OPEN TEXT BASED ASSESSMENT 2016-17

Geography Class - XI

Theme 1: Organic Farming

Learning Objectives

- To highlight the need and objectives of Organic Farming.
- To popularise the natural ways of coexistence.
- To comprehend the adverse effects of excessive use of pesticides.
- To evaluate the economic viability of organic methods of cultivation.
- To adopt the sustainable resources for quality living.

Note to Readers

Following text passage is designed to make students aware of the alternate strategies for a healthy and disease free society by adopting the natural ways of living. Its purpose is to popularise the natural ways of coexistence. Organic farming has been such natural alternate to neutralise the higher cases of side-effects of the chemical consumptions in Green Revolution. More and more people all over the world are adopting the natural ways of co-existence. In India also we are adopting organic farming increasingly. The text provides the need and importance of organic system of farming, the economics of adoption of natural measure and the future prospects of organic farming in India. Teacher should encourage the learners to discuss the related cases for better understanding of the concepts. Two open-ended questions are given at the end to promote the self-thinking of the learners.

OPEN TEXT BASED ASSESSMENT 2016-17

Geography Class - XI

Theme 1: Organic Farming

Abstract

Organic farming has grown out of the conscious efforts by inspired people to create the best possible relationship between the earth and human beings. Since its beginning, the sphere surrounding organic farming has become considerably more complex. A major challenge today is certainly its entry into the policy making arena, its entry into anonymous global market and the transformation of organic products into preferred commodities. During the last two decades, there has also been a significant sensitization of the global community towards conservation of environment and assuring of food quality. Ardent promoters of organic farming consider that it can meet both these demands and become the mean for complete development of rural areas. After almost a century of development, organic farming is now being embraced by the mainstream and shows great promise commercially, socially and environmentally. While there is variety of thoughts from earlier days to the present, the modern organic movement is radically different from its original form. It now has environmental sustainability at its core, in addition to the founders' concerns for healthy soil, healthy food and healthy people.

Cancer Train in Punjab: Result of Heavy Use of Pesticides

At railway station of Bathinda (Punjab), a passenger asked the duty clerk about arrival of a train, and his words were:

Bhaiya, yeh 'Cancer Train' kitne baje ayegi...??

(When would the Cancer Train arrive..??)

(www.youtube.com/watch?v=W0zlNtPeoGw)

Wrapped in blankets, a number of ailing men and women steadily head towards platform number 2 of Bathinda railway station at 9 pm to catch the train for Bikaner (Rajasthan). Thousands of cancer patients travel to Bikaner (Rajasthan) from Punjab to get treatment of cancer in a charitable hospital at Bikaner. Over the years, this particular train has come to be known as the "Cancer Train" (https://www.youtube.com/watch?v=W0zlNtPeoGw)

Cancer patients and their attendants outnumber other passengers on the platform by the time the train arrives. This particular train has virtually become the hope for the cancer patients of the cotton growing Malwa belt consisting of the districts of Bathinda, Mukatsar, Mansa, Ferozepur, Moga, Barnala, Faridkot and Sangrur as it carries them to the place of their treatment.

Fig. 1: Cancer patients waiting for 'Cancer Train'
Source: http://www.punjabfoundation.org/belt.html

So, it is a matter of fact that a train from Bathinda (Punjab) to Bikaner (Rajasthan), is known as 'Cancer Train'. The number of cancer patients is increasing in Punjab. The total land area of Punjab is about 1.5 percent of the total land area of India, but the use of pesticides in Punjab is about 15-20 percent of total pesticides used in India.

Excessive use of pesticides by the farmers in Punjab has resulted in cancer patients in Punjab. The number of cancer patients has grown manifold in the recent years in the Malwa area of Punjab. Local people feel that excessive use of pesticides has contaminated the ground water. The pollutants are also found in the vegetables grown in the area.

