá, GEOLAB. In addition, researchers at the Institute of Economics, Geography and Demography are also members of the editorial team of “Estudios Geográficos”, a biannual journal on geographical studies that has been published by the Spanish National Research Council since 1940.

The Spanish National Geographic Institute is responsible for planning and managing geographical instruments and infrastructures in Spain (http://www.ign.es/ign/main/index.do). In addition to its work on the National Cartographic Plan, the production, updating and use of national topographic and cartographic resources and the conservation of historical collections, in recent years the Institute has promoted knowledge transfer through its webpage and by means of exhibitions held in its headquarters in Madrid and Murcia.

The Institute’s most important projects include the National Atlas of Spain Information System (SIANE in its Spanish acronym), which provides technical support for the production and publication of the National Atlas of Spain (ANE), as well as other products and services offered by the Institute’s Department of Thematic Cartography and the
The primary function of the **Spanish Army Geographic Centre (CEGET)** is to produce the geospatial information required by military users in order to plan and conduct operations and exercises in Spain and abroad, in accordance with the provisions of the 2013-2016 Cartographic Plan of the Armed Forces and in coordination with the 2013-2016 Spanish National Cartographic Plan. Specifically, in order to produce geospatial information for areas of the world where Spanish units are deployed, the Spanish Army Geographic Centre participates in the Multinational Geospatial Co-production Programme (MGCP), a multinational project launched in 2006 under the leadership of the United States and involving 26 nations, including Spain, which joined from the outset with the status of lead nation.

The Spanish Army Geographic Centre has also continued to support the Borders Commission of the Spanish Ministry of Foreign Affairs and Cooperation in maintaining land borders with France and Portugal. This support is embodied in participation in the meetings of International Border Commissions with the abovementioned countries and annual fieldwork campaigns on these borders in coordination with the French National Geographic Institute and the Geospatial Information Centre of the Portuguese Army, respectively.

On 22 September 2014, the Spanish Army Geographic Centre celebrated its 75th anniversary. Several activities were organised to mark this occasion, including a series of conferences held at the Gómez Pardo Foundation in Madrid on various aspects of geospatial information (history, production, European regulations, support for operations and borders) and an exhibition on the history of the Spanish Army Geographic Centre and its work over these 75 years, held at the Technical University of Madrid (UPM) School of Mining Engineering. In addition, under the title “Cartography, science and art in the service of all”, historical cartography exhibitions have been held at the Conference Centre in Madrid, the Palace of the Captaintcy General in Zaragoza, the Seu Vella Cathedral in Lleida and the Provincial Government Palace in Almería.

The **Catalan Geographic Society (CGS)** is one of the affiliated societies of the Institute of Catalan Studies (member of the International Union of Academies) and member of
EUGEO, the Association of Geographical Societies in Europe. In June 2016, the CGS has 456 members; ten of which are honorary. In only four years the Society has increased its membership over a 10%. The last honorary members are Josefina Gomez Mendoza; emeritus full professor at the Universidad Autónoma de Madrid (UAM), and Jaime Miranda Canals, director of the Institute of Cartography and Geology of Catalonia.

In the last four years, the CGS organized 59 academic sessions, usually in Barcelona, with 88 speakers, 20 of which from outside the Catalan speaking region. It has also organized 11 courses or colloquia; 23 fieldtrips 6 of which outside Catalonia.

The Society has also a series of publications. The Journal *Treballs de la Societat Catalana de Geografia* publishes two issues per year. The volumes 73 to 80 appeared during the period 2012-2016. The CGS has also two different book collections, with four books published in the same period. The CGS organizes an annual prize competition for the best research papers of university students or recent graduates, and another for high school students. During the last four years the prize has been granted to nine university students and three high schools students.

