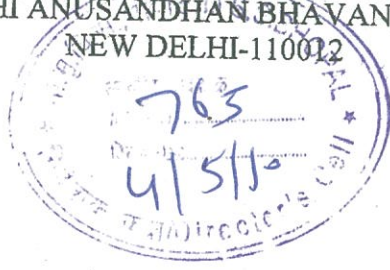


23/5-2010 / RTI / 1155

**MOST IMMEDIATE**

**INDIAN COUNCIL OF AGRICULTURAL RESEARCH  
KRISHI ANUSANDHAN BHAVAN, PUSA,  
NEW DELHI-110012**



F.No.1(3)/2007-SW&DF

Dated the 3<sup>rd</sup> May, 2010

To

The Director  
National Bureau of Soil Survey & Land Use Planning,  
Shankar Nagar, Amravati Road,  
Nagpur-440010  
FAX No. 0712 - 2500534

The Director  
Indian Institute of Soil Science,  
Nabi Bagh, Bersia Road,  
Bhopal-462038  
FAX No. 0755 - 2733310

**Sub:- CARBON CONTENT IN SOILS OF INDIA MY RTI NO : ACT**

Sir,

Please find enclosed herewith a copy's of the RTI letters No. LRA - 01/XBU dated 27<sup>th</sup> March, 2010 received from Sh. Laxmi Narain Modi on the subject mentioned above. You are requested to send the required information (point wise) to the Council by FAX.

*Dr. Blaize D'Souza*  
*A. Sankar*  
*PS*  
*4/5/10*

Yours faithfully,

*P.D. Sharma*  
(P.D. SHARMA)  
ASSISTANT DIRECTOR GENERAL (S)

Encl:- As above

Received on 5-5-10 *5-5-10 11:30 AM*

RTI Matter TOP PRIORITY : Information may be supplied in soft & hard copy within a week.

- 1) *Dr. M. Singh, PC, LT&E*
- 2) *Dr. M. C. Manna, HoD, Soil Biology &*
- 3) *Dr. B. L. Lakana Sr. Scientist, Soil Fertility & Chemistry Div.*

Please provide information required. See page enclosed.



**LAXMINARAIN MODI**  
Senior Citizen

ॐ  
ओम् आनो मदाः क्रतवो यन्तु विश्वतः  
Let noble thoughts come from all sides

लक्ष्मीनारायण मोदी  
वरिष्ठ नागरिक

ज्ञानम् परमं बलम्  
योगः कर्मसु कौशलम्

Managing Trustee  
Aminal Rights International  
Bharatiya Cattle Resource  
Development Foundation  
Durga Dutt Modi  
Foundation

Director General  
Indian Fedration of Ahimsa  
Organisations

Former Memberships  
National Commission  
on Cattle

Wkg. Group (Xth Plan)  
Animal Husbandry &  
Dairying  
Organic & Bio-Dyamic  
Agriculture

Wkg. Group (XIth Plan)  
Cattle and Buffalo Breeding

Draught Animal Power  
Animal Welfare &  
Disaster Management

\*Governing Body  
All India Management  
Association

National Productivity  
Council

Cement Development  
Council

Central Purchase  
Advisory Committee

Delhi Telephone  
Advisory Committee

\*Chairman  
Cane Development  
Council, Rampur (UP)

\*Chief Executive  
\*J.Dalmia Group

Chairman Emeritus  
Avanti Overseas Pvt. Ltd.

Dr. Munechwan Singh  
Dr. M.C. Manna  
\* Former Dr. B.L. Lakawa

PIO  
Ministry of Agriculture  
Krishi Bhavan  
New Delhi- 110 001

120/RTI/110  
15/4

LRA-01/XBU  
March 27, 2010

Manyawar,

**CARBON CONTENT IN SOILS OF INDIA  
MY RTI NO : ACT**


I believe carbon content plays a very important role in Agricultural produce, which has been going down.