Further, the traces of DDT and Benzene Hexachloride (BHC) were found in the canal-based drinking water supply some time ago when the Pollution Control Board conducted test of water samples. It is a common belief that cancer struck the *Malwa* region soon after cotton cultivation was introduced here. This resulted in reckless spraying of pesticides to save the cotton crop. The underground water has now got contaminated to an alarming level**.** The number of cancer patients has steeply multiplied during the past couple of years in the *Malwa* area of Punjab and the common people attribute it to excessive use of pesticides that has contaminated the underground water that they drink. The cotton belt has now come to be known as the Cancer Belt of Punjab.

India's Green Revolution of the 1960s and '70s to promote modern farming methods using high-yield varieties of seeds, chemical fertilizers and pesticides – was meant to fight hunger and increase productivity. But over the years, that model has become medically and environmentally unsustainable, according to many anti-pesticide campaigners, who advocate organic farming and tougher laws.

Agricultural scientists have urged to adopt organic farming since a long time. Their advice becomes vital in this alarming situation.

Concept of Organic Farming

Organic farming is very much native to this land. Whosoever tries to write a history of organic farming will have to refer India and China. The farmers of these two countries are farmers since

ages and it is organic farming that sustained them. This concept of organic farming is based on following principles:

- Nature is the best role model for farming, since it does not use any inputs nor it demands unreasonable quantities of water.
- The entire system is based on intimate understanding of nature's ways. The system does not believe in mining of the soil for its nutrients and does not degrade it in any way for today's needs.
- The soil in this system is a living entity.
- The soil's living population of microbes and other organisms are significant contributors to its fertility on a sustained basis and must be protected and nurtured at all costs.
- The total environment of the soil, from soil structure to soil cover, is very important.

What is Organic Farming?

In today's terminology, it is a method of farming which primarily aims at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (bio-fertilizers) to release nutrients to crops for increased sustainable production in an eco-friendly pollution-free environment.

As per the definition of the United States Department of Agriculture (USDA), "Organic Farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc.) and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection".

FAO (Food and Agriculture Organization) of United Nations suggested that "Organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs".

Fig. 2

Source: http://agritech.tnau.ac.in/org_farm/orgfarm_introduction.html

Need of Organic Farming

With the increase in population, our compulsion would be not only to stabilize agricultural production but to increase it further in sustainable manner. The scientists have realized that the 'Green Revolution' with high input use has reached a plateau and is now sustained with diminishing return of falling dividends. Thus, a natural balance needs to be maintained at all cost for existence of life and property. The obvious choice for that would be more relevant in the present era, when these agrochemicals which are produced from fossil fuel and are not renewable and are diminishing in availability. It may also cost heavily on our foreign exchange in future.

Moreover, the never ending demand by the developed nations from India for non-food grain products has further led to a pressing demand which is being met largely via the use of fertilizers and pesticides. The consumption of fertilizers in India over the last three decades has grown to half a million tonnes on an average per year. However, the efficiency of the fertilizers, as pointed out by experts, is only 30%-35% with the remaining amount seeping into the ground to mix with ground water. The areas making use of high levels of fertilizers has shown a drastic contamination of ground as well as irrigation water with nitrate levels being well over the safety level of 45mg/litre. (*Organic Farming in India: Relevance, Problems and Constraints; Dr S. Narayan, NABARD*)

The high dose of pesticides is having an adverse impact on the aquatic life, plants and animals. Again and again, animal deaths and human deaths as well, have been reported due to the excessive use of fertilizers.

The key characteristics of organic farming include:

- Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity and careful mechanical intervention.
- Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms.
- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures.
- Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention.
- The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing.
- Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats.

Organic Farming in India

The growth of organic agriculture in India has three dimensions and is being adopted by farmers for different reasons.

First category of organic farmers are those which are situated in no-input or low-input use zones, for them organic agriculture is a way of life and they are doing it as a tradition (may be under compulsion in the absence of resources needed for conventional high input intensive agriculture).

Second category of farmers are those which have recently adopted the organic agriculture in the wake of ill-effects of conventional agriculture, may be in the form of reduced soil fertility, food toxicity or increasing cost and diminishing returns.

