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Biodiversity Conservation In Punjab Key Initiatives



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EDITORIAL

The Earth's biological resources are vital to humanity's economic and social development. They are an important foundation for a sustainable society. As a result, there is a growing global consensus that the biological diversity is an asset of tremendous value to present and future generations. Over the years, the pollution, climate change and population growth are threats to species and ecosystems and has led to unprecedented rise in the rate of species extinction.

In response, many international, national & regional steps are being taken and one of the major was the Convention on Biological Diversity (CBD was signed on 5 June 1992 at the United Nations Conference on Environment and Development, the Rio "Earth Summit") for inspiring by the world community's growing commitment to sustainable development. The Convention is considered as the international legal instrument representing a spectacular step forward in the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising from the use of genetic resources. Currently, the declaration by the United Nations of 2021–30 as the UN Decade on Ecosystem Restoration is drawing worldwide attention to the challenge of restoring natural ecosystems that have been degraded or converted.

India is one of the world's 'mega diversity' countries and is ranked ninth in the world in terms of higher plant species richness., India is also well-endowed at the ecosystem level with a rich history of conservation movements, which speak of the value people place on nature and biodiversity. As a party to CBD, India endeavours to meet its international obligations and commitments and has a resolute conviction in the conservation of biodiversity as a national priority and recognizes its crucial linkages with the livelihoods and well-being of millions of people.

In view of above, the current issue of Newsletter summarizes the major initiatives being undertaken for conservation and protection of biodiversity within the state. It is hoped that it will motivate for taking more fore-front actions/steps towards the restoration of state biodiversity with collective ambition and willingness.

— Editors

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Introduction

Biodiversity is the variety of different types of life found on earth. It includes diversity at three levels: Genetic Diversity (within species), Species Diversity (between species) and ecosystem diversity (between ecosystems). This diversity of living creatures forms a support system which has been used by each civilization for its growth and development. As per Convention on Biological Diversity (CBD), Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

It is critical to our survival and economic prosperity and provides the basic goods and services for human society to exist and secure economic and social development. Biological resources are essential for maintaining the basic life processes as they not only provide food, medicine and products of commercial and non-commercial use, but also provide various environmental services.

India is known for its rich heritage of biological diversity, having already documented over 1,01,167 species of fauna and 47,485 species of flora representing about 8% of globally known floral and faunal species (6.7% of the world

fauna and 11.2% the world flora) within just 2.4% of the world's land area (Implementation of India's National Biodiversity Action Plan-An overview 2019). India is at the 8th position in the world in terms of total biodiversity owing to its large landmass covering a range of ecosystems and India is one of the 17 mega bio-diverse countries of the world.

India has made sustained efforts in fulfilling its commitments towards conservation of biodiversity, its sustainable use and the fair and equitable sharing of benefits arising from the use of biological resources associated traditional knowledge. In pursuance to its obligation and commitment to the CBD of UN adopted at Earth Summit in 1992, India being a party to CBD and enacted the Biological Diversity Act (BD Act), 2002 to implement the provisions of the Convention. The BD Act, 2002 is aimed at conservation & sustainable use of biological resources and fair & equitable sharing of benefit of arising from commercial use of biological resources and associated traditional knowledge.

Box 1. Convention on Biological Diversity (CBD)

The Convention on Biological Diversity (CBD) entered into force on 29th December 1993. It was signed by 150 government leaders at the 1992 Rio Earth Summit and since then more than 175 countries have ratified the agreement. The CBD is dedicated to promoting sustainable development. Conceived as a practical tool for translating the principles of Agenda 21 into reality, the Convention recognizes that biological diversity is about more than plants, animals and micro organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live. It has 3 main objectives:

1. The conservation of biological diversity
2. The sustainable use of the components of biological diversity
3. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources

The Convention has created a global forum – actually a series of meetings – where governments, non-governmental organizations, academics, the private sector, and other interested groups or individuals share ideas and compare strategies. The Convention's