The CGS has two websites, l’Obrador Obert (http://scg.iec.cat/), with over 18000 visits during the last year and the most recent Recursos per a l’Ensenyament de la Geografia (http://ensenyament-geografia.espais.iec.cat/), to provide teaching resources in geography with over 10000 visits. It also has Twitter with more than 1100 followers and a facebook page with 850.
Report from the Swedish National Committee for Geography 2015 and 2016

The Swedish National Committee is a committee under the Royal Swedish Academy of Sciences. The committee has 14 members representing both human and physical research and higher education in Sweden. Teacher’s education in Geography is also represented as well as Geography as a school subject in the primary and secondary school. The Committee also have some members from the private trade and business sector. We have two regular meetings a year, arrange a colloquium every year as well as awarding a geography teacher in primary or secondary school “the Geography prize”. During the last two years (2015-2016) the committee has been focusing a number of issues, most of them aiming to emphasize the important of Geography in education and science. The last year we have had the strongest focus on developing a bid for hosting the IGU congress in 2024 together with the Danes. Besides that we have the following focus in our work and ambitions.

1. Monitoring Geography as a school subject in the Swedish school system. To some extent geographical knowledge is being replaced or outranged by other subjects. We believe that the sustainable development requires geographical knowledge. In this matter we have an ongoing contact with national school agencies and also act as a link between higher education in Geography and school-geography.

2. Enabling or improving the relations between Human Geography and Physical Geography. In Sweden, as in many other countries, the subject is divided in a social science part and natural science part. In the Academia these two geographical disciplines belongs to two different faculties.

3. Establish a better meeting place for Geographers in Sweden as a complement to the Nordic Geographical meeting.

We also have a very strong cooperation with the Swedish Society for Anthropology and Geography which also supports the Committee with funding for the geography prize.

During the last two years Associated Professor Olof Stjernström has been the chair and Professor Lena Molin the vice-chair.

Olof Stjernström
/chair of the Swedish National Committee for Geography
Rapport Quadriennal 2012-2015 / Comité suisse de l’UGI (CSIGU)

Membres du Comité au 01.01.2016


Président : Prof. Etienne Piguet (Université de Neuchâtel)
• Prof. Céline Rozenblat (Université de Lausanne)
• Prof. Doris Wastl-Walter (Université de Berne)
• Prof. Yvonne Riano (National Center of Competence in Research on migration and mobility)
• Prof. Francisco Klauser (ex-officio as chair of the Association Suisse de Géographie)

A noter que l’association SwissGeOlymp est désormais représentée au Comité de l’ASG ce qui va rendre possible sa participation au Comité suisse de l’UGI www.swissgeolymp.ch.

Mandat

Selon règlement approuvé par le Comité central de la SCNAT le 22 juin 2016.

Le CSIGU constitue un Groupe de Travail de la «Plateforme Géosciences» selon l'article 7, paragraphe 1 du règlement intérieur de la SCNAT

Le CSIGU est lié à l’Association suisse de géographie (ASG). Le président de l’ASG en est membre de droit. Réciproquement, le président du CSIGU fait partie du steering-committee de l’ASG.

L’élection et la durée des mandats des membres du CSIGU est réglée par le règlement intérieur de la SCNAT (article 6, paragraphe 5, point f et article 7, paragraphe 1: http://www.scnat.ch/downloads/Geschaeftsordnung_11korr_000.pdf).

Tâches et buts : Assurer le lien entre la communauté scientifique des géographes suisses et l’Union géographique internationale en diffusant l’information et en encourageant la participation aux
activités de l’UGI, en particulier les conférences régionales et les congrès mondiaux. Participer aux efforts internationaux de l’UGI en assumant des tâches au sein des commissions et en participant au nom de la Suisse aux élections des organes de direction.

Finances : La participation suisse à l’Union géographique internationale est payée directement par la SCNAT à qui le président du comité transmet la facture annuelle. Le CSIGU soumet un budget à la SCNAT pour une contribution aux frais de déplacements de ses membres aux événements organisés par l’UGI.

Rapport d’activité : Le CSIGU présente chaque année un rapport annuel d’activité dans les délais prévus par la SCNAT.