The third category comprised of farmers and enterprises which have systematically adopted the commercial organic agriculture to capture emerging market opportunities and premium prices.

While majority of farmers in first category are traditionally organic farmers (or by default), they are not certified, second category farmers comprised of both certified and un-certified but majority of third category farmers are certified. These are the third category commercial farmers which are attracting most attention. The entire data available on organic agriculture today, relates to these commercial organic farmers.

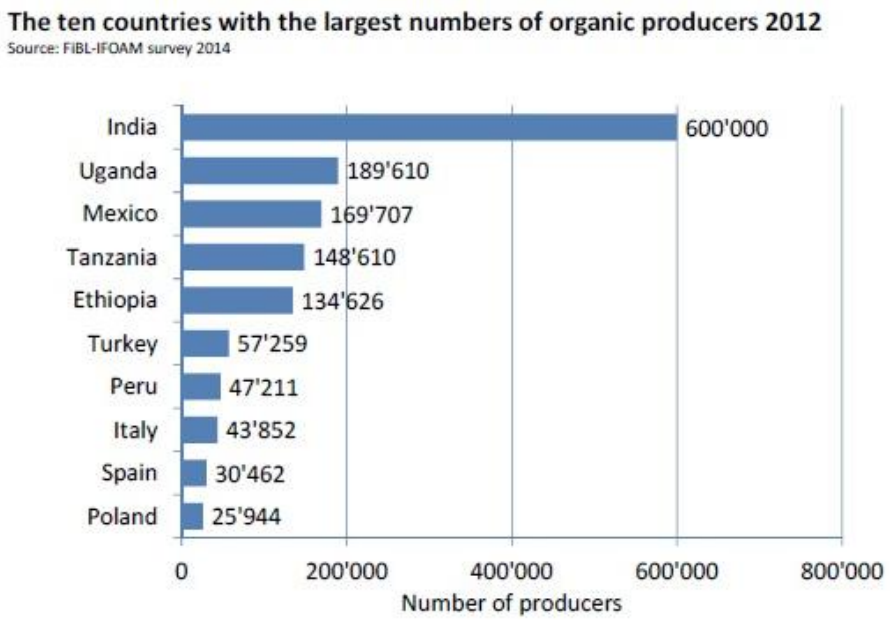

Fig. 3

Growing Area

Emerging from 42,000 ha under certified organic farming during 2003-04, the organic agriculture has grown almost 29 fold during the last 5 years. By March 2010, India has brought more than 4.48 million ha area under organic certification process. Out of this, cultivated area accounts for 1.08 million ha while remaining 3.4 million ha is wild forest harvest collection area. Year-wise growth of cultivated area under organic management is shown in Table 1. Production of different commodities under organic management is given in Table 2. Fig. 4 shows the increase in total area (cultivated and wild) whereas Fig. 5 shows the cultivated area under organic culture.

Table 1: Growth of area under organic management

S. No.	Years	Area under Organic management in Ha
1	2003-04	42,000
2	2004-05	76,000
3	2005-06	1,73,000
4	2006-07	5,38,000
5	2007-08	8,65,000
6	2008-09	12,07,000
7	2009-10	10,85,648

