

Short Note

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B.Sc 1st yr Paper 1, Group B

Rain water harvesting

Rainwater harvesting (RWH) is a simple method by which rainfall is collected for future usage. The collected rainwater may be stored, utilised in different ways or directly used for recharge purposes. With depleting groundwater levels and fluctuating climate conditions, RWH can go a long way to help mitigate these effects. Capturing the rainwater can help recharge local aquifers, reduce urban flooding and most importantly ensure water availability in water-scarce zones. Though the term seems to have picked up greater visibility in the last few years, it was, and is even today, a traditional practice followed in rural India. Some ancient rainwater harvesting methods followed in India include madakas, ahar pynes, surangas, taankas and many more.

This water conservation method can be easily practiced in individual homes, apartments, parks, offices and temples too, across the world. Farmers have recharged their dry bore wells, created water banks in drought areas, greened their farms, increased sustainability of their water resources and even created a river. Technical know how for the rooftop RWH with direct storage can be availed for better implementation. RWH An effective method in water scarce times, it is also an easily doable practice. Practical advice is available in books written by Indukanth Ragade & Shree Padre, talks by Anupam Mishra and other easy to follow fun ways.

Rainwater harvesting provides the independent water supply during regional water restrictions, and in developed countries, is often used to supplement the main supply. It provides water when a drought occurs, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable groundwater levels to be sustained. It also helps in the availability of potable water, as rainwater is substantially free of salinity and other salts. Applications of rainwater harvesting in urban water system provides a substantial benefit for both water supply and wastewater subsystems by reducing the need for clean water in water distribution systems, less generated stormwater in sewer systems, and a reduction in storm water runoff polluting freshwater bodies.

A large body of work has focused on the development of life cycle assessment and its costing methodologies to assess the level of environmental impacts and money that can be saved by implementing rainwater harvesting systems. Many application of rainwater harvesting for eg; In Agriculture, Domestic use, Industry

Rainwater harvesting in North Bihar

Every year fierce floods affect the lives and livelihoods of millions of people in North Bihar due to heavy rainfall and breaching of embankments. During the floods, there is a critical lack of safe drinking water, sanitation and shelter that increases the vulnerability of people to the outbreak of diseases and malnutrition. From 2007, over two phases of the project, Arghyam supported Megh Pyne Abhiyan, (MPA) to propagate Watson interventions in the flood prone villages, increase self-reliance of the community and enhance local coping mechanisms to reduce the community's vulnerability to flooding. Some of these measures were taken to scale in the Chagares district by the government. The government now recognises MPA as its grassroots partner for helping provide scalable, sustainable and low-cost solutions for Watson under flood situations.

Tiger reserve in India

Project Tiger was launched by the Government of India in the year 1973 to save the endangered species of tiger in the country. Starting from nine (9) reserves in 1973-74 the number is grown up to fifty (50). A total area of 71027.10 km² is covered by these project tiger areas.

- Tiger reserves are administered by the National Tiger Conservation Authority (NTCA).
- Initially, only 9 tiger reserves were covered under the project.
- But today, this number has increased to 50 (list is given at the end of the article).
- On the recommendation of NTCA, the state government has the power to notify a region as a tiger reserve.
- There are 50 tiger reserves spreading across 17 states (tiger reserve states) of India which is home to nearly 70% of tiger population of the world.
- From 1,411 tigers in 2006, this number has increased to 1,706 in 2010 and 2,226 in 2014.

Important Facts

- Largest Tiger Reserve in India- Nagarjunsagar-Srisaïlam Tiger Reserve (Andhra Pradesh, Telangana)
 - Smallest Tiger Reserve in India- Bor Tiger Reserve (Maharashtra)
- Valmiki National Park, Tiger Reserve and Wildlife Sanctuary** is located at the India-Nepal border in the West Champaran district of Bihar, India on the bank of river Gandak. It is the only National park in Bihar. The extensive forest area of Valmikinagar(formally known as **BHAINSA LOTAN**) was previously owned by the Bettiah Raj and Ramanagar Raj until the early 1950s. Valmiki Tiger Reserve (VTR) is one of the natural virgin recesses in east India, situated in the north west corner of Bihar. The pristine forest and wilderness of VTR is an excellent example of Himalayan Terai landscape. VTR comprises the Valmiki National Park and Valmiki Wildlife Sanctuary. The VTR forest area covers 899.38 square kilometres (347.25 sq mi), which is 17.4% of the total geographical area of the district West Champaran. As of 2018, there were 40 tigers in the Reserve.

Structure:

- A tiger reserve is demarcated on the basis of 'core-buffer strategy' which includes:
 - (i) Core zone
 - (ii) Buffer zone

Project tiger

- It was launched in the country in the year 1973 in Palamau Tiger Reserve. The first time project tiger was launched in 1973, at Jim Corbett National Park, Uttarakhand. (in some sources)
- It was done with the help of World Wildlife Fund (WWF) on the basis of the recommendation of a special task-force of the Indian Board for Wildlife.