Secrétariat : Les tâches administratives du président et du CSIGU sont soutenues, dans la mesure du possible et selon les besoins, par le secrétariat de l’ASG et par les secrétariats des Instituts de géographie membres de l’ASG.

Principales activités par années

2012

L’année 2012 a été marquée par le Congrès mondial de l’UGI (32nd International Geographical Congress, Cologne, Germany, 26th to 30th August 2012). 2865 délégués et 90 pays étaient représentés sur le thème général «Down to Earth». Il s’agit du plus grand congrès depuis la fondation de l’UGI il y a près de 150 ans. Le Congrès mondial a lieu tous les quatre ans et est un événement majeur de l’UGI.

La Suisse a été très présente à Cologne avec, entre autre, la présence de la présidente du Comité national en 2012, Prof. Doris Wastl-Walter, de l’ancien président de l’UGI, Prof. Bruno Messerli, du futur président du Comité suisse, Prof. Etienne Piguet.

Durant l’ensemble de la manifestation, un stand a été tenu par l’Association suisse de géographie sous la responsabilité de M. P. Bachmann, secrétaire exécutif et du Prof. H.-R. Egli, président de l’ASG. Le stand a été très fréquenté.

Des chercheurs suisses ont participé à de nombreuses sessions des différentes Commissions. Deux Commission sont présidées par des géographes des universités suisses : la Commission de géographie urbaine (Prof. C. Rozenblat – Lausanne) et la Commission de géographie de la population (Prof. E. Piguet – Neuchâtel). Nb. les activités, colloques et publications de ces commissions ne sont pas listées dans le présent rapport qui est centré sur l’activité du Comité suisse de l’UGI.

La présidente du Comité national suisse a participé à l’élection des nouvelles instances dirigeantes lors de l’Assemblée générale à Cologne (élection du Prof. V. Kolossov à la présidence de l’UGI – et désignation du Prof. Mike Meadows secrétaire général et des vice-présidents Profs. Aharon Kellerman, Dieter Soyez, RB Singh, Joos Droogleever-Fortuijn, Ron Abler, Qin Dahe, Jarkko Saarinenet Yukio Himiyama.

2013

L’année 2013 a été marquée par la Conférence régionale à Kyoto (une conférence régionale a lieu annuellement tandis que le Congrès mondial de l’UGI a lieu tous les quatre ans). La conférence a
réuni 1431 participants de 61 pays ou régions dont 289 étudiants. Les principaux pays représentés étaient le Japon, Taiwan, les USA, l’Inde et la Chine. Le nombre total de présentations a atteint 1,256 (en comptant les 128 posters).

La Suisse a été bien présente à Kyoto malgré la distance. Des chercheurs suisses ont participé aux sessions des différentes Commissions (liste sous www.igu-kyoto2013.org) et trois membres du Comité national ont été particulièrement actif en organisant différentes sessions (les Professeurs Doris Wastl-Walter (Berne), C. Rozenblat (Lausanne – présidente de la commission de géographie urbaine) et E. Piguet (Neuchâtel – président de la commission de géographie de la population).

2014

L’année 2014 a été marquée par la Conférence régionale à Krakow. La conférence sous le label général “Changes, Challenges, Responsibility” a réuni 1372 participants de 60 pays. Les principaux pays représentés étaient la Pologne, l’Allemagne, le Japon, la Rép. Tchèque et la Chine. Le nombre total de présentations a atteint 1,398 (en comptant les 227 posters).

La Suisse a été bien présente à Krakow. Des chercheurs suisses ont participé aux sessions des différentes Commissions (liste sous http://www.geo.uj.edu.pl/konferencja/igu2014/) et trois membres du Comité national ont été particulièrement actif en organisant différentes sessions (les PD Yvonne Riano (Berne), C. Rozenblat (Lausanne – présidente de la commission de géographie urbaine) et E. Piguet (Neuchâtel – président de la commission de géographie de la population).