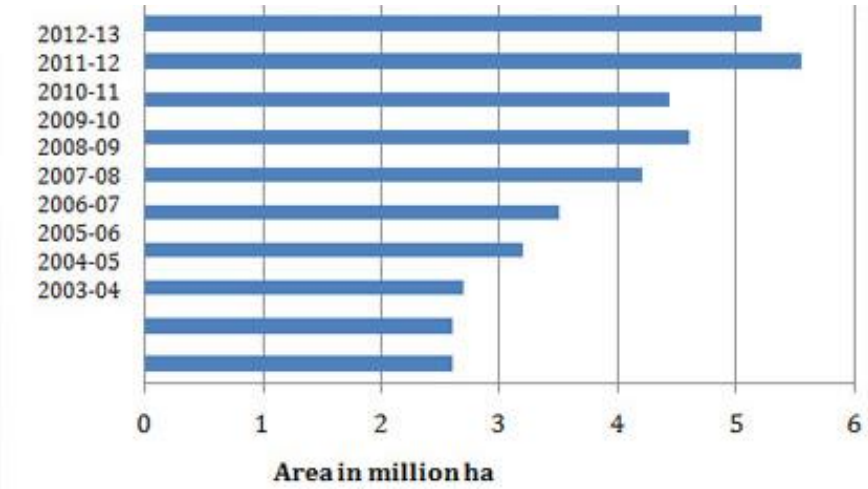

Fig. 4: Total area under certification (Cultivated + Wild harvest)

Table 2 : Production of different commodities under organic management

S. No.	Product Name	Production (in MT)	
		2010-11	2011-12
1	Cotton	552388.47	111382.54
2	Cereals & Millets (excluding rice)	171684.66	40785.61
3	Rice (Basmati and non Basmati)	176683.17	22673.70
4	Pulses	42721.61	12956.69
5	Fruits and Vegetables	335863.10	8227.74
6	Tea	27684.26	5273.34
7	Oil seeds excluding Soybean	360837.17	2849.80

8	Coffee	13122.03	1376.54
9	Dry Fruits	52369.09	521.46
10	Medicinal & Herbal plants	1792014.86	189.27
11	Miscellaneous	221191.96	27.36

Source : National Project on Promotion of Organic Farming (NPOF-DAC)

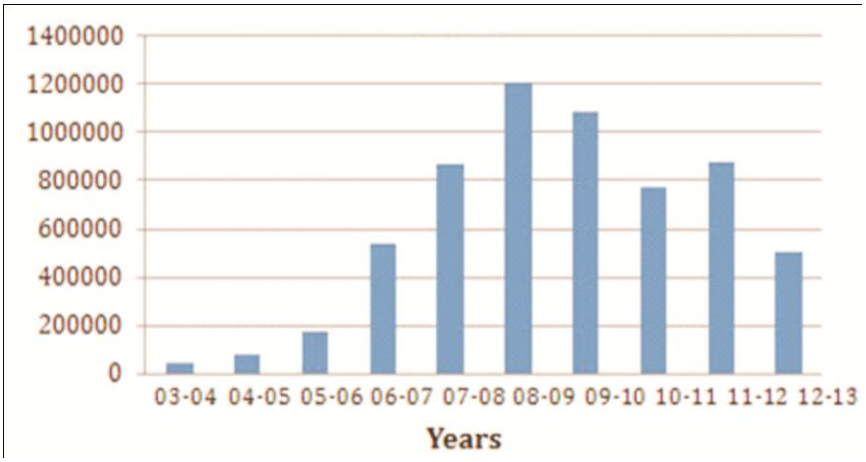

Fig. 5: Cultivated Area under Organic certification (in ha)

Growing number of farmers and operators - Out of total 2099 operators, while processors account for 427 and individual farmers 753, majority of farmers i.e. 597,873 are small and marginal farmers covered by 919 grower groups. Out of the total organic producers in the world approximately half of them are in India. This is mainly because of small holdings with each producer. Fig. 6 shows the immense potential of organic farming for both domestic as well as export market.