National tiger conservation authority (NTCA)

- It is a statutory body constituted under the Wild Life (Protection) Amendment Act, 2006.
- It was recommended by Tiger Task Force.
- It is responsible for all the measures and actions taken under the project tiger for the conservation of the tiger.
- Minister for Environment and Forests is its chairperson and Minister of State for Environment and Forests is the vice-chairperson.
- The NTCA / Project Tiger also conducts the country level assessment of the status of tiger, co-predators, prey and habitat once in every four years. It is done using the refined methodology, as approved by the Tiger Task Force.

Phase IV Programme

- Through phase IV programme, NTCA has announced wide expansion of its tiger monitoring programme.
- The methodology was developed by Wildlife Institute of India (WII) and NTCA. This would provide a yearly indication of tiger population around the country.

International Cooperations

- MoU with Nepal to prevent trans-boundary illegal trade in wildlife.
- A protocol on the conservation of tiger with China.

- A Global Tiger Forum of Tiger Range Countries has been created.
- 'New Delhi Resolution' was passed in third Asian Ministerial Conference on Tiger Conservation.
- Bhutan, Nepal, and Bangladesh joined hands with India to conclude 'tiger census-2018' in the subcontinent.

Recent Updates

- For 2018 census counting, NTCA has developed an android app named 'M-STriPES'.
Objective:
 - (i) for the proper location data feeding and filling the record more accurately.
 - (ii) to strengthen the patrolling and surveillance of tigers.
- The primary focus of the tiger census 2018: to cover the northeast India that was not included in the previous census.
- For the first time, Bhutan, Nepal and Bangladesh have come together to count the tigers especially in the region with mutual borders.
- In the previous census, only Nepal and Bangladesh were engaged in the counting.

Conservation of Biodiversity

Biodiversity:

Biodiversity is the degree of variation of life forms within a given ecosystem, biome, or an entire planet. Biodiversity is a measure of the health of ecosystems. Biodiversity is in part a function of climate. In terrestrial habitats, tropical regions are typically rich whereas Polar Regions support fewer species.

Conservation of Biodiversity:

Biodiversity is being depleted by the loss of habitat, fragmentation of habitat, over exploitation of resources, human sponsored ecosystems, climatic changes, pollution invasive exotic species, diseases, shifting cultivation, poaching of wild life etc.

Since the human beings are enjoying all the benefits from biodiversity, they should take proper care for the preservation of biodiversity in all its form and good health for the future generation i.e., the human being should prevent the degradation and destruction of the habitats thereby maintaining the biodiversity at its optimum level.

Conservation of biodiversity is protection, upliftment and scientific management of biodiversity so as to maintain it at its threshold level and derive sustainable benefits for the present and future generation. In other words, conservation of bio-diversity is the proper management of the biosphere by human beings in such a way that it gives maximum benefits for the present generation and also develops its potential so as to meet the needs of the future generations.

Mainly the conservation of biodiversity has three basic objectives:

- (a) To maintain essential ecological processes and life supporting systems.
- (b) To preserve the diversity of species.
- (c) To make sustainable utilisation of species and ecosystems.

Strategies for Conservation of Biodiversity:

The following strategies should be undertaken in order to conserve biodiversity:

- (1) All the possible varieties (old or new) of food, forage and timber plants, live stock, agriculture animals and microbes should be conserved.
- (2) All the economically important organisms in protected areas should be identified and conserved.
- (3) Critical habitats for each species should be identified and safeguarded.
- (4) Priority should be given to preserve unique ecosystems.
- (5) There should be sustainable utilisation of resources.
- (6) International trade in wild life should be highly regulated.
- (7) The poaching and hunting of wildlife should be prevented as far as practicable.
- (8) Care should be taken for the development of reserves and protected areas.

- (9) Efforts should be made to reduce the level of pollutants in the environment.
- (10) Public awareness should be created regarding biodiversity and its importance for the living organisms.
- (11) Priority should be given in wildlife conservation programme to endangered species over vulnerable species and to vulnerable species over rare species.
- (12) The habitats of migratory birds should be protected by bilateral and multilateral agreement.
- (13) The over exploitation of useful products of wild life should be prevented.
- (14) The useful animals, plants and their wild relatives should be protected both in their natural habitat (in-situ) and in zoological botanical gardens (ex-situ)
- (15) Efforts should be made for setting up of National parks and wild life sanctuaries to safeguard the genetic diversity and their continuing evolution.
- (16) Environmental laws should be strictly followed.

Conservation Methods

There are two types of conservation methods namely in-situ and ex-situ conservations. Let us discuss the different conservation methods along with their importance.