Please inform under RTI

1. Status of carbon in each State/UT
2. Rate of decrease in last 10 years
3. What is critical point of carbon, below which taking produce would be very very problematic ?
4. What efforts have or intended to be taken to augment ?
5. What are reasons for carbon depletion :
6. What carbon decline is expected in next 10-20 years ?
7. How critical is carbon for taking produce ?
8. What are methods of improving carbon content ?
9. Is loss of carbon mentioned in any of your reports, if so bibliography of same
10. Any other

If any item does not concern you, kindly forward under section 6(3) to appropriate authority and furnish details. If the other authority does not respond in reasonable time, please pursue with them under intimation to me.

Requisite fee of Rs 10 is sent herewith by Postal Order No: 88E 334999

Cordially  
  
Laxmi Narain Modi

PS: Please quote my RTI or letter number for easy referencing.

C-8, SOUTH EXTENSION-II, NEW DELHI 110 049-02 (INDIA)  
Tel. 91(11) 4164 1480 (O), 2625 5533 @ Mob. : 98 910 13200 Fax 4764 4077 E-mail: lnmodi@cowind.org

ओम् महापुरुष का स्वर है, ओम् अरुणोदय का स्वर है,  
ओम् असीम प्रेम का स्वर है, ओम् सुभाष का स्वर है।

Bankers  
Axis Bank

ॐ पूर्णविक्रमः पूर्णविक्रमः पूर्णविक्रमः

7K 2K 0209

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04/05 2010 03:00 FAX 91+11+23387705





## INDIAN INSTITUTE of SOIL SCIENCE

Division of Soil Physics

Nabibagh, Berasia Road,

Bhopal 462 038, M.P., India

Phone : 0755-2730970 Ext. 108, Fax: 0755-2733310

**Dr. Blaise Desouza ARS**  
**Principal Scientist & PIO**

**By Fax**  
**Top- Priority RTI Matter**


Dated May 12, 2010  
RTI/PIO/SPD/IISS/01

Sir:

### **Sub: Carbon Content of Indian Soils – RTI Information requested**

This is with reference to your letter F. No. 1(3)/2007-W&DF dated 3 May 2010 regarding furnishing information on Carbon Content in soils of India, under the RTI Act. Kindly find the response to the queries raised by the Applicant.

Yours faithfully,

  
(Blaise Desouza) 12-5-10

To  
Dr. P. D. Sharma  
Assistant Director General  
I.C.A.R., Pusa  
New Delhi - 110 012



**Dated: 12/5/10**

**To  
The Director  
IISB, Bhopal**

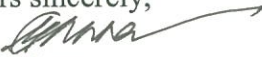
Ref: LRA-01/XBIJ Dated March 27, 2010 reg.

Sir,

Please find enclosed herewith copy of reply for the above mentioned queries as desired by you.

Thanking you,

Yours sincerely,

  
M.C.Manna  
HOD (SB)

*Dr Blair, D.  
12/5/10*

## Ref: LRA-01/XBIJ Dated March 27, 2010

**Subject: Carbon content in soils of India**

### 1. Status of carbon in each state/UT

**Reply:** Soil organic carbon status in Semiarid tropic regions (Table1) in India

**Table1. Changes in SOC in Semi-Arid Tropic Benchmark Soils of India**

Soil Series under different bio-climatic zones	Name of the state	Initial SOC		After 20-25 years of Cultivation	
		SOC (%)	Year	SOC (%)	After 20-25 years
<b>Black Soils</b>					
Sub-Humid Moist ( Kheri)	Madhya Pradesh	0.41	1982	0.53	2002
SubHumid-dry ( Linga)	Maharashtra	0.49	1980	0.82	2002
Sub-Humid Moist ( Asra)	Maharashtra	0.30	1982	0.73	2002
Semi-Arid Dry ( Semla)	Gujarat	0.65	1978	0.76	2002
Semi-Arid Dry (Teligi)	Karnataka	0.44	1974	1.03	2002
Arid ( Sokhda)	Gujarat	0.49	1977	0.50	2002
<b>RED SOIL</b>					
Sub-Humid Moist (Vijayapura)	Karnataka	0.44	1982	0.50	2002
Semi-Arid Dry (Kakuntala)	Andhra Pradesh	0.32	1978	0.78	2002
Semi-Arid Dry (Patancheru)	Andhra Pradesh	0.39	1978	1.42	2002
Arid (Palathurai)	Tamil Nadu	0.39	1978	0.75	2002

