

*Eagle Vision*

# AGRICULTURE



## **FOR ALL AGRICULTURAL COMPETITIVE EXAMINATIONS**

(UPSC, MPSC, IBPS-AO, ARS/SRF/JRF, Pre-PG and Ph.D.  
Entrance Examinations and Interview of All Agricultural Services)

*Compiled by*

**NARAYAN A. NAGRE**

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**M.Sc. Agriculture**

Genetics & Plant Breeding

*Special thanks to*

**Bharat S. Nagre**

**M.Sc. Agriculture**

Agronomy

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## **PREFACE**

This book covers all the important aspects of ICAR Institutes and Current updates, General Agriculture, Agronomy, Soil Science & Biochemistry, Microbiology, Plant Pathology, Horticulture, Genetics & Plant Breeding, Seed Sciences & Technology, Plant Physiology, Agricultural Entomology, Agricultural Economics, Extension Education, Animal Husbandry & Dairy Science and Agricultural Engineering containing descriptive & one word type of questions.

Competitive examinations in the field of agriculture have become routine in nature for recruitment or admission in Union Public Service Commission, State Public Service Commission(s), ICAR, Banking services and State Agricultural University(s). One has to go through a number of text books and other related books to get prepared for those examinations. After wide discussion made with the students as per their desire, the book “**Eagle Vision Agriculture**” was planned and brought out.

I am genuinely thankful to Dr. V. L. Gawande, Associate professor & HOD Botany, College of Agriculture, Dr. PDKV, Akola for encouragement and technical guidance. The moral support and sacrifice from family for completing this task is immensely acknowledged.

I hope, the readers will be happy to find the new appearance of book. The suggestions from the readers for any printing errors or mistakes to improve the quality of book are deeply welcomed.

**(Narayan Asaram Nagre)**

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# 1

## GENERAL AGRICULTURE

Agriculture is the 'latin' word "ager" meaning 'Soil' and "cultura" meaning 'Cultivation', so cultivation of soil is called agriculture. Agriculture, since its invention and inception has been the prime and foremost activity of every culture and civilization throughout the history of mankind.

The first man was *Homo erectus* evolved on the earth around 1.5 million years ago and after 5 lakh years he spreads throughout the old world [First in tropical region and then in temperate region]. The evolution of modern man was as follows:

Monkey (>1.5 million year ago) → Java man / *Homo erectus* (15 lakh years ago) → Cro-Magnon → Modern man / *Homo sapiens sapiens* (250 thousand years ago). 'Homo' meaning 'continuous', 'erectus' meaning 'erect' and 'sapiens' meaning 'learning habit'. The ancestor of modern man, *Homo sapiens* first time appeared in Africa around 35 thousand years ago. The *Homo sapiens* different from fellow animals due to presence of large brain, small teeth and chin, intelligence and skill in making and use of tools. The genus *Homo* gets knowledge of fire control around 500 thousand years ago. The living development of *Homo sapiens* is as follows:

Intelligence/brain development → Making tools [First tools was boulders (rock/stone) and spears of wood tipped with blades of flint] → Hunting of animals  
Cooked meat on fire → Started domestication of dog → Dog helped in hunting  
→ Started gathering seeds, leaves and fruits from jungle.

### CHRONOLOGY OF MODERN AGRICULTURE

Year	Events
1871	Department of Revenue, Agriculture and Commerce (DRAC)
1874	Severe famine in Bihar
1875	Indian Meteorological Department (IMD) at Pune (Maharashtra)
1876	Famine in Madras and Bombay presidencies
1877	Famine in Punjab, Central province (10 lakh died)
1878	Higher education in agriculture at Coimbatore.
1880	Famine commission appointed.

1881	Government of India started Department of Revenue and Agriculture in provinces
1882	Veterinary college established at Lahore (now in Pakistan)
1890	Higher Education in agriculture at Pune
1891	Dr. J. A. Volcker's report on improvement of Indian Agriculture
1892	Agriculture chemist and an assistant chemist were appointed to look after research and teaching.
1899-1900	Famine (Chhapaniyakal)
1900	Forest Research Institute
1901-1905	Agricultural colleges were established at Pune, Kanpur, Sabour, Nagpur, Lyallapur and Coimbtore
1901	First Irrigation Commission
1903	An Entomologists were appointed
1905	Established the Imperial (now known as Indian) Agricultural Research Institute at Pusa, (Bihar) shifted to New Delhi in 1936
1906	Started Agriculture Journal India
1921	Indian central cotton committee.
1926	Appointment of Royal Commission on Agriculture headed by Lord Linlithgow
1928	Royal Commission on Agriculture submitted its report
16 July 1929	Establishment of Imperial (now Indian) Council of Agricultural Research (ICAR), New Delhi
1931	Indian Central Lac Committee
1 <sup>st</sup> April 1935	Establishment of <b>Reserve Bank of India</b> (RBI) with RBI act 1934
1936	Indian Central Jute Committee
1940	Monthly Journal (Popular) <b>Indian Farming</b> started by Imperial (Indian) Council of Agricultural Research (ICAR), New Delhi
1942	Department of Food Created
1943	Great Bengal Famine (Caused by <i>Helminthosporium oryzae</i> )
1944	Indian Central Sugarcane Committee.

1944	Dr W. Burns report on Technological Possibilities of Agricultural Development in India
1945	Sir, Pheroze Kharegat's memorandum on the development of Agriculture and Animal Husbandry in India
1945	Indian Central Coconut Committee
1945	Indian Central Tobacco Committee.
1946	Directorate of Plant Protection & Quarantine.
1946	Central Rice Research Institute (CRRI)
11 Dec 1946	UNICEF, Headquarter at <b>New York</b> (International organisations)
1947	Food policy committee
1947	Indian Central Oilseeds Committee.
1947	Fertilizers & Chemicals Travancore
1948	FAO (Food & Agriculture Organization), <b>Rome (Italy)</b>
Jan 1948	GATT (General Agreement on Tariffs and Trade), now replaced by WTO.
1 Jan 1949	Nationalization of RBI
1949	Areanut Committee
1955	UNESCO
1956	Project for intensification of regional research on cotton, oilseeds, millets (PIRRCOM)
1957	All India Coordinated maize improvement Project.
1958	Status of Deemed University accorded to IARI under UGC Act,1956.
1958	Spices and Cashewnut Committee
1958	<b>Nalagarh Committee report</b> (or Agricultural Administrative Committee)
2 <sup>nd</sup> Oct 1958	NAFED (National Agricultural Cooperative Marketing Federation)
1960	First agricultural University in India. G.B. Pant University of Agriculture & Technology at Pantnagar, on the pattern of Land-Grant system of USA
1963	National Seed Corporation
14 Jan 1965	Food Corporation of India (FCI)
1965	Became First DG or Vice President of ICAR. <b>Dr. B.P. Pal</b>
1965	ACRIPs were started on other crops as well as in other areas of Research