2015

L’année 2015 a été marquée par la Conférence régionale à Moscou. La conférence sous le label général “Geography, Culture and Society for Our Future Earth” a réuni plus de 1000 participants d’environ 60 pays du 17 au 21 août.

La géographie suisse a été bien présente à Moscou. Environ 20 chercheurs suisses ont présenté des communications et participé aux sessions des différentes Commissions (liste sous http://www.igu2015.ru/) et trois membres du Comité national ont été particulièrement actifs en organisant différentes sessions (les PD Yvonne Riano (Berne), C. Rozenblat (Lausanne – présidente de la commission de géographie urbaine) et E. Piguet (Neuchâtel – président de la commission de géographie de la population).

Prof. C. Rozenblatt a en outre prononcé l’un le keynote speech : Urban challenges in a complex world le 20.08.2015
Rapport Quadriennal 2012-2015 / Comité suisse de l’UGI (CSIGU)

Membres du Comité au 01.01.2016


Président : Prof. Etienne Piguet (Université de Neuchâtel)

- Prof. Céline Rozenblat (Université de Lausanne)
- Prof. Doris Wastl-Walter (Université de Berne)
- Prof. Yvonne Riano (National Center of Competence in Research on migration and mobility)
- Prof. Francisco Klauser (ex-officio as chair of the Association Suisse de Géographie)

A noter que l’association SwissGeOlymp est désormais représentée au Comité de l’ASG ce qui va rendre possible sa participation au Comité suisse de l’UGI www.swissgeolymp.ch.

Mandat

Selon règlement approuvé par le Comité central de la SCNAT le 22 juin 2016.

Le CSIGU constitue un Groupe de Travail de la «Plateforme Géosciences» selon l'article 7, paragraphe 1 du règlement intérieur de la SCNAT

Le CSIGU est lié à l'Association suisse de géographie (ASG). Le président de l’ASG en est membre de droit. Réciproquement, le président du CSIGU fait partie du steering-committee de l’ASG.

L'élection et la durée des mandats des membres du CSIGU est réglée par le règlement intérieur de la SCNAT (article 6, paragraphe 5, point f et article 7, paragraphe 1: http://www.scnat.ch/downloads/Geschaeftsordnung_11korr_000.pdf).

Tâches et buts : Assurer le lien entre la communauté scientifique des géographes suisses et l’Union géographique internationale en diffusant l’information et en encourageant la participation aux
activités de l’UGI, en particulier les conférences régionales et les congrès mondiaux. Participer aux efforts internationaux de l’UGI en assumant des tâches au sein des commissions et en participant au nom de la Suisse aux élections des organes de direction.

Finances : La participation suisse à l’Union géographique internationale est payée directement par la SCNAT à qui le président du comité transmet la facture annuelle. Le CSIGU soumet un budget à la SCNAT pour une contribution aux frais de déplacements de ses membres aux événements organisés par l’UGI.

Rapport d’activité : Le CSIGU présente chaque année un rapport annuel d’activité dans les délais prévus par la SCNAT.

Secrétariat : Les tâches administratives du président et du CSIGU sont soutenues, dans la mesure du possible et selon les besoins, par le secrétariat de l’ASG et par les secrétariats des Instituts de géographie membres de l’ASG.

**Principales activités par années**

**2012**

L’année 2012 a été marquée par le Congrès mondial de l’UGI (32nd International Geographical Congress, Cologne, Germany, 26th to 30th August 2012). 2865 délégués et 90 pays étaient représentés sur le thème général «Down to Earth». Il s’agit du plus grand congrès depuis la fondation de l’UGI il y a près de 150 ans. Le Congrès mondial a lieu tous les quatre ans et est un événement majeur de l’UGI.

La Suisse a été très présente à Cologne avec, entre autre, la présence de la présidente du Comité national en 2012, Prof. Doris Wastl-Walter, de l’ancien président de l’UGI, Prof. Bruno Messerli, du futur président du Comité suisse, Prof. Etienne Piguet.