Bhattacharyaya et al. (2007) & Manna et al (, 2008)

## **Information 2: Rate of decrease in last ten years**

**Reply:** Long term study (15-30 years) indicated that the decreasing rate of SOC was 1.7 to 4.4 % per year in unfertilized control, N and NP treated plots in Inceptisol ( Rice-wheat system), 12.6 % per year in unfertilised control plots in Vertisol ( sorghum – wheat system) and 1.1 -2.3 % per year in soybean-wheat system in Alfisol ( Manna et al. 2005). They also reported that there no SOC declined trend was observed under balanced NPK and NPK+FYM treated plots in all these soils.

## **Information 3: What is critical point of carbon below which taking produce would be very very problematic?**

**Reply:** It is a relative term. For example, if yield trend is negative and at the same time SOC trend is significantly negative then the value of SOC would be treated as threshold limit. Thus, there is no critical limit of SOC is problematic.

## **Information 4: What efforts have or intended to be taken to ugment?**

**Reply:** The following strategies to enhance SOC

1. Controlling top soil erosion
2. Conservation tillage (specially reduces and zero tillage) and surface residue management, mulching, etc
3. Balanced and adequate fertilization and integrated nutrient use
4. Inclusion of legumes in cropping systems
5. Green manuring and green leaf manuring
6. Carbon sequestration through agroforestry tree species and its recycling by leaf litter fall.
7. Use of soil amendments
8. Regular use of manures

**Information 5. What are the reason for carbon depleton?**

**Reply:** The following reasons may be considered.

- (a) Extensive cultivation.
- (b) Imbalanced or no use of fertilizer application.
- (c) Less incorporation of manure in soil.
- (d) Less recycling of crop residue in soil.
- (e) Deforestation

**Information 6: What carbon decline is expected in next 10-20 years.**

**Reply:** If farmer continuously follow high management techniques ( Integrated nutrient management), there is less scope to decline organic carbon in soil.

**Information 7: How critical is carbon for taking produce?**

**Reply:** The SOC restore all plant nutrients, maintain buffering capacity, water holding capacity of soil, sustain soil biodiversity, improve physical properties. All these soil quality parameters critically maintain by SOC which ultimately reflects yield sustainability.

**Informaton 8: What are methods of improving carbon content**

**Reply:** Answer has been given on item number 4.

**Information 9. Is loss of carbon mentioned in any of your reports, if so bibliography of same?**

**Reply:** Manna, M.C. et al ( 2005) Long-term effect of fertilizer and manure application on soil organic carbon storage, soil quality and yield sustainability under sub-humid and semi-arid tropical India. Field crop research. 93: 264-280.

# CARBON CONTENT IN SOILS OF INDIA (Reply to RTI)

Ref.: LRA-01/XBU dtd 27.03.2010 RTI letter by Laxminarayan Modi, C-8, South Extension-II, New Delhi 110 049-02 (lnmodi@cowind.org)

Information under reply to RTI is as follows

## 1. Status of carbon in each State/UT

To study the impact of nutrient management practices, All India Coordinated Research Project on “Long Term Fertilizer Experiment to Study Changes in Soil Quality, Crop Productivity and Sustainability” has been established by ICAR at 17 location covering the predominant cropping system and soils of the country. The results obtained during last 39 years have proved that balanced and integrated use of nutrient resulted improvement in soil organic carbon (SOC) status of soil. The values in absolute terms with respect to SOC have been reproduced in Table 1 as given below.