1966	Placement of different agricultural research institutes under the purview of ICAR
19 <sup>th</sup> July 1969	Nationalization of 14 major commercial banks
1969	Second Irrigation commission
1970	National commission on agriculture.
1971	All India coordinated project for dry land agriculture
1972	<b>ICRISAT</b> ; International Crop Research Institute for Semi-Arid Tropics, <b>Hyderabad</b>
1973	Creation of Department of Agricultural Research and Education (DARE) in the Ministry of Agriculture
1973	Started Agricultural Research Services (ARS) by Dr. M.S. Swaminathan.
1974	Operational Research Project
1975	Establishment of <b>Regional Rural Bank (RRB)</b> , RRB act 1976
1975	Establishment of Agricultural Scientists Recruitment Board (ASRB) based on recommendation of G. Gadkar Committee
1976	National Academy of Agricultural Research and Management (NAARM); <b>Hyderabad</b>
1986	Technology Mission on Oilseeds (TMO)
1986	National Watershed Development Programme for Rainfed Areas
1986	National agricultural research project (Phase-II)
1988	Special Food Production Programme (SFPP)
1 Jan 1995	WTO- World Trade Organization, <b>Geneva</b> (Switzerland)
1996	Establishment of National Gene Bank at New Delhi
1 <sup>st</sup> April 2004	The four erstwhile schemes of OPP, OPDP, NPDP and AMDP have been merged into one Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM) being implemented from 1.4. 2004.
2004	Inauguration of National Agricultural Science Complex (NASC) at New Delhi
2004	Marine Fishing Policy

2004	National Commission on Farmers (Chairman Dr. M.S. Swaminathan)
July 2006	National Agricultural Innovation Project (NAIP) through World Bank
May 2005	National Horticulture Mission (NHM)
2006-07	National Bamboo Mission
2006	National Rainfed Area Authority (NRAA) on 3.11.2006

## ABOUT AN INDIAN AGRICULTURE

1. Geographical area of India is : **328.74 mha**
2. Total reporting area of India is : **306 mha**
3. Gross sown area of India is : **192.20 mha**
4. Net sown area of India is : **140.02 mha**
5. Cropping intensity of India is : **137.26 %**
6. Gross irrigated area of India is : **86.42 mha**
7. Net irrigated area of India is : **63.26 mha**
8. Total degraded land of India is : **120.40 mha (36.6% TGA)**
9. Annual world precipitation is : **1000 mm**
10. Average annual rainfall of India : **1194 mm**
11. Generated rainfall volume of India : **400 mha-m**
12. The generated runoff volume : **185 mha-m**
13. Forest area of India is : **70 mha (21.2% TGA)**
14. Optimum forest area required : **33% of Geographical area**
15. Per capita availability of agricultural use land is : **0.30 ha**
16. Area under cultivable wasteland is : **14.63 mha (5%)**
17. State having highest geographical area in India : **Rajasthan**
18. The State which is second in geographical area : **MP**
19. Highest forest area in the state: **MP**
20. The state which is first in pulse production: **MP**
21. The state which is 1<sup>st</sup> in food grain production: **UP**
22. The state which is 1<sup>st</sup> in total coarse cereal production: **Rajasthan**
23. The state which is 2<sup>nd</sup> in food production: **Panjab**
24. The state which is first in wheat production: **U.P.**
25. The state which is 2<sup>nd</sup> in wheat production: **Punjab.**
26. Maximum area under irrigation is in: **Ganga basin**
27. Maximum area under drip irrigation is in: **Maharashtra**
28. Maximum area under sprinkler is in: **Haryana**

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29. Highest fertilizer consumption rate (Includes States and Union Territories):  
**Pundicherry** (1091.0 kg/ha)
  30. Highest fertilizer consumption rate (Among state): **Punjab** (212 kg/ha)
  31. Total fertilizer consumption is maximum in: **U.P.**
  32. Maximum area under irrigation is in: **Panjab** (92.7% of cultivated area)
  33. Number of agro climatic zones in India (Planning commission): **15**
  34. Number of agro ecological regions (NBSS & LUP): 21 (**now 20**)

### INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR)

- **1926:** Established Royal Commission on Agriculture, headed by Lord Linlithgow recommended setting up Imperial Council of Agricultural Research to promote, guide and coordinate agricultural research throughout the India.
- **1928:** Royal Commission on Agriculture submitted its report
- **16<sup>th</sup> July, 1929:** ICAR was set up on 16 July 1929 as registered society under the Societies Registration Act 1860 on the recommendation of Royal Commission of Agriculture.
- **March, 1946:** Under the president ship of Jogendra Singh it was decided to change the name 'Imperial' into "Indian" and now it is called **Indian Council of Agricultural Research.**
- **1947:** ICAR named as Indian Council of Agricultural Research
- **1963:** The Agricultural Review Team headed by Dr. Marion W. Parker of USDA was appointed
- **1965:** A policy was made to appoint an Agricultural scientist as the chief executive of ICAR with the designation of Director General: **Dr. B.P. Pal** became the first DG of ICAR in 1965.
- **1966:** ICAR was made a fully autonomous organization on the recommendation of Agricultural Review Team
- **June, 1972: Gajendra Gadkar Committee** was established to review the recruitment and personal policies of ICAR and its Institutes, which submitted its report in 1973.
- **1973:** Department of Agricultural Research and Education (DARE) was created in Ministry of food and Agriculture
- **1973:** Establishment of Agriculture Research Service (ARS)
- **1 Nov., 1975:** The Agricultural Scientists Recruitment Board (ASRB) was established as an independent recruitment agency in pursuance of the recommendations of the Gajendra Gadkar Committee.
- President of ICAR: Union Minister of Agriculture
- DG of ICAR also Secretary of DARE: (Department of Agriculture Research and Education) established in 1973.
- First President of ICAR: Khan Bhadur Sir Mohammad Habibullah.

