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NEWSLETTER

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Research is to think what nobody else has thought. — *Wendell Berry*

Natural Resource Data for Land Use Planning- Issues, Constraints and Strategies

Dr. G.S. Sidhu

Land use planning is a complex subject, integrating natural resources, and environmental factors, social, economic and legal aspects. Land use plans and impact statements are prepared prior to many development programmes. In a developing country like India, land is not only an important factor of production but also the basic means of subsistence for majority of people. Agriculture contributes less than 30% to India's Gross Domestic Product, but absorbs almost 64% of the country's working population. The per capita available land area is shrinking rapidly due to the population pressure, soil degradation, urbanization and conversion of agriculture land to non-agriculture land. **According to Renowned Agricultural Scientist Dr. M.S. Swaminathan, the per capita arable land was 0.195 ha in 1990, reduced to 0.163 ha in 2000 and is expected to be 0.121 ha in 2025 and 0.087 ha when the population stabilizes by the year 2050 or later**.

Since all the lands are not equally suitable for profitable alternative farming and, there is a need for interdisciplinary, holistic and cluster approach for development. Land use planning can never be complete, comprehensive or perfect. It is an iterative (cyclic) process that should begin by effectively displaying information that is already available. A market-driven land use pattern may yield higher returns in the short run, but may pose several unmanageable problems for future generations due to unplanned over-exploitation of land (soil and water), climate and other natural resources. Sustainable development should be environmentally non-degrading, technically appropriate, economically viable and socially acceptable. In planning for agricultural development, there is a need to identify environmentally analogous areas, where a particular cropping practice will give the same results. Locating analogous areas is a thus first step in transferring research conclusions within and among regions.

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Among the natural resources, land is being constantly degraded and over-exploited. It is estimated that about 115 Mha area comprising 81% of the agricultural land is inflicted by one or another type of soil degradation. **Our studies show that Himachal Pradesh alone, experiences soil replacement of about 258 Mt. Displacement of soils at such an alarming rate is the point of concern for land use planners and may pose severe problem of siltation of dams and rivers downstream areas.** Another serious problem is shortage of water available for irrigation. It is predicted that present per capita annual water availability of 2001 m^3 will reduce to a stress level of 1700 m^3 in the next 2-3 decades. In agriculture sector the present share of 89% will be reduced to 75% by 2020, which will adversely affect food production. In India, the rainfall is received in 100 hours out of 8760 hours in a year. So *in-situ* water conservation measures coupled with appropriate farming technology may increase the food production in these areas.

The issues of climate change and global warming caused by emission of green-house gases (possibly due to faulty land use) have emerged as new thrust areas. **It is projected that South Asia may have an increase in temperature between 0.1 and 0.3 ^{0}C by 2010, and 0.4 and 2.0 ^{0}C by 2070. Think of the situation as human body where even a 2 °F (0.9 °C) rise in temperature from 98.4 ^{0}F to 100 ^{0}F causes concern.** In recent article '*The Big Meltdown*' (India Today, November 6, 2006), the concern of climate change and global warming highlighted that the length of Samudra Tapu (one of the largest glaciers in the Chandra Basin of Lahaul & Spiti) reduced by 862 m between 1962 and 2006, at the rate of 18.5 metre per year. Moreover, 127 small glaciers have shrunk by 38% and large ones by 12%. In another report (Times of India, October 30, 2006), in Venice, waterways make up the primary commuting routes due to raised sea level by several inches because of changes in groundwater table and the global climate change. The sea level is expected to rise by 15 and 24 cm over the next century and low lying areas will get inundated. Therefore, while preparing land use plans at regional level, these aspects pertaining to land,

water and climate should be taken care of for safeguarding these precious resources in future.

Soil resource data and maps generated by National Bureau of Soil Survey & Land Use Planning (NBSS & LUP) by integrating land, water and climatic parameters, are needed for land use planning, for different purposes, on different scales, for different kinds of displays. These soil maps along with interpretative maps *i.e.* agro-ecological regions, sub-regions, land degradation maps *etc.* will help to demarcate the analogous and homogenous areas which may be used as a basis for land use planning at different administrative levels. The soil resource maps are available at country level (1:1 M), state level (1: 0.5 M), of some districts (1:50000) and village/farm/watershed level representing some agro-eco-regions. However, small scale maps are constrained to be used at the field level planning due to scale limitation. Heterogeneity in land holding size, dominance of small land holding sizes and divergent socio-economic strata of farmers and diversified agro-climatic conditions have further compounded the problem of arriving at sound and sustainable land use planning. Priorities of small farmers may not be same as that of farmers having medium or large size farms. A small farmer may be more interested in growing food crop instead of cash crop for which his land suits more.