Durant l’ensemble de la manifestation, un stand a été tenu par l’Association suisse de géographie sous la responsabilité de M. P. Bachmann, secrétaire exécutif et du Prof. H.-R. Egli, président de l’ASG. Le stand a été très fréquenté.

Des chercheurs suisses ont participé à de nombreuses sessions des différentes Commissions. Deux Commission sont présidées par des géographes des universités suisses : la Commission de géographie urbaine (Prof. C. Rozenblat – Lausanne) et la Commission de géographie de la population (Prof. E. Piguet – Neuchâtel). Nb. les activités, colloques et publications de ces commissions ne sont pas listées dans le présent rapport qui est centré sur l’activité du Comité suisse de l’UGI.

La présidente du Comité national suisse a participé à l’élection des nouvelles instances dirigeantes lors de l’Assemblée générale à Cologne (élection du Prof. V. Kolossov à la présidence de l’UGI – et désignation du Prof. Mike Meadows secrétaire général et des vice-présidents Profs. Aharon Kellerman, Dieter Soyez, RB Singh, Joos Droogleever-Fortuijn, Ron Abler, Qin Dahe, Jarkko Saarinenet Yukio Himiyama.

**2013**

L’année 2013 a été marquée par la Conférence régionale à Kyoto (une conférence régionale a lieu annuellement tandis que le Congrès mondial de l’UGI a lieu tous les quatre ans). La conférence a
réuni 1431 participants de 61 pays ou régions dont 289 étudiants. Les principaux pays représentés étaient le Japon, Taiwan, les USA, l’Inde et la Chine. Le nombre total de présentations a atteint 1,256 (en comptant les 128 posters).

La Suisse a été bien présente à Kyoto malgré la distance. Des chercheurs suisses ont participé aux sessions des différentes Commissions (liste sous www.igu-kyoto2013.org) et trois membres du Comité national ont été particulièrement actif en organisant différentes sessions (les Professeurs Doris Wastl-Walter (Berne), C. Rozenblat (Lausanne – présidente de la commission de géographie urbaine) et E. Piguet (Neuchâtel – président de la commission de géographie de la population).

**2014**

L’année 2014 a été marquée par la Conférence régionale à Krakow. La conférence sous le label général “Changes, Challenges, Responsibility” a réuni 1372 participants de 60 pays. Les principaux pays représentés étaient la Pologne, l’Allemagne, le Japon, la Rép. Tchèque et la Chine. Le nombre total de présentations a atteint 1,398 (en comptant les 227 posters).

La Suisse a été bien présente à Krakow. Des chercheurs suisses ont participé aux sessions des différentes Commissions (liste sous http://www.geo.uj.edu.pl/konferencja/igu2014/) et trois membres du Comité national ont été particulièrement actif en organisant différentes sessions (les PD Yvonne Riano (Berne), C. Rozenblat (Lausanne – présidente de la commission de géographie urbaine) et E. Piguet (Neuchâtel – président de la commission de géographie de la population).

**2015**

L’année 2015 a été marquée par la Conférence régionale à Moscou. La conférence sous le label général “Geography, Culture and Society for Our Future Earth” a réuni plus de 1000 participants d’environ 60 pays du 17 au 21 août.

La géographie suisse a été bien présente à Moscou. Environ 20 chercheurs suisses ont présenté des communications et participé aux sessions des différentes Commissions (liste sous http://www.igu2015.ru/) et trois membres du Comité national ont été particulièrement actifs en organisant différentes sessions (les PD Yvonne Riano (Berne), C. Rozenblat (Lausanne – présidente de la commission de géographie urbaine) et E. Piguet (Neuchâtel – président de la commission de géographie de la population).