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**NEWATICAR :**

1. Present Director General of ICAR and Secretary, DARE, Ministry of Agriculture : **Dr. T. Mahapatra**
2. Present President of ICAR and Union Minister of Agriculture : **Mr. Radha Mohan Singh**
3. Present Chairman of Agriculture Scientist Recruitment Board (ASRB), New Delhi : **Dr. Gurubachan Singh**

**INDIAN AGRICULTURAL RESEARCH INSTITUTE (IARI)**

- **1905:** Agricultural Research Institute was established at Pusa, Bihar under the viceroyalty of Lord Curzon. Earlier it was in West Bengal. Help of sum of rupees 9 lakh was donated by an American Philip of USA
- **1911:** Renamed as Imperial Agricultural Research Institute
- **1923:** Institute started offering Diploma of Associate ship.
- **1934:** Major Earth quake damaged the building at Pusa, Bihar.
- **1936:** IARI was shifted to Pusa road, New Delhi
- **1936:** **B. Vishwanath** became first Indian Director of Institute
- **1946:** The Diploma of Associate ship was recognized equivalent to M.Sc.
- **1947:** Name has been changed from Imperial Agricultural Research Institute to **Indian Agricultural Research Institute.**
- **1958:** Recognized as “Deemed University” under UGC Act 1956. PG school was established.

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## ICAR INSTITUTES

### Deemed Universities - 4

1. **IARI** : Indian Agricultural Research Institute, New Delhi
2. **NDRI** : National Dairy Research Institute, Karnal, Haryana
3. **IVRI** : Indian Veterinary Research Institute, Izatnagar, UP
4. **CIFE** : Central Institute on Fisheries Education, Mumbai, MH

### Institutions - 63

1. **CIARI** : Central Island Agricultural Research Institute, Port Blair
2. **CAZRI** : Central Arid Zone Research Institute, Jodhpur, Rajasthan
3. **CARI** : Central Avian Research Institute, Izatnagar, UP
4. **CIFRI** : Central Inland Fisheries Research Institute, Barrackpore, WB
5. **CIBA** : Central Institute of Brackish water Aquaculture, Chennai, TN
6. **CIRB** : Central Institute for Research on Buffaloes, Hissar, Haryana
7. **CIRG** : Central Institute for Research on Goats, Makhdoom, Mathura, UP
8. **CIAE** : Central Institute of Agricultural Engineering, Bhopal, MP
9. **CIAH** : Central Institute for Arid Horticulture, Bikaner, Rajasthan
10. **CICR** : Central Institute of Cotton Research, Nagpur, MH
11. **CIFT** : Central Institute of Fisheries Technology, Cochin, Kerala
12. **CIFA** : Central Institute of Freshwater Aquaculture, Bhubneshwar, Odisha
13. **CIRCT** : Central Institute of Research on Cotton Technology, Mumbai, MH
14. **CISTH** : Central Institute of Sub Tropical Horticulture, Lucknow, UP
15. **CITH** : Central Institute of Temperate Horticulture, Srinagar, J&K
16. **CIPHET** : Central Institute on Post-harvest Engineering and Technology, Ludhiana, Panjab
17. **CMFRI** : Central Marine Fisheries Research Institute, Kochi, Kerala
18. **CPCRI** : Central Plantation Crops Research Institute, Kasargod, Kerala
19. **CPRI** : Central Potato Research Institute, Shimla, Himachal Pradesh
20. **CRIJAF** : Central Research Institute for Jute and Allied Fibres, Barrackpore, WB
21. **CRIDA** : Central Research Institute of Dry land Agriculture, Hyderabad
22. **NRRI** : National Rice Research Institute, Cuttack, Odisha
23. **CSWRI** : Central Sheep and Wool Research Institute, Avikanagar, Rajasthan
24. **IISWC** : Indian Institute of Soil and Water Conservation, Dehradun, Utrakhand
25. **CSSRI** : Central Soil Salinity Research Institute, Karnal, Haryana
26. **CTRI** : Central Tobacco Research Institute, Rajahmundry, Telangana

- 
27. **CTCRI**: Central Tuber Crops Research Institute, Trivandrum, Kerala
  28. ICAR Research Complex for Eastern Region, Patna, Bihar
  29. ICAR Research Complex for NEH Region, Barapani, Meghalaya
  30. **CCARI** : Central Coastal Agricultural Research Institute, Ela, Old Goa, Goa
  31. **IASRI** : Indian Agricultural Statistics Research Institute, New Delhi
  32. **IGFRI** : Indian Grassland and Fodder Research Institute, Jhansi, UP
  33. **IIAB** : Indian Institute of Agricultural Biotechnology, Ranchi, Jharkhand
  34. **IIHR** : Indian Institute of Horticultural Research, Bengaluru, Karnataka
  35. **IINRG** : Indian Institute of Natural Resins and Gums, Ranchi, Jharkhand
  36. **IIPR** : Indian Institute of Pulses Research, Kanpur, UP
  37. **IISS** : Indian Institute of Soil Sciences, Bhopal, MP
  38. **IISR** : Indian Institute of Spices Research, Calicut, Kerala
  39. **IISR** : Indian Institute of Sugarcane Research, Lucknow, UP
  40. **IIVR** : Indian Institute of Vegetable Research, Varanasi, UP
  41. **NAARM** : National Academy of Agricultural Research & Management, Hyderabad
  42. **NIBSM** : National Institute of Biotic Stresses Management, Raipur, Chhattisgarh
  43. **NIASM** : National Institute of Abiotic Stress Management, Malegaon, Maharashtra
  44. **NIANP** : National Institute of Animal Nutrition and Physiology, Bengaluru, KN.
  45. **NIRJAFT** : National Institute of Research on Jute & Allied Fibre Technology, Kolkata, WB
  46. **NIVEDI** : National Institute of Veterinary Epidemiology and Disease Informatics, Hebbal, Bengaluru
  47. **SBI** : Sugarcane Breeding Institute, Coimbatore, TN
  48. **VPKAS** : Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora, Uttrakhand
  49. **CIRC** : Central Institute for Research on Cattle, Meerut, Uttar Pradesh
  50. **NIHSAD** : National Institute of High Security Animal Diseases, Bhopal, MP
  51. **IIMR** : Indian Institute of Maize Research, New Delhi
  52. **CARI** : Central Agroforestry Research Institute, Jhansi, UP
  53. **NIAEPR** : National Institute of Agricultural Economics and Policy Research, New Delhi
  54. **IIWBR** : Indian Institute of Wheat and Barley Research, Karnal, Haryana
  55. **IIFSR** : Indian Institute of Farming Systems Research, Modipuram, UP
  56. **IIMR** : Indian Institute of Millets Research, Hyderabad
  57. **IIOR** : Indian Institute of Oilseeds Research, Hyderabad
  58. **IIOPR** : Indian Institute of Oil Palm Research, Pedavegi, West Godawari
  59. **IIWM** : Indian Institute of Water Management, Bhubaneswar, Odisha

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60. **IIRR** : Indian Institute of Rice Research, Hyderabad
  61. **CIWA** : Central Institute for Women in Agriculture, Bhubaneswar, Odisha
  62. **CCRI** : Central Citrus Research Institute, Nagpur, MH
  63. **NOFRI** : National Organic Farming Research Institute, Ghaziabad (UP)