Soil resource interpretations at farmers' field level are often needed. Location-specific requirements of farmers should be addressed while preparing land use plan by adopting participatory approach on watershed basis. The technology invented by farmers sometimes acts as the guideline to the Scientists and Planners. **The recent example of planting sugarcane in ridges and trenches by a farmer in Gurdaspur district of Punjab saved 50% irrigation water and increased yield of sugarcane up to 840 q/acre worth Rs. one lakh (The Tribune, 25th October, 2006) convinced the Sugarcane Industry to adopt the technique on large scale (30,000 acres).** It will also help in diversification from rice-wheat system which comparatively consumes more water and is less profitable.

To address these issues and constraints, the NBSS&LUP has undertaken studies on land use planning on regional eco-system concept, adopting multi- and inter-disciplinary approach and latest techniques of information technology, remote sensing and GIS. About 52 watersheds representing five agro-ecosystems *i.e.* irrigated, arid, rainfed, hills and mountain, and coastal eco-systems have been selected for this purpose. These eco-systems are unique and analogous units *w.r.t.* characterization of soils, water resources, climatic conditions, socio-economic status, topographical features, bio-diversity (plants/animals/fishery), *etc.* Future strategies should include the introduction and testing of alternative, improved and profitable agro-techniques/farming systems acceptable to farmers without deteriorating the soil and bio-environment on long-term basis. Electronic media and "new age" web capacities should be employed to strengthen the relationship among farmers, consumers, civil society, institutions, scientists and policy makers.

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Chapter Activities

Pantnagar Chapter

The Chapter organized the 8th Dr. N.S. Randhawa Memorial Lecture on 20-09-2006, delivered by Dr. Raj K. Gupta, Rice-Wheat Consortium, CIMMYT, NASC Complex, New Delhi.

Awards/Recognitions to Society Members

- Dr. J.C. Katyal, Vice Chancellor, CCS HAU, Hisar has been conferred with Haryana Ratan Award at the Silver Jubilee function of the All India Conference of Intellectuals.
- Dr. J.S.P. Yadav, former Chairman, ASRB, has been conferred with National Fellow Award by the Soil Conservation Society of India.
- Dr. Bijay Singh, Senior Soil Chemist, Punjab Agricultural University, Ludhiana, has been conferred National Professorship by ICAR, New Delhi.
- Dr. A.K. Singh, Project Director, Water Technology Centre, IARI, New Delhi, awarded the SCSI Gold Medal – 2006 by the Soil Conservation Society of India.

Appointments

- Dr. P.S. Minhas, as Assistant Director General (Water Management), ICAR w.e.f. 17-05-2006.
- Dr. Anand Swarup, as Head, Division of Soil Science and Agricultural Chemistry, IARI, New Delhi w.e.f. 01-07-2006.
- Dr. J.C. Katyal, as Vice Chancellor, CCS Haryana Agricultural Chemistry, Hisar, Haryana w.e.f. 03-02-2006.
- Dr. S.S. Dhane, as Head, Department of Agricultural Chemistry and Soil Science, Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli.

Visits of ISSS Members Abroad

- Dr. J.S. Samra, President, ISSS and Deputy Director General (NRM), ICAR attended (i) Meet-

ISSS Zonal Award and First Round of ISSS Best Doctoral Presentation Awards 2006 organized by Chpaters of ISSS

Zone	Organizing Chapter	Date of Contest
North	Ludhiana	26-09-2006
South	Hyderabad	12-09-2006
East	Kolkata	12-09-2006
West	Parbhani	16-09-2006

ing to share experience with Faculty of University of Western Sydney (UWS), Australia during May 20-31, 2006; (ii) 18th World Congress of Soil Science at Philadelphia, USA during July 9-15, 2006.