Prof. C. Rozenblatt a en outre prononcé l’un le keynote speech : Urban challenges in a complex world le 20.08.2015
The Geographical Sciences Committee of the U.S. National Academies of Science is the IGU national committee in the United States. Geographers in the United States are members of the American Association of Geographers (AAG, http://www.aag.org/) and/or the American Geographical Society (AGS, http://americangeo.org/). They may also join other scientific organizations to engage with colleagues with similar areas of specialization (e.g., geographic information science, regional studies, ecology). Those who teach geography at any educational level may be members of the National Council for Geographic Education. This report highlights recent activities of the AAG, the largest organization of geographers in the United States, and summarizes recent developments in several other geographical organizations.

**American Association of Geographers (AAG)**

The AAG changed its name on January 1, 2016, from Association of American Geographers to American Association of Geographers, to reflect the increasing proportion of international members. Recent achievements of the AAG include:

**Growth in membership:** At the end of 2015, the total number of AAG members had risen to 11,735, an increase of over 931 from 2014. Of these, 39% are students and 9% are Developing Regions members (http://www.aag.org/cs/about_aag/regional_divisions/developing_regions_xlink).

**Annual meeting:** The AAG hosted approximately 9,000 geographers at its 2016 annual meeting in San Francisco, California. The 2017 meeting will be April 5–9, 2017 in Boston, Massachusetts. During its 2016 meeting, the AAG held a 3-day Mapathon to assist humanitarian efforts and community projects.

**International Encyclopedia of Geography:** The AAG is in the final stages of producing the *International Encyclopedia of Geography* (Wiley), with publication scheduled for February 2017. The 15-volume set contains 1032 entries, lists 112 geographical associations, and includes contributions by authors representing 45 countries. Doug Richardson, AAG Executive Director, is editor-in-chief.

**Geography in U.S. Education Act:** The AAG has worked for years to ensure that the U.S. Congress would include Geography in the reauthorization of the Education Act. The Act, passed in 2015, includes geography as a core academic subject and as part of a “well-rounded education” as defined in the law.

**GeoMentors Program:** The AAG’s GeoMentors Program is a part of U.S. President Barack Obama’s ConnectED Initiative to promote Internet connectivity and use of educational technology. AAG is collaborating with ESRI to create a network of knowledgeable GIS users and educators, and to support the national initiative to provide every school in the U.S. with high-speed wireless connections and new technologies, including GIS, to enhance learning. In the first year (2015), over 700 volunteers registered as GeoMentors and 150 engagements with educators were recorded throughout the U.S.
**New GeoHumanities journal**: The AAG launched a new, biannual journal, *GeoHumanities*, in April 2015 (Routledge, http://www.tandfonline.com/loi/rgeo20#read) to connect the traditional humanities to science and the creative arts. The three issues now published contain 52 papers, including 33 “articles,” 18 “practices and curations,” and one editorial. In the 2015 issues, 42% of submissions were by geographers and 58% from people in different academic fields. The AAG also publishes, with Routledge/Taylor & Francis, *Annals of the AAG* and the *Professional Geographer*.

**Helping U.S. geographers attend the IGU Congress**: The AAG, with support from the National Science Foundation, awarded travel grants to help 34 U.S. scholars participate in the 2016 IGU Congress in Beijing.

**The American Geographical Society (AGS)**
Established in 1851 and based in New York City, the American Geographical Society currently has approximately 1000 members and over 11,000 followers of its Facebook page. In 2016, it welcomed a new president, Dr. Marie Price; a new chairman, Dr. Christopher Tucker; and a new executive director, Dr. John Konarski. Dr. Jerome Dobson, outgoing president, had served in that role for 15 years.


A new AGS initiative, "GeoBadges," will help teachers across the United States partner with professional organizations to develop project-based mapping activities for students.

**National Geographic Society**
The National Geographic Society (NGS) reorganized in 2015 to publish its magazines and books and produce its cable network programming through a corporate partnership with 21st Century Fox. The re-organized, non-profit Society focuses on geographical research and education, provides content, and exercises editorial control over products and publications that carry its name and logo. The National Geographic Society supports research and exploration, in geography and in other fields of science, to "inspire, illuminate and teach."

**National Council for Geographic Education**