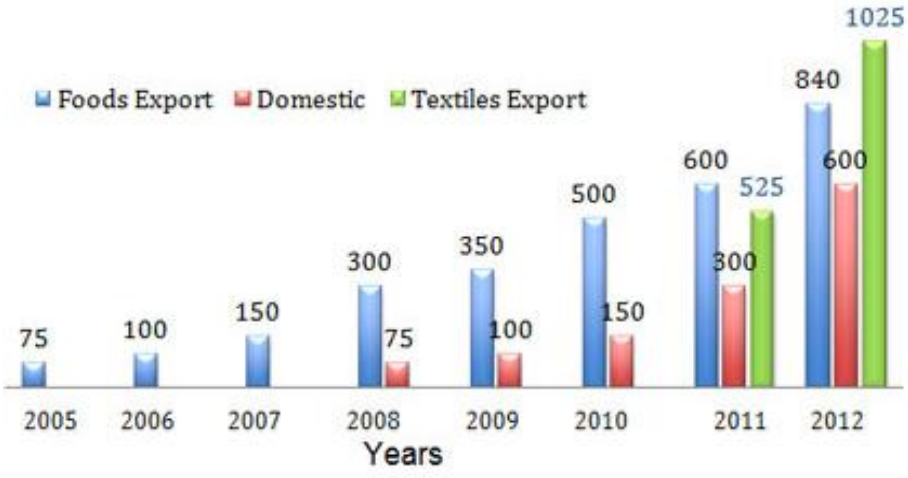

Fig. 6: Export and Domestic market for organic products (Rs. crores)

Important features of Indian Organic Sector

With the phenomenal growth in area under organic management and growing demand for wild harvest products, India has emerged as the single largest country with highest arable cultivated land under organic management. India has also achieved the status of single largest country in terms of total area under certified organic wild harvest collection. With the production of more than 77,000 MT of organic cotton lint, India had achieved the status of largest organic cotton grower in the world a year ago, with more than 50% of total world's organic cotton.

Important steps

While turning towards organic it is essential that the basic requirements of the system and the area are properly understood and long term strategies are addressed first. In most part of the country poor soil health due to loss of organic matter and soil microbial load is a major problem. Reducing water availability and increasing temperature is further adding to the problems. Too much dependence on market for supply of inputs and energy has made the agriculture a cost intensive high input enterprise with diminishing returns. We need to address all these concerns and develop a system which is not only productive and low cost but also resource conserving and sustainable for centuries to come. To start with, following parameters need to be addressed in first stage

- Enrichment of soil
- Management of temperature
- Conservation of rain water
- Maximum harvesting of sun energy
- Self reliance in inputs
- Maintenance of natural cycles and life forms
- Integration of animals
- Maximum reliance on renewable energy sources, such as solar power and animal power

How to achieve

1. Enrichment of soil – Abandon use of chemicals, use crop residue as mulch, use organic and biological fertilizers, adopt crop rotation and multiple cropping, avoid excessive tilling and keep soil covered with green cover or biological mulch.
2. Management of temperature - Keep soil covered, Plant trees and bushes on bund
3. Conservation of soil and rain water – Dig percolation tanks, maintain contour bunds in sloppy land & adopt contour row cultivation, dig farm ponds, maintain low height plantation on bunds.
4. Harvesting of sun energy – Maintain green stand throughout the year through combination of different crops and plantation schedules.

5. Self reliance in inputs – develop your own seed, on-farm production of compost, vermicompost, vermiwash, liquid manures and botanical extracts.
6. Maintenance of life forms – Develop habitat for sustenance of life forms, never use pesticides and create enough diversity.
7. Integration of animals – Animals are important components of organic management and not only provide animal products but also provide enough dung and urine for use in soil.
8. Use of renewable energy – Use solar energy, bio-gas and bullock driven pumps, generator and other machine.

Future prospects

Although, commercial organic agriculture with its rigorous quality assurance system is a new market controlled, consumer-centric agriculture system world over, but it has grown almost 25-30% per year during last 10 years. In spite of recession fears the growth of organic farming is going unaffected. The movement started with developed world is gradually picking up in developing countries. But demand is still concentrated in developed and most affluent countries. Local demand for organic food is growing. India is poised for faster growth with growing domestic market. Success of organic movement in India depends upon the growth of its own domestic markets.

India has traditionally been a country of organic agriculture, but the growth of modern scientific, input intensive agriculture has pushed it well. But with the increasing awareness about the safety and quality of foods, long term sustainability of the system and accumulating evidences of being equally productive, the organic farming has emerged as an alternative system of farming which not only address the quality and sustainability concerns, but also ensures a debt free, profitable livelihood option.

