

Tarun Bharat Sangh° (TBS)

It is a non profitable environmental, Non Govern-
-mental Organization (NGO), with headquarters
in Bheekampura, Alwar, Rajasthan. It was
founded by Dr. Rajendra Singh (popularly known
as Waterman of India) in 1985.

TBS started its work with
mobilising communities around the issue of
water, and supporting them in 'reviving'
and revitalizing the traditional systems of
water management through construction of
'Johads' and 'Bandis' for rain water
harvesting from shramdan and partly by TBS.

At present the contribution of the
organization is spread around 1000 villages of
15 districts of the state of Rajasthan. TBS
has revived and rejuvenated 11 rivers in
Rajasthan and established about 11,800 johads.
TBS was awarded with Stockholm Water Prize
(Nobel Prize for Water) in 2015.

Ganga Action Plan (GAP)

The Ganga Action Plan was launched on 14 Jan. 1986 by the then Prime Minister of India Shri Rajiv Gandhi, with the main objectives to improve the water quality by the interception, diversion and treatment of domestic sewage and to prevent toxic and industrial chemical wastes from identified polluting units from entering the river.

In GAP primarily water quality of river Ganga was targeted to bring it into the 'bathing water class'. To achieve the objectives of GAP three major states were given massive funding such as UP, Bihar and West Bengal. Now, GAP has been relaunched by Ministry of Jal Shakti under National Mission for Clean Ganga by ~~by~~ renaming it as - 'Namami Gange', on the year 2014 with a budget outlay of 20,000 Crores to accomplish the main objectives of effective abatement of pollution, conservation and rejuvenation of National River Ganga.

The Plastic Waste Management Rules, 2016 :

These rules aim to - increase minimum thickness of plastic carry bags from 40 to 50 microns and stipulate minimum thickness of 50 μ for plastic sheets also to facilitate collection and recycle of plastic waste.

Ozone Layer Depletion :

Ozone is a poisonous gas made up of three oxygen atoms, a layer of ozone in the lower stratosphere keeps about 95% of the sun's harmful ultra-violet (UV-A and UV-B) radiation from reaching the earth's surface.

In the 1970s, scientists discovered that CFCs (Chloro Fluoro Carbons) used as refrigerants and aerosol propellants, finally break apart in the atmosphere and release chlorine atoms. This causes ozone depletion. Bromine atoms released by halons (used in the fire extinguishers) have the same effect. Such chemicals commonly called as Ozone Depleting Substances (ODS). First, ozone layer depletion was observed above Arctic and Antarctica. The loss of ozone over Antarctica

has been called an ozone hole. A more accurate term is ozone thinning because the ozone depletion varies with altitude and location.

Ozone depletion in the stratosphere has posed a serious threat to humans, animals and plants. There are following effects of ozone layer depletion :-

I. Human Health

- Worse sunburns
- More eye cataracts and skin cancers
- Immune system suppression

II. Food and forests

- Reduced yield for some crops
- Reduced seafood supply from reduced phytoplankton
- Decreased forest productivity for UV-sensitive tree species

III. Climate Change - CFCs acts as green house gas also, in troposphere.

IV. Air pollution and materials

- Increased acid deposition
- Increased photochemical smog
- Degradation of outdoor paints and plastics

Mitigation for ozone depletion:

- 1) We should immediately stop producing all Ozone Depleting Substances (ODS).
- 2) In 1987, Montreal Protocol was adopted by 36 representatives of Nations (36) to cut emissions of CFCs by about 35% between 1989 and 2000.
- 3) On the same line, in 1992 Copenhagen Protocol was adopted by 93 nations to accelerate the phasing out the ODS.
- 4) CFCs have been replaced by HFCs in refrigerating systems, which is very less harmful on ozone layer.

If nations continue to follow these agreements, ozone levels should return to the 1980 levels by 2068 and to 1950 levels by 2099.

Basics of Ecosystem Restoration:

Ecosystem or Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed.

Ecosystem restoration focuses on the recovery of an ecosystem's :-

- 1) Health - functional processes such as water filtration, carbon sequestration etc.
- 2) Integrity - species composition and community structure
- 3) Sustainability - resistance and resilience to disturbance

Ecosystems can be restored by following steps :

- I. Assess the site
- II. Develop project goals
- III. Remove sources of disturbance
- IV. Restore processes / natural disturbance cycles such as flood or fire cycles.
- V. Restore vegetation
- VI. Monitor and maintain

Ecosystem preservation and conservation strategies:

The following strategies can be adopted and implemented for the ecosystem preservation and conservation:

- 1) Enhance habitat connectivity and ecosystem function
- 2) Manage threats to biodiversity
- 3) Protect species and ecological communities
- 4) Enhance biodiversity value of urban areas
- 5) Strengthen community engagement

These strategies will help guide future management of the Territory's open spaces, rural areas, urban areas, riverine corridors and nature reserves, and guide investment of funding and resources. This approach ensures continuity and commitment to long term actions such as managing the recovery of threatened species.

Types of Species on the basis of their Role played in Ecosystem:

(1) Indicator Species:

Species that provides early warnings of damage to a community or an ecosystem are called indicator species. Birds are excellent biological indicators because they are found everywhere and are affected quickly by environmental changes such as the loss or fragmentation of their habitats and the introduction of chemical pesticides. Some amphibians are also classified as indicator species.

(2) Keystone Species:

Keystone species are species whose roles have a large effect on the types and abundance of other species in an ecosystem. Such species often exist in relatively limited numbers in their ecosystems, but the effects that they have there are often much larger than their numbers would suggest. And because of their smaller numbers, some keystone species are more vulnerable to extinction than other species.