- Dr. P.D. Sharma, Assistant Director General (Soils), ICAR attended Annual Research Meeting of Generation Challenge Programme of CIMMYT, 2006, as one of the Country Representatives, at Sao Paulo, Brazil, during September 12-16, 2006.
- Dr. A.K. Singh, Project Director, Water Technology Centre, Indian Agricultural Research Institute, New Delhi visited (i) "Workshop on Aerobic Rice: Progress and Prospects", held at IRRI, Manila, The Philippines, April 3-5, 2006; (ii) Kabul, Afghanistan during April 22-29, 2006 as a Member of Delegation to develop the biennial work plan between India and the Islamic Republic of Afghanistan for cooperation in the field of Agricultural Research and Education under the MoU signed between the two countries; (iii) Vienna, Austria during June 12-15, 2006 as a Consultant to assist the IAEA in developing a programme of work on the "Geochemical and isotopic techniques to evaluate the water flux below the root zone in irrigation systems"; and (iv) to participate in the 3rd INWEPF Steering Meeting and Workshop on "Rice Paddy: Now, Tomorrow and the Future", organized by the Malaysian National Committee in Irrigation and Drainage, Kuala Lumpur, Malaysia during September 17-19, 2006.

Forthcoming Seminars/ Symposia/Conferences

International Conference on "Integrated Watershed Management for Bharat Nirman", 6-10 November 2007, NASC Complex, New Delhi.

Information: Shri B. Rath, Secretary General, Soil Conservation Society of India, G-3, National Societies Block, NASC Complex, Dev Prakash Shastri Marg, New Delhi, 110012. Fax: 011-25848244; Email: soilcsi@yahoo.co.in; bhan_suraj 2001@yahoo.com

10th Inter-Regional Conference on Water and Environment (ENVIROWAT 2007) Ensuring Water and Environment for Prosperity and Posterity, 17-20 October, 2007 at IARI, New Delhi.

Information: Dr. A.K. Singh, Organising Secretary, Water Technology Centre, IARI, New Delhi, 110012. Tel: 011-25846790, 25842494; Fax: 011-25843112; Email: iswam_2001@hotmail.com; webpage: www.iswam.in/envirowat2007

18th World Congress of Soil Science – Brief Report

The venue for the 18th World Congress of Soil Science (WCSS) was the historic Pennsylvania Convention Centre, Philadelphia, USA. The sponsors of the congress were U.S. National Committee for Soil Science of the U.S. National Academy of Sciences, the Soil Science Society of America, and the International Union of Soil Sciences.

Dr. J.S. Samra, President, ISSS participating in the meeting of the Council of IUSS at Philadelphia

The opening session was started with the America's most illustrious historical figure, Benjamin Franklin, the inventor, publisher, politician and diplomat, whose 300th birthday is being celebrated. The other opening speakers were Michael Clegg, Foreign Secretary of the U.S. National Academy of Science: Ambassador Kenneth Quinn, recognizing the 2006 World food Prize Laureate who is a Soil Scientist: Bruce Knight, Chief of the Natural Resources Conservation Services (NRCS): and Ed de Mulder, Past President of the International Union of Geological Sciences discussed the Year of Planet

Upcoming Meetings under the aegis of IUSS

2006
Preferential flow and transport processes in soil 4-9 Nov Switzerland
Soil: food security and poverty 6-11 Nov Peru
ASA-CSSA-SSSA International annual meeting 12-16 Nov USA
Balanced Fertilization for Sustaining Crop Productivity 22-25 Nov India
2nd Int. Conf. Sustainable sloping lands & watershed 12-15 Dec Lao PDR

2007
4th African Soil Science Society Conference 7-13 Jan Ghana
Intensive Training Course on Soil Micromorphology 8-19 Jan Spain
Contamination CleanUp 4-8 March Australia
44th Annual meeting of the clay minerals society 2-7 June USA
10th International Symposium on Soil and Plant Analysis 11-15 June Hungary
2nd Int symposium on trace elements & health 18-20 June Finland
5th Int Congress of the European Society for Soil Cons. 25-30 June Italy
Organic matter dynamics in agro ecosystem July France
Pedofract 3-6 July Spain
9th Intern. conf. biogeochemistry of trace elements 15-19 July China
Enzymes in the environment 15-19 July Italy
Pedometrics 2007 27-30 Aug Germany
Soils with mediterranean type of climate 22-25 Oct France
ASA-CSSA-SSSA International annual meeting 4-8 Nov USA

2008
High resolution digital soil sensing and mapping 5-8 Feb Australia
International congress of irrigation and drainage Pakistan
EUROSOIL Congress 23-31 Aug Austria
5th International conference on land degradation 18-22 Sept Italy
ASA-CSSA-SSSA International annual meeting 26-30 Oct USA

2010
19th World Congress of Soil Science, Brisbane, 1-6 Aug Australia

For details please see: www.iuss.org

Earth (YPE) initiative. The Plenary address was given by Jeffrey Scahs, the noted economist at Columbia University and the author of the acclaimed book, *The End of Poverty*. Professor Sachs is the Director of the earth Institute at Columbia and serves as special Advisor to UN Secretary - General Kofi Annan on the Millennium Development Goals.