In totality organic agriculture aims at a sustainable production system based on natural processes. Key characteristics are that organic agriculture has it:

- Relies primarily on local, renewable resources;
- Makes efficient use of solar energy and the production potential of biological systems;
- Maintains the fertility of the soil;
- Maximises recycling of plant nutrients and organic matter;
- Does not use organisms or substances foreign to nature (e.g. GMOs, chemical fertilisers or pesticides);
- Maintains diversity in the production system as well as the agricultural
- Landscape; gives farm animals life conditions that correspond to their ecological role and allow them a natural behaviour.

Organic agriculture is also a sustainable and environmentally friendly production method, which has particular advantages for small-scale farmers. Available evidence indicates the appropriateness

of organic agriculture for small farmers in developing countries like India. Organic agriculture contributes to poverty alleviation and food security by a combination of many features, such as;

- Increasing yields in low-input areas;
- Conserving bio-diversity and natural resources on the farm and in the surrounding area;
- Increasing income and/or reducing costs;
- Producing safe and varied food;
- Being sustainable in the long term.

Bibliography

- http://agritech.tnau.ac.in/org_farm/orgfarm_introduction.html
- National Centre of Organic Farming, Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India,
- *Organic Farming in India: Relevance, Problems and Constraints; Dr S. Narayan, NABARD*
- https://www.youtube.com/watch?v=W0zlNtPeoGw
- Organic Movement – Navdanya
- TNAU Agri-tech Portal Organic Farming
- The International Fund for Agricultural Development (IFAD) India
- www.punjabfoundations.org
- www.washingtonpost.com
- www.downtoearth.org
- krishijagran.com/**farm**/scenario-in-**india**/2015/03/**Organic-Agriculture**-At-a-Glance
- www.fibl.org/en/themes/**organic-farming-statistics**.html
- https://www.nabard.org/pdf/OC%2038.pdf
- orgprints.org/29790/13/willer-lernoud-2016-global-data-biofach.pdf

Sample Questions

1. Do you agree that 'the use of renewable resources will lead to increase in organic farming world over,' support your answer with suitable example? (5 Marks)
2. How can we popularise the organic farming in India? What role you will play in it? (5 Marks)

Suggestive Answers

Answer 1

- Human greed for more and more production has made it compulsory to make use of excessive chemicals for agriculture production.

- Organic farming is one such way wherein we make use of the renewable resources-local plants and biological system of preparing manures without any side effects or ill effects.
- Fertility of the soils can be determined and enhanced by making up the deficiencies of the soils in the natural ways.
- The use of cow or buffaloes excreta in the fields not only increases the production but also is the healthy one.
- Recycling and reuse of the available resources will be a great help
- Solar energy can be used for running pumps and other agricultural operations.
- The spread of the awareness about the natural organic ways has given impetus to the more and more people following organic farming.

(Any other valid point)

Answer 2

- By spreading awareness about the natural methods of farming.
- Highlight the local resources to counter the use of chemical consumption.
- Technological support by govt.- solar energy and soil testing techniques.
- Advertise for the popularity of organic products so as to create demand for such products.
- Govt. support in purchasing and marketing products in initial stages.
- (any other relevant points suggested by students)

OPEN TEXT BASED ASSESSMENT 2016-17

Geography Class - XI

Theme 2: Naturalization of Humans and Humanization of Nature

Learning Objectives

- To understand the relationship between nature and human being.
- To understand the impact of human actions on nature and vice-versa.
- To comprehend the different techniques that can be utilized to conserve the ecosystem.
- To come up with innovative suggestions to solve the problem of environmental degradation due to agricultural activities.

Note to Readers

The text along with case-study, supplied to schools should be thoroughly read, discussed and analyzed by the readers. If possible, the readers can get together for a brainstorming session working on the following:

- Objectives of the Text /Case-study
- The concepts involved
- Application of concepts to real life situations
- Description and further explanation of the case study/problem
- Higher Order thinking skills involved
- Analysis with different perspectives
- Assessment techniques: The case study with leading questions should be assigned to students in groups who would discuss at their level.
- The teacher should guide them with further leading questions based on the text
- The teacher should carry out an interactive session and students should be asked to suggest solutions.