#### **National Research Centres - 14**

1. **NRCB** : National Research Centre for Banana, Trichi
2. **NRCG** : National Research Centre for Grapes, Pune
3. **NRCL** : National Research Centre for Litchi, Muzaffarpur
4. **NRCP** : National Research Centre for Pomegranate, Solapur
5. **NRCC** : National Research Centre on Camel, Bikaner
6. **NRCE** : National Research Centre on Equines, Hissar
7. **NRCM** : National Research Centre on Meat, Hyderabad
8. **NRCM** : National Research Centre on Mithun, Medziphema, Nagaland
9. **NRCO** : National Research Centre on Orchids, Pakyong, Sikkim
10. **NRCP** : National Research Centre on Pig, Guwahati
11. **NRCPB** : National Research Centre on Plant Biotechnology, New Delhi
12. **NRCSS** : National Research Centre on Seed Spices, Ajmer
13. **NRCY** : National Research Centre on Yak, West Kemang
14. **NCIPM** : National Centre for Integrated Pest Management, New Delhi

#### **National Bureaux - 6**

1. **NBPGR**: National Bureau of Plant Genetics Resources, New Delhi
2. **NBAIM**: National Bureau of Agriculturally Important Micro-organisms, Mau, Uttar Pradesh
3. **NBAIR**: National Bureau of Agricultural Insect Resources, Bengaluru, Karnataka
4. **NBSS & LUP**: National Bureau of Soil Survey and Land Use Planning, Nagpur, MH
5. **NBAGR**: National Bureau of Animal Genetic Resources, Karnal, Haryana
6. **NBFGR**: National Bureau of Fish Genetic Resources, Lucknow, UP

#### **Directorates / Project Directorates - 14**

1. Directorate of Seed Research, Mau
2. Directorate of Groundnut Research, Junagarh
3. Directorate of Soybean Research, Indore
4. Directorate of Rapeseed & Mustard Research, Bharatpur
5. Directorate of Mushroom Research, Solan

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6. Directorate on Onion and Garlic Research, Pune
  7. Directorate of Cashew Research, Puttur
  8. Directorate of Medicinal and Aromatic Plants Research, Anand
  9. Directorate of Floricultural Research, Pune, Maharashtra
  10. Directorate of Weed Research, Jabalpur
  11. Project Directorate on Foot & Mouth Disease, Mukteshwar
  12. Directorate of Poultry Research, Hyderabad
  13. Directorate of Knowledge Management in Agriculture (DKMA), New Delhi
  14. Directorate of Cold Water Fisheries Research, Bhimtal, Nainital

### **International Agencies**

1. **CIFOR** – Centre for International Forestry Research, Bogor, Indonesia
2. **CIAT** – International Centre for Tropical Agriculture, Cali, Columbia (1967)
3. **CIP** – International Centre for Potato, Lima, Peru
4. **CIMMYT** – International Centre for the Improvement of Maize and Wheat, Mexico (1966)
5. **IPGRI** – International Plant Genetic Resources Institute, Rome, Italy (1974)
6. **ICARDA** – International Centre for Agricultural Research in the Dry Areas, Aleppo, Syria (1977)
7. **ICGEB** – International Centre for Genetic Engineering and Biotechnology, Trieste, Italy & New Delhi, India
8. **ICRISAT** – International Crops Research Institute for the Semi- Arid Tropics, Patancheru, Hyderabad, India (1972)
9. **IFPRI** – International Food Policy Research Institute, Washington, D.C., USA
10. **IITA** – International Institute for Tropical Agriculture, Ibadan, Nigeria (1968)
11. **IWMI** – International Water Management Institute, Colombo, Sri Lanka
12. **ILCA** – International Livestock Centre for Africa, Addis Ababa
13. **ILRI** – International Livestock Research Institute, Nairobi, Kenya
14. **IRRI** – International Rice Research Institute, Manila, Philippines (1966)
15. **FAO** – Food and Agricultural Organisation, Rome, Italy
16. **WAC** – World Agro-forestry Centre, Nairobi, Kenya
17. **IIMI** – International Irrigation Management Institute, Digana, Sri Lanka
18. **AVRDC** – Asian Vegetables Research and Development Centre, Taiwan
19. **WMO** – World Meteorological Organization, Geneva, Switzerland



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### **Change in the name of ICAR Institutes during 2014-15 :**

1. Central Soil and Water Conservation Research and Training Institute (CSWCRTI), Dehradun is now renamed as  
– **Indian Institute of Soil and Water Conservation (IISWC)**
2. Directorate of Wheat Research (DWR), Karnal, Hisar is now renamed as  
– **Indian Institute of Wheat and Barley Research (IIWBR)**
3. Directorate of Maize Research, New Delhi is now renamed as  
– **Indian Institute of Maize Research (IIMR)**
4. Directorate of Water Management, Bhubaneswar, Odisha is now renamed as  
– **Indian Institute of Water Management, (IIWM)**
5. National Research Centre for Agroforestry (NRCAF), Jhansi, UP is now renamed as  
– **Central Agroforestry Research Institute (CAFRI)**
6. Project Directorate for Farming Systems Research (PDFSR), Meeruth UP is renamed as  
– **Indian Institute of Farming Systems Research (IIFSR)**
7. Central Agricultural Research Institute (CARI), Andaman and Nicobar is renamed as  
– **Central Island Agricultural Research Institute (CIARI)**
8. ICAR Research Complex for Goa, North Goa, Goa is renamed as  
– **Central Coastal Agricultural Research Institute (CCARI)**
9. Directorate of Oil Palm Research (DOPR), West Godavari district, AP is renamed as  
– **Indian Institute of Oil Palm Research (IIOPR)**
10. National Research Centre for Citrus (NRCC), Nagpur, MH is renamed as  
– **Central Citrus Research Institute (CCRI)**

### **New ICAR Institutes:**

1. National Institute of Biotic Stresses Management (NIBSM) – **Raipur**, Chhattisgarh
2. National Institute of Abiotic Stress Management (NIASM) – **Malegaon**, MH
3. Indian Institute of Agricultural Biotechnology (IIAB) – **Ranchi**, Jharkhand
4. Indian Institute of Natural Resins and Gums (IINRG) – **Ranchi**, Jharkhand
5. Directorate of Knowledge Management in Agriculture, **New Delhi**

### **New Agriculture Facts**

- 2014 is observed as International year of – **Family farming**
- 2015 is observed as International year of – **Soil & Light**
- 2016 is observed as International year of – **Pulses**
- World Water Day – **22 March**
- World Soil Day – **5 December**
- GST stands for – **Good and Service Tax**
- Good and Service Tax (GST) is – **Indirect tax**