The proclamation was given by the Mayor City of Philadelphia.

Out of 2638 papers and posters listed, contribution from India was 207, second only to USA, the host country with 736 papers. In terms of the participants, India ranked 5th with 57 delegates behind USA (981), China (103), Australia (70), Germany (67) and Canada (65).

The Indian Society of Soil Science provided Rs. 20000/- as a part of travel assistance to its members to attend the 18th World Congress of Soil Science held at Philadelphia, Pennsylvania, USA, whose names are: Dr. H.T. Channal, Dr. S.K. Dubey, Dr. Ajit S. Kharub, Dr. D. Martin, Dr. B.B. Mishra, Dr. (Ms.) D. Selvi, Dr. K.N. Sharma, Dr. Bhupinder Singh and Dr. (Ms.) S. Thiyageshwari.

Editor's Note

Managing natural resources is an important parameter in Indian agriculture and in the past several issues of this newsletter, many Indian soil scientists have already shared their thought and ideas on the topic. The lead article of this issue is also dealt on this subject and written by Dr. G.S. Sidhu, Principal Scientist, NBSS&LUP (ICAR), Regional Centre, Delhi. I express my gratitude to Dr. Sidhu for this thought provoking article. This issue is also special in nature for covering the report on 18th World Congress of Soil Science and participation of Indian delegation in general and ISSS members in particular. The Society is happy to know the greater participation of Indian Soil Scientists in this mega Soil Science Congress. I earnestly request all the members of ISSS and specially all the Chapters' office bearers to communicate the salient activities of different Chapters as well as fruitful suggestions to make the Newsletter more informative and dynamic.

Dr. S.K. Mahapatra

IUSS Soil Song

Music: "Boxturtle Bob" Chirnside
Lyrics: "Boxturtle Bob" Chirnside and Alfred Hartemink

First sung at the closing ceremony of the 18th World Congress of Soil Science on 15th July 2006

The MP3 of this song can be downloaded from www.iuss.org

We call it soil

It is our life! We call it soil
It is the stuff, in which we toil
From soil we've sprung, to soil we'll go
Protect the soil of this earth so we can grow

Verse I
From the podsols beneath snow drifts
To aridisols where few crops live
Soil is as varied, as the rainbow
And is as precious as a rainbow's pot of gold

Verse II
Some soils are dry, some soils are wet
Some soils are fertile and from them high yields you get
But if you don't, give to the soil
Then you will not reap a thing for all your toil

Verse III
We study chelates, leachates and porosity
We learn our muck and peat and mineralogy
Some study urban, some study rural
And we can tell just by the smell who's in manural

Verse IV
Soils are just like, humanity
With yellow, brown, red, black and white, you'll see
That some are dull, and some are gray
And can fall prey to greed of man that's our decay

Verse V
A living world beneath our feet
It even lives, beneath our streets
With flora and fauna, so complete
That it can save us from the brownfields of defeat

IUSS Honorary Members 2006

1. W.E.H. Blum, Austria
2. H-P. Blume, Germany
3. J. Bouma, Netherlands
4. S-J. Cho, South Korea
5. J. Glinski, Poland
6. M.G.H. Jamagne, France
7. D.R. Nielsen, USA
8. J.H.V. van Baren, Netherlands
9. L.P. Wilding, USA

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Dy Secy General: Alfred Hartemink
Treasurer: Jim Gauld

2008 to be the International Year of Planet Earth

As per the UN Resolution 60/192, 2008 has been proclaimed as the UN Year of Planet Earth. For the first time ever, the geosciences will be placed in the focus of political attention by all 191 UN nations. By this Resolution, all nations are invited to report on what they have done to apply the geosciences in local, national and international decision making. The UN Year (2008) will be the central year in the triennium 2007-2009 designated as the lifetime for the International Year of Planet Earth.

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