Examples: Wolf, leopard, lion, tiger etc.

The loss of a keystone species can lead to population crashes and extinctions of other species in a community that depends on them for certain ecological services. This is why, it is very important for scientists to identify and protect keystone species.

(3) Flagship Species:

It is a species selected to act as an ambassador, icon or symbol for a defined habitat, issue or campaign or environmental cause. By focusing on, and achieving conservation of that species, the status of many other species which share its habitat, or are vulnerable to the same threats - may also be improved.

Flagship species are usually relatively large, and considered to be 'charismatic' in western cultures. e.g. Royal Bengal Tiger, Single Horned Rhino etc.

(4) Umbrella Species:

The species that are selected for conservation related decisions because the conservation and protection of these species indirectly affects the the conservation and protection of other species within their ecosystem.

Umbrella species help in the selection

of potential reserve locations, as well as the determination of the composition of the reserve. Umbrella species usually have a large area requirement for which the conservation of the species extends the protection to other species sharing the same habitat. e.g. Spotted owl, rattlesnake.

Species Reintroduction and translocation:

Reintroduction is a part of broad process of biodiversity conservation whereby, a captive individual of a species released into an area which was once part of that species historical range, but from which it has been extinct. Generally, individuals of threatened species are reintroduced after the captive breeding programmes. e.g. proposal to bring cheetah to India in an effort to reintroduce the species (from Africa)

Translocation is similar to reintroduction in that it involves the release of individuals into a part of the species historical range. However, instead of captive individuals translocation refers to the relocation of wild-caught individuals from another area. e.g. Tiger from the Ranthambore translocated to Sariska National Park.

Project Elephant : (PE) - A centrally sponsored scheme, was launched in February, 1992 to provide financial and technical support to major elephant bearing states in the country for protection of elephants, their habitats and corridors. It also seeks to address the issues of human-elephant conflict and welfare of domesticated elephants. The project is being implemented in 13 states. The project elephant has declared 24 Elephant Reserves.

As per 2017 census of elephants, India is home to 27,312 elephants accounting for 55% of total world elephant population.

Project Great Indian Bustard :

Project Great Indian Bustard was launched by Government of Rajasthan to recover the population of the critically endangered bird. Currently less than 200 individuals of this endemic bird are left in the wild. Project costs around 12 crores, of which 4 crores will be spend on enclosures and breeding in protected areas i.e. Desert National Park while rest of the money will be used to breed the birds outside the protected areas.

Crocodile Conservation Project:

This project was launched in 1975 with support from the UNDP and FAO. The project included an extensive captive rearing and breeding programme intended to restock depleted natural habitats in India.

Crocodile conservation project is one of the most successful conservation initiatives in the world. It has pulled back once threatened - crocodile species from the brink of extinction and placed them on a good path of recovery.

The broad objectives of activities under the crocodile project were:

- 1) to protect the remaining population of crocodiles in their natural habitat by creating sanctuaries.
- 2) to rebuild natural population quickly through 'grow and release' or 'rear and release' technique.
- 3) to promote captive breeding
- 4) to take-up research to improve management, and
- 5) to involve the local population in the project intimately.

Vulture Breeding Programme:

The unprecedented scale and speed of vulture population declines has left all three resident types vulture species Critically Endangered. In order to ensure survival of these Indian (Asian) vulture species it was thought necessary to bring them into captivity for breeding.

Successful conservation breeding will enable vulture numbers to increase, eventually allowing for the release ^{back} into the wild once their food source is free of Diclofenac & other toxic NSAIDs. Dr. Vithu Prokash, Principal Scientist of the Bombay Natural History Society (BNHS), heads up the vulture breeding programme in India and manages a large number of staff and complex range of activities varying from overseeing the construction of aviaries and facilities, to managing the feeding requirements and health of birds within the three centres.

The programme now holds over 600 vultures in captivity at three centres in the states of Haryana, West Bengal and Assam. With funding from the MoEFCL, India, the Indian Central Zoo Authority (CZA) has plans to establish a further 5 centres in India.

Homeostasis:

Homeostasis is the ability to maintain a relatively stable internal state that persists despite changes in the world outside. All living organisms, from plants to animals to people, must regulate their internal environment to process energy and ultimately survive. It dynamically ensures steady state conditions in climatic ecosystems. Physiologist Walter Cannon coined the term 'Homeostasis' in the 1920s. Homeostatic processes also maintain water, O_2 , pH and blood sugar levels, as well as core body temperature.

Concepts of Productivity:

In Ecosystem/Ecology the rate of biomass production or the amount of food energy produced or obtained or stored by a particular trophic level per unit area in unit time is called productivity. It can also be defined as the energy accumulated in plants by photosynthesis. The unit of productivity is $g/m^2/yr$ or $Kcal/m^2/year$. According to Odum there are three types of productivities -

- 1) Primary Productivity
- 2) Secondary Productivity
- 3) Community Productivity

1) Primary Productivity :

Primary productivity is the productivity at the producer level. It can be termed as the amount of organic matter produced by the plants from solar energy in a given area during a given period of time. Approximately 1-5% of solar energy that falls on the plants is converted to organic matter.

Two types $\left\{ \begin{array}{l} \text{Gross Primary Productivity (GPP)} \\ \text{Net Primary Productivity (NPP)} \end{array} \right.$

$$NPP = GPP - \text{Respiration}$$

2) Secondary Productivity :

This refers to the productivity at the consumer level. The secondary productivity reflects only the utilization of food for production of consumer biomass. It can be referred to as the net rate of increase in biomass of heterotrophs. The secondary productivity acts as a food to the next trophic level.

3) Community Productivity :

This is the rate of net synthesis of organic matter by a community per unit time and area.