- NITI Aayog stands for – **National Institution for Transforming India**
- NITI Aayog was set up on – **1 Jan, 2015**
- Planning commission was replaced by - NITI Aayog
- Chairperson of the NITI Aayog- **Prime Minister of India**
- Concept of total revolution belongs to – **Jay Prakash Narayan**
- System of Rice Intensification (SRI) is developed by a – **Jesuit priest (Henri de Lacelanie)**
- System of Rice Intensification (SRI) is introduced first time in India at – **Tamil Nadu (2000)**
- Presently, System of Rice Intensification (SRI) is adopted by – **more than 50 countries**
- “More for less” slogan of System of Rice Intensification (SRI) belongs to the state - **Tripura.**
- Who received Krishi Karmath award for SRI – **T. Amalarani** (a woman, Vasudevanallur, TN)
- “Green Gross Root Revolution” is related with – **System of Rice Intensification (SRI)**
- A major constraint in adaption of System of Rice Intensification is – **Its labor intensive.**
- In SRI higher yield can be – **15.20 tonnes per ha**
- In SRI, water saving can be – **30 %**
- The number of regulated markets in India till 31 March 2014 is – **7114**

## AGRICULTURAL UPDATES : 2015-16

### Important Agriculture Updates:

- Presently number of Krishi Vigyan Kendras (KVK) by Dec. 2015 is – **645 KVKs**
- Total storage capacity of the Food Corporation of India (FCI) and state agencies is – **74.35 MT.**
- Average all India use of NPK (2015) is – **8.2 : 3.2 : 1**
- Presently, Irrigated area (2015) is – **63 million ha.**
- Production of food grains during 2013-14 is estimated as – **264.4 MT**
- Acreage/area under food grains during 2013-14 has estimated by – **126.2 million ha**
- Acreage under oilseeds during 2013-14 has estimated by – **28.2 million ha**
- Area under pulse production during 2013-14 is – **25.4 million ha**
- Area under course cereal production during 2013-14 is – **25.5 million ha**
- Horticulture production during 2012-13 is estimated up to – **265 million tonnes**
- By 2016-17, New targets of food grains production under the National Food Security Mission (NFSM) has been set to – **25 million tonnes.**
- In 2013-14, higher production is achieved mainly due to – **Expanding acreage.**
- As per census 2011, the absolute number of cultivators is – **118.7 million**
- Share of agriculture and allied sector in total employment (census 2011) is – **54.6 per cent**
- Which year is considered as the base year for calculating GDP for 2015-16 budget – **2011-12**
- Share of agriculture and allied sectors in total Gross Domestic Product (GDP) during 2013-14 (at constant price of 2011-12) is approx. – **18 per cent**

- 
- Share of agriculture and allied sector in Gross Domestic Product (GDP) during 2013-14 (at current price of 2004) is approx. – **13.9 per cent**
  - Growth in GDP due to agriculture and allied sectors during 2013-14 (at constant price of 2011-12) is approx. – **3.7 per cent**
  - Growth in GDP due to agriculture and allied sectors during 2013-14 (at current price of 2004) is approx. – **1.4 per cent**
  - Share of agriculture and allied sectors in total GDP during 2013-14 (at constant price of 2011-12) is – **7.9 per cent**
  - The horticulture sector contributed to agril. GDP during 2012-13 – **30.4 per cent**
  - The livestock sector contributed to agril. GDP during 2012-13 – **4.1 per cent**
  - Who is popular with the name of “Waterman of India” and won the prestigious Stockholm Water Prize 2015 – **Rajendra Singh**
  - India ranks first in productivity of – **grapes, banana, cassava, peas, and papaya.**
  - 2014 is being observed as – **“Year of Farmer Producer Organizations (FPOs)”**
  - Over the last decade Indian agriculture has become more robust with record production of – **Food grains and oilseeds.**
  - During 2013-14, impact on agriculture production and price is mainly concern on monsoon which is due to – **El Nino looming.**
  - The share of agriculture and allied sector in gross domestic product (GDP) during Eleventh Five Year Plan was – **15.2 per cent**
  - During 2013-14, which oilseed crops have highest increase in yield – **Groundnut**
  - The Technology Mission on Oilseeds and Oil Palm (TMO & OP), introduced during – **Twelfth Plan.**
  - Domestic demand for edible oilseeds/oil in India is short of – **50 per cent.**

#### **Allied Sectors Production (2013-14):**

- ✓ India ranks first in milk production, accounting for **17 per cent** of world production
- ✓ During 2013-14, milk production peaked at – **137.7 million tonnes**
- ✓ The average year-on-year growth rate of milk in India is – **4.04 per cent**
- ✓ NPBBDM stands for — **National Programme on Bovine Breeding and Dairy Development**
- ✓ During 2013-14, Egg production is estimated – **74.75 billion**
- ✓ India's rank in world egg production - **Third**
- ✓ During 2013-14, poultry meat production is estimated – **2.68 million tonnes**
- ✓ Total meat production – **8.89 million tonnes**
- ✓ Total fish production – **9.59 million tonnes**
- ✓ India ranks **second** in world fish production
- ✓ India shares about **5.4 per cent** of global fish production
- ✓ Total wool production – **47.9 million kg**

### Net availability and per capita availability:

- Net availability of food grains in 2013– **229.1 million tonnes.**
- Per capita net availability of food grains (2013) – **186.4 kg per year**
- Net availability of edible oils increased up to – **15.8 kg per year**
- Per capita availability of milk at – **295 g per day is higher**
- Per capita availability of eggs is around – **55 eggs per year**
- Per capita availability of fruits (2011-12) – **172 g per day**
- Per capita availability of vegetables (2011-12) – **350 grams per day**

### Area, Production, Productivity of major cultivated crops in India

(Area: million ha, Production: million tonnes and Productivity/Yield: Kg/ha)

Group/ Commodity	Area	Production		Average yield (kg/ha)	Max. productivity
	2013-14*	2013-14*	2014-15**	2013-14*	2013-14
<b>Food grain</b>	<b>126.0</b>	<b>264.8</b>	<b>251.12</b>	<b>2101</b>	
Rice	43.9	106.5	102.54	2424	Panjab (3952)
Wheat	31.2	95.9	90.78	3075	Panjab (5017)
Jowar	5.8	5.4	4.49	850	Andhra Pradesh (1661)
Maize	9.4	24.4	22.74	2566	Tamil Nadu (5372)
Bajra	7.9	9.2	9.00	1198	
<b>Pulses</b>	<b>25.2</b>	<b>19.3</b>	<b>17.38</b>	<b>764</b>	
Gram	10.2	9.9	7.59	967	Andhra Pradesh (1439)
Tur	3.9	3.3	2.71	848	Bihar (1667)
<b>Oilseeds</b>	<b>28.5</b>	<b>32.9</b>	<b>27.3</b>	<b>1153</b>	
Groundnut	5.5	9.7	6.6	1775	Gujarat (2668)
Rapeseed & Mustard	6.7	8.0	6.7	1188	Gujarat (1723)
Cotton <sup>b</sup>	11.7	36.7	35.3	532	Panjab (750) Maharashtra (358)
Sugarcane	5.0	350.0	356.5	70	West Bengal (114273)