(a) In situ conservation:

The conservation of species in their natural habitat or natural ecosystem is known as in situ conservation. In the process, the natural surrounding or ecosystem is protected and maintained so that all the constituent species (known or unknown) are conserved and benefited. The factors which are detrimental to the existence of species concerned are eliminated by suitable mechanism. The protection and management of biodiversity through in situ conservation involve certain specific areas known as protected areas which include national parks, Sanctuaries and Biosphere reserves.

The different advantages of in situ conservation are as follows:

- (a) It is a cheap and convenient way of conserving biological diversity.
- (b) It offers a way to preserve a large number of organisms simultaneously, known or unknown to us.
- (c) The existence in natural ecosystem provides opportunity to the living organisms to adjust to differed environmental conditions and to evolve in to a better life form.

The only disadvantage of in situ conservation is that it requires large space of earth which is often difficult because of growing demand for space

1. Protected areas:

The protected areas are biogeographically areas where biological diversity along with natural and cultural resources are protected, maintained and managed through legal and administrative measures. The demarcation of biodiversity in each area is determined on the basis of climatic and physiological conditions.

In these areas, hunting, firewood collection, timber harvesting etc. are prohibited so that the wild plants and animals can grow and multiply freely without any hindrance. Some protected areas are: Cold desert (Ladakh and Spiti), Hot desert (Thar), Saline Swampy area (Sunderban and Rann of Kutch), Tropical moist deciduous forest (Western Ghats and north East) etc. Protected areas include national parks, sanctuaries and biosphere reserves. There are 37,000 protected areas throughout the world. As per World Conservation Monitoring Centre, India has 581 protected areas, national parks and sanctuaries.

2. National parks:

These are the small reserves meant for the protection of wild life and their natural habitats. These are maintained by government. The area of national parks ranges between 0.04 to 3162 km. The boundaries are well demarcated and circumscribed. The activities like grazing forestry, cultivation and habitat manipulation are not permitted in these areas. There are about 89 national parks in India.

Some important national Parks of India are:

- (i) Biological Park, Nandankanan, Orissa,
- (ii) Corbett national Park Nainital, U.P. (First national Park)
- (iii) Koziranga national Park, Jorhat, Assam
- (iv) Tudula national Park, Maharashtra
- (v) Hazaribagh national Park, Hazaribagh, Bihar
- (vi) Bandhavgarh national park, M.P.
- (vii) Bandipur national park, Karnataka.
- (viii) Kanha National Park, M.P.

(ix) Reibul Lamjao National Park, Manipur

(x) Nawgaon National Park, Maharashtra

3. Sanctuaries:

These are the areas where only wild animals (fauna) are present. The activities like harvesting of timbers, collection of forest products, cultivation of lands etc. are permitted as long as these do not interfere with the project. That is, controlled biotic interference is permitted in sanctuaries, which allows visiting of tourists for recreation. The area under a sanctuary remains in between 0.61 to 7818 km.

Some important sanctuaries of Orissa are as follows:

(i) Nandankanan Zoological Park

(ii) Chandaka Elephant reserve

(iii) Simlipal Tiger Reserve

(iv) Bhitarkanika Wild life Sanctuary

(v) Gharial project at Tikarpada

(vi) Chilika (Nalaban) Sanctuary

4. Biosphere reserves:

Biosphere reserves or natural reserves are multipurpose protected areas with boundaries circumscribed by legislation. The main aim of biosphere reserve is to preserve genetic diversity in representative ecosystems by protecting wild animals, traditional life style of inhabitant and domesticated plant/ animal genetic resources. These are scientifically managed allowing only the tourists to visit.

Some importance of biosphere reserves is as follows:

(a) These help in the restoration of degraded ecosystem.

(b) The main role of these reserves is to preserve genetic resources, species, ecosystems, and habitats without disturbing the habitants.

(c) These maintain cultural, social and ecologically sustainable economic developments.

(d) These support education and research in various ecological aspects,

Some important biosphere reserves are:

Simlipal, (Orissa), Sunderban (West Bengal), Kanha (M.P Kaziranga (Assam) etc. The biosphere reserve net work was introduced by UNESCO 1971.

(b) Ex-situ conservation:

Ex-situ conservation involves maintenance and breeding of endangered plants and animals under partially or wholly controlled conditions in specific areas like zoo, gardens, nurseries etc. That is, the conservation of selected plants and animals in selected areas outside their natural habitat is known as ex-situ conservation.

The stresses on living organisms due to competition for food, water, space etc. can be avoided by ex-situ conservation there by providing conditions necessary for a secure life and breeding.

Some important areas under these conservation are:

(i) Seed gene bank,

(ii) Field gene bank;

(iii) Botanical gardens;

(iv) Zoos.