Table 1 Effect of long term fertilizer and manure use on SOC (g kg<sup>-1</sup>) at different locations of All India Coordinated Research Project on Long-Term Fertilizer Experiments (AICRP LTFE)

State	Location	Initial (1972)	No fertilizer or manure	NP	NPK	NPK+FYM
Karnataka	Bangalore	4.6	4.3	4.7	4.7	5.7
Tamil nadu	Coimbatore	3.0	5.8	6.7	6.7	10.4
Jharkhand	Ranchi	4.5	3.6	3.8	3.7	4.5
Uttarakhand	Pantnagar	14.8	5.4	8.5	8.7	16.1
Himachal Pradesh	Palampur	7.9	8.6	9.4	9.7	13.2
Delhi	New Delhi	4.4	3.2	3.9	4.4	5.5
Madhya Pradesh	Jabalpur	5.7	4.1	6.6	7.6	9.4
Orissa*	Bhubaneshwar	4.3	2.9	3.6	3.7	5.3
Maharashtra*	Akola	4.6	2.7	4.9	5.1	6.8
Gujarat*	Junagadh	8.9	7.1	6.8	7.1	13.6
Chhatisgarh*	Raipur	6.2	5.9	6.0	6.1	6.4
Andhra Pradesh*	Jagtial	7.9	9.5	10.1	10.3	11.6
Kerala*	Pattambi	9.0	11.0	13.0	14.0	14.2

\* Initiated during 1996-97

The Annual Report of LTFE 2008-09 may kindly be referred for detailed explanation on SOC status at different LTFE sites.

## 2. Rate of decrease in last 10 years

As on date, we have no information on decrease rates of soil organic carbon for the country.

From the long-term fertilizer experiments conducted at various locations in the county, in general, there was no decline in soil organic carbon wherever balanced and integrated nutrient management practices are followed. At some locations,



viz., Jharkhand, Uttarakhand, Gujarat and Chattishgadh, imbalanced use of nutrients resulted in a decline in soil organic carbon (Table 1).

However, on farmers' field situations, the scenario is likely to be different. Increase in C content was noted in farmers' fields with high productivity (Punjab, Haryana, Western Uttar Pradesh, rice-rice growing areas in Andhra Pradesh and Tamil Nadu).

### 3. What is critical point of carbon, below which taking produce would be very very problematic?

As such we do not have critical level of carbon below which taking of produce will be problematic. However, in some of soil we have worked out minimum amount of carbon required to maintain SOC. For example in Madhya Pradesh nearly 900 kg C (equivalent to 6 ton well decomposed organic manure) is required to be added annually. Whereas in West Bengal, amount of carbon required is 4500 kg year<sup>-1</sup> (27 tons of organic manure) to maintain the initial equilibrium.

### 4. What efforts have or intended to be taken to augment?

As data given (table 1) clearly indicate that integrated use of chemical fertilizer and organic manure did not allow to decline carbon in soil. So recommendations are made that Integrated Nutrient Supply System (IPNS) should be followed to sustain the soil productivity.

### 5. What are reasons for carbon depletion :

Generally, Indian soils are low in organic C mainly because of high temperature and the aridity of climate.

Important reasons for decline in soil carbon

- a. Complete removal of all the straw from the field
- b. Addition of less amount of carbon through manure and organic biomass
- c. Cultivation practices followed: intensive tillage leads to loss of C through oxidation.

### 6. What carbon decline is expected in next 10-20 years?

Results of LTFE proved that if the balance and integrated use of nutrient is followed then decline in soil organic carbon is not expected.

### 7. How critical is carbon for taking produce?

Soil organic carbon is critical soil constituent which not only regulate the supply of plant nutrients but also maintain good physical condition of soil which helps the soil organism to perform their action in proper way. Thus SOC is very important to sustain the soil productivity.

**8. What are methods of improving carbon content?**

To maintain or enhance SOC we must adopt the following practices:

- a. Balanced and integrated use of nutrients
- b. Supply of carbon through organic manure, FYM, vermicompost, poultry manure etc.
- c. Practicing of green manuring
- d. Recycling of crop residues to maximum extent possible instead of burning

**9. Is loss of carbon mentioned in any of your reports, if so bibliography of same**

Singh, Muneshwar and Wanjari, R.H. (2009) All India Coordinated Research Project on Long -Term Fertilizer Experiments to Study Changes in Soil Quality, Crop Productivity and Sustainability. AICRP - LTFE, Indian Institute of Soil Science, Nabi Bagh, Bhopal, pp. 1-95.