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**Source:** Economic Survey (GOI), 2014-15)

**Note:** \*Fourth AE.

<sup>a</sup>Includes cereals, coarse cereals, and pulses

<sup>b</sup>Bales of 170 kg

\*\*As per 3<sup>rd</sup> Advance Estimates for 2014-15

**India's position in world Agriculture**

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<b>Particular</b>	<b>Position</b>
Total Area	Seventh (2.4 % of world area)
Irrigated Area	First
Total Cereals	Third
Wheat production	Second
Rice production	Second
Coarse grains	Fourth
Total Pulses	First
Oil seeds	Second
Fruits and Vegetables	Second (first - China)
Mango, Cashew & Banana	First
Coconut	First
Implements (Tractor)	Third
Milk production	First
Live Stock	First
Tea, Jute & Allied Fibres	First
Tobacco production	Third
Coffee	Sixth
Silk production	Second

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**World Agricultural Scenario :**

- **Rice :** China > India > Indonesia
- **Maize :** USA > China > Brazil
- **Wheat :** China > India > USA
- **Groundnut :** China > India
- **Sugarcane :** Brazil > India
- **Total Cereals :** China > USA > India
- **Coarse Cereals :** USA > China > Brazil > India
- **Total Pulses :** India - 1<sup>st</sup>
- **Mustard & Rapeseed :** China > Canada > India
- **Fruits & Vegetable :** China > India
- **Cotton :** China > USA > India
- **Tobacco :** China > Brazil > India

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## Position of Agricultural trades in India:

- a. **Agriculture export commodities:**
  - Rice > Cashew > Wheat > Tea > Tobacco
- b. **Agriculture imports commodities:**
  - Vegetable oil > Cashew > Pulses > Fruits

## Revolutions in Agriculture:

### Green Revolution:

- The term Green Revolution is coined by **William S. Gaud** in 1968 of **USAID**; to describe the productivity based improvement in food production particularly in wheat and rice.
- Main components in green revolution are high yielding varieties, use of chemical fertilizers and plant protection chemicals.
- Father of Green Revolution in world: **Dr. N.E. Borlaug**
- Father of Green Revolution in India: **Dr. M.S. Swaminathan**

### Ever Green Revolution:

- This term coined by **Dr. M.S. Swaminathan** to denote the green revolution based on sustainable methods of crop intensification and diversification.

### Vertical Revolution in Agriculture:-

- **Maximizing production per unit land area per unit of time** using intensive cropping system, high production inputs and improved management practices.

### Other Revolution in Agriculture :-

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Revolution	Related to
Green Revolution	<b>Food grain production</b>
White Revolution	<b>Milk production</b>
Blue Revolution	<b>Fish production</b>
Brown Revolution	<b>Food processing</b>
Grey Revolution	<b>Fertilizer production</b>
Yellow Revolution	<b>Oil seed production (Mustard)</b>
Red Revolution	<b>Tomato/Meat production</b>
Pink Revolution	<b>Prawn/Onion production</b>
Golden Revolution	<b>Fruit production</b>
Round Revolution	<b>Potato production</b>
Silver Revolution	<b>Eggs /poultry production</b>
Black Revolution	<b>Biofuel /Jatropha production</b>
Rainbow Revolution	<b>All sectors of agriculture</b>
Prabhani Revolution	<b>Okra production</b>

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**Important days in agriculture :**

- **11 March** – Water Resource Day
- **15 March** – World Consumer Day
- **21 March** – World Forest Day
- **22- March** – World Water Day
- **22 April** – World Earth Day
- **5 June** – World Environment Day
- **1 July** – National Agricultural Day
- **11 July** – World Population Day
- **16 July** – ICAR Day
- **16 Sept** – Ozone Day
- **16 Oct** – World Food Day
- **4 Dec** – Women in Agriculture Day
- **5 Dec** – World Soil Day
- **23 Dec** – National Farmers Day

**Important years related to agriculture :**

- **2004** : International Year of **Rice**
- **2005** : International Year of **Physics**
- **2006** : International Year of **Desert and Desertification**
- **2007** : International Year of **Water**
- **2008** : International Year of **Potato**
- **2009** : International Year of **Fibre**
- **2010** : International Year of **Bio-diversity**
- **2011** : International Year of **Forest and Chemistry**
- **2012** : International Year of **Co-operative**
- **2012** : Year of Horticulture  
(declared by Ministry of Agriculture and food processing, govt. of India)
- **2013** : International Year of **Water Conservation**
- **2014** : International Year of **Family Farming**
- **2015** : International Year of **Soil**
- **2016** : International Year of **Pulses.**

**First time in agriculture:**

SN	First in Agriculture	
1	Hybrid Pigeon Pea	ICPH-8 (ICRISAT, Hyderabad)
2	Hybrid sunflower	BSH-1 (Pro-Agro)
3	Hybrid cotton	H-4 (G-67 × <i>A.Nectorless</i> ) GAU, Surat
4	Semi-dwarf variety of basmati rice	Pusa Basmati-1 (IARI)
5	Aromatic Rice Hybrid	Pusa RH-10 (IARI)
6	Sorghum hybrid	CSH-1 (1964, IARI)
7	Public sector hybrid of forage Sorghum	Pusa Chari Hybrid 106
8	Mango hybrid for commercial cultivation	Mallika (Neelam × Dasherri)
9	Public sector insect resistant multi cut forage	PCH-106
10	Viral disease	Leaf curl of Tobacco
11	Plant Parasitic Nematode	<i>Anguina tritici</i>
12	Plant Parasitic Bacterial Disease	Fire Blight of apple
13	Viroid disease	Potato spindle tuber
14	Sorghum high yielding variety	CSV-1
15	Rice variety introduced in India	TN-1
16	Developed dwarf variety of rice	TN-1
17	Hybrid variety of Rice in India	Jaya
18	Hybrid of Mustard	Pusa jai kisan
19	Hybrid variety of Bajra	HB-1 (1965)
20	Hybrid developed by using local male parent	Hare Chhole no-1
21	Man-made cereal	Triticale
22	Resistant variety of Rice developed for yellow stem Borer	IR- 20 (TN-1 × TKM- 6)
23	Organophosphate compound	Parathion
24	Napier x Bajra (NB) hybrid	Pusa Giant
25	Hormone	Secretin
26	Maize hybrid	Ganga-101 (1961)
27	High productive early duration hybrid released by DRR (rice)	DRR H- 2
28	Country to develop hybrid rice	China



29	Hybrid rice released in India	APHR-1 and APHR-2
30	Egyptian variety of cotton	Sujata
31	Super rice variety for saline/alkaline conditions	Lunishree
32	Country to introduce zero tillage	USA
33	Zero tillage were adopted in	Rice and Wheat
34	Sugarcane variety	CO-205
35	Scented basmati rice for normal and sodic soils	Yamini (CSR-30)
36	Interspecific variety of cotton	Varalaxmi
37	Tobacco hybrid	GTH-1
38	Safflower hybrid	DSH-129
39	Crop to have its genome decoded	Rice
40	Single cross maize hybrid	Paras
41	Pathogenic resistant gene	HM-1
42	Systemic fungicide	Carboxin
43	Organic fungicide	Dithiocarbamate
44	Fungicide	Bordeaux mixture (inorganic in nature)
45	Person to record plant diseases	Theophrastus
46	Plant to have its genome decoded	<i>Arabidopsis thaliana</i>
47	Autopolyploid variety released for commercial cultivation in India	Pusa Giant Berseem
48	Organochlorine compound	DDT
49	Carbamate compound	Sevin/ carbaryl
50	Laureate of the "World food prize"	Dr. M.S. Swaminathan
51	Director general of ICAR	Dr. B.P. Pal
52	President of ICAR	Mohammad Habibullah
53	Indian scientist who collected and identified the fungus	K.R. Kirtikar

54	Agricultural University	G.B.Pant University of Agriculture and Technology, Pantnagar (1960)
55	Plant pathologist of India	Dastur
56	Plant parasitic bacteria was reported by	T.J. Burrell
57	Plant parasitic nematode was reported by	Needham
58	Mycoplasma disease reported by	Do <i>et.al.</i> and Ishiit <i>et.al.</i>
59	Virus was first discovered by	Iwanowsky
60	Scientist to study fungi and their species	Micheli
61	Transgenic plant	Tobacco
62	Biotechnological crop introduced in India	Bt. Cotton (2002)
63	Hormone artificially produced by culturing bacteria	Insulin
64	Commercial bio insecticide	Sporeine
65	Maize hybrid developed in India	Ganga- 2
66	'00' or canola type variety of Gobhisarson	PGSH- 51
67	Short duration pigeon pea hybrid	PPH-4
68	Leaf curl resistant cotton hybrid	Fateh LHH-144
69	Sorghum x Sudan grass hybrid	Sudan Chari no-1
70	Fungicide used	Sulphur (powdery mildew of vine)
71	Insecticide used	Paris Green
72	First Bt cotton variety	Bollguard (Cry1 Ac gene used)
73	Fumigant used	Hydrocyanic acid (HCN)
74	First hybrid in India	Pusa Meghdoot (bottle gourd)
75	Commercial fertilizer	SSP
76	First fertilizer used	Calcium Nitrate

**Father of different disciplines:**

SN	Father of	Disciplines
1	Agronomy	Pietro Decrescenzi
2	Agricultural chemistry / Biochemistry	Justus Von Liebig
3	Agroclimatology	Koppen
4	Agrometeorology	D.N. Walia
5	Agrometeorology in India	L.A. Ramdas
6	Antibiotics	Alexander Flemming
7	Biology	Aristotle
8	Biodynamic farming	Rudolf Steiner
9	Botany	Theophrastus
10	Bacteriology	Leuwenhoek
11	Cytology	Robert Hooke
12	Cytoplasmic Inheritance	Carl Correns
13	Cooperative movement in India	F. Nicholson
14	Crop rotation	Norfolk
15	DNA-finger printing technique	Alec Jeffrey
16	Economics	Adam smith
17	Modern Economics	Keynes
18	Economic Ecology	Dr. M.S. Swaminathan
19	Ecology	Reiter
20	Extension	Leagnes
21	Extension Education	James staurt
22	Experimental Genetics	Thomas Hunt Morgan
23	Eugenics	Francis Galton
24	Forest pathology	Robert Haring
25	Fermentation	Louis Pasteur
26	Field plot experimentation	Jean Baptiste Boussingault
27	Fruits and vegetables preservation	M. Nicolas Apart
28	Genetics	Gregor Johann Mendel
29	Genetic Engineering	Paul Berg
30	Green Revolution	Dr. N. E. Borlaug
31	Green Revolution in India	Dr. M. S. Swaminathan
32	Golden Revolution in India	Dr. K.L. Chadha
33	Golden Rice	Dr. Ingo Potrykus
34	Hybrid Rice	Yuan Long Ping
35	Hybrid rice in India	E. A. Siddiqe

36	Hybrid cotton	C.T. Patel
37	Indian phytopathology/ Indian Plant Pathology	E.J. Butler
38	Indian Rust	Dr. K.C. Mehta
39	Indian Mycology	E.J. Butler
40	Indian Ecology	R. Mishra
41	Indian plant breeding	Dr. B.P. Pal
42	Immunology	Edward Jenner
43	Microbiology	A.V. Leuwenhoek
44	Mycology	Pler A. Micheli
45	Medicinal Bacteriology	Robert Koch
46	Modern Genetics	T.H. Morgan
47	Mutation Theory	Hugo de Vries
48	Modern Botany	Linnaeus/ Bauchin
49	Modern Cytology	Swanson
50	Natural Farming	Masanobu Fukuoka
51	Nematology	N. A. Cobb
52	Nitrogen Fixation	S.N. Winogradsky
53	Organic Farming	Albert Howard
54	Ornamental Gardening	M.S. Randhawa
55	Plant Pathology	Anton De Bary
56	Plant Physiology	Stephen Hales
57	Pedology	V.V. Dokuchaev
58	Parasitology	F. Platter
59	Plant Tissue culture	G. Haberlandt
60	Plant Anatomy	Grew
61	Polygenic Inheritance	Kolreuter
62	Pure culture technique	Oscar Brefeld
63	Radiation Genetics	H. J. Muller
64	Sociology	Auguste Compte
65	Statistics	R.A. Fisher
66	Soil science	V. V. Dokuchaev
67	Soil Microbiology	S. N. Winogradsky
68	Soil Conservation	H. H. Bennett
69	Soil testing Technique	M.L. Troug
70	Super Rice	Dr. G.S. Khush
71	Taxonomy	Carolus Linnaeus
72	Tillage	Jethro Tull

73	Zero Tillage	G.B. Triplett
74	Virology	W.M. Stanley
75	Weeds Science	Jethro Tull
76	White Revolution	Dr. Varghese Kurien
77	Zoology	Aristotle
78	Host plant resistance	R.H. Painter
79	Polymerase Chain Reaction (PCR) technique	Kary B. Mullis
80	Father of seed technology	Nobbe

**Famous name of crops:**

SN	Famous name	Crops
1	King of cereals	Wheat
2	Queen of cereals	Maize
3	King of coarse cereals	Sorghum
4	King of pulses	Gram
5	Queen of pulses	Pea
6	King of fruits	Mango
7	Queen of fruits	Mangosteen
8	King of temperate fruits	Apple
9	King of spices	Black Pepper
10	Queen of spices	Cardamom
11	King of vegetables	Potato
12	Poor man's meat/ boneless meat	Soybean
13	Wonder crop	Soybean
14	Famine reserves	Millet
15	Camel of crops	Sorghum
16	Queen of oilseeds	Sesame
17	King of oilseeds	Mustard
18	King of fodder crops	Berseem
19	Queen of fodder crops	Lucerne
20	Poor man's fruit	Jackfruit, Ber
21	Vegetable meat	Cowpea
22	Poor man's substitute for ghee	Sesame
23	Poor man's friend	Potato
24	Poor man's food	Pearl millet
25	King of arid and semi-arid fruits	Ber

26	King of weeds	Congress grass ( <i>Parthenium Hysterophorus</i> )
27	National fruit of India	Mango
28	Glory of East	Chrysanthemum
29	Autumn queen	Chrysanthemum
30	Wonder tree	Neem
31	Queen of night	<i>Cestrum nocturnum</i>
32	Egg plant	Brinjal
33	Bio energy plant	Jatropha
34	King of flowers	Gladiolus
35	Queen of flowers	Rose
36	Brown gold	Dead pupae of silkworm
37	Apple of paradise / Adams fig	Banana
38	Poor man's orange(India) and love of apple (England)	Tomato
39	Drosophila of crop plants	Maize
40	Butter fruit	Avocado
41	Queen of beverage crop	Tea
42	China's miracle fruit	Kiwi fruit
43	Food of god	Cocoa
44	Small holder's irrigated crop	Oil palm
45	Oldest cultivated tropical fruits	Banana
46	Tree of heaven	Coconut
47	King of forest	Teak
48	Flame of forest	Palas
49	Poor man's timber	Bamboo
50	Pungent pepper	Chilli

**Concepts and related persons:**

Concepts	Related Person
Super rice	G.S. Khush
Hybrid rice	Yuan Long Ping
Golden rice	Ingo Potrykus
Super wheat	S. Nagarajan
Crop ideotype	Donald
Cropping system	Dr. S.S. Bains

Functional nutrients	Nicholus, 1963
Essentiality of nutrients	Arnon & Stout, 1939
Nutrient mobility concept	R.H. Bray
Green Revolution	N.E. Borlaug
Green revolution in India	M.S. Swaminathan
White Revolution	Varghese Kurien
Evergreen revolution in India	M.S. Swaminathan
Rainbow Revolution	Nitish Kumar
Golden Revolution	K.L. Chadha
A" value concept	Dean & Fried
Bt. Cotton in India	C.D. Mayee
Green Revolution Term	William Gaudd
Nobilization of sugarcane	T.S. Venkatraman
Hybrid cotton	C.T. Patel
PURA concept	A.P.J. Abdul Kalam
Leaf area index	Watson
Harvesting index	Donald
Photoperiodism	Gardener & Allard
Thermoperiodism	F.W. Went
Vernalization	Lysenko

**Toxins produced in plants :**

<b>Toxic</b>	<b>Plant</b>
<b>Gossypol</b>	Cotton
<b>Neurotoxin</b>	Lathyrus
<b>Erucic acid</b>	Rapeseed and mustard
<b>Goitrogen</b>	Soybean
<b>Saponin and plant estrogens</b>	Alfalfa
<b>Aflatoxin</b>	Groundnut
<b>Coumarin</b>	Sweet Clover
<b>CN glucocides</b>	Sorghum
<b>Steroidal alkaloids</b>	Potato
<b>Alkaloids</b>	Yam
<b>Resins</b>	Mango
<b>Antivitamin E Factor</b>	Field pea
<b>Polyphenolics</b>	Safflower

<b>Tripsin Inhibitor</b>	Pigeon pea, French bean & soybean
<b>Haemagglutinins</b>	French bean
<b>Lathryrogenes</b>	<i>Lathyrus sativus</i>
<b>Glucocides</b>	White clover
<b>Eicosenoic acid</b>	Rapeseed and mustard
<b>Polyphenolics</b>	Sunflower
<b>Cucurbitacins</b>	Cucurbits
<b>CN glucocides</b>	Cassava

**Crop name & beverage prepared from them**

SN	Crop	Product
1	Barley	<b>Whiskey/Beer</b>
2	Sugarcane molasses	<b>Alcohol/Rum</b>
3	Potato	<b>Vodka</b>
4	Grape	<b>Wine/Brandy</b>
5	Apple	<b>Cider</b>
6	Hull less barley	<b>Lugri</b>

**Global warming:**

- Surface of the earth is **warmth** from **sun heats**.
- Earth absorbs most of sun energy but **reflects back** some energy in the form of **infrared radiation**.
- **Greenhouse** gases e.g. **CO<sub>2</sub>(55%), Methane (25%), CFC (11%) and N<sub>2</sub>O(4%)**.
- These gases are present in **atmosphere**; **transmit the infrared radiation and reflect back** to the earth.
- This reflected energy falls on the earth surface and keeps it **warmer**.
- This is called **global warming** or **greenhouse effect**.

**Source of greenhouse gases:**

- In developed countries: Emission from **automobiles** & factories contains **CFCs**.
- In developing countries: **Deforestation** causes rise in CO<sub>2</sub> level, **methane** gas from **paddy field** & livestock and **nitrous oxide** from N base fertilizer.

**Effect of global warming on world and agriculture:**

- Increases overall temperature on earth e.g. earth's surface temperature has increased **1.4 °F** in first century (It has been forecasted that **5 °F** will rise in next century).
- Cause changes in climate tremendously.
- Results in **melting of ice** in polar region.
- Increase sea level resulting in **submerging** of coastal areas.
- Drought in warmer region



**Eagle Vision Agriculture**  
**Is**  
**Compilation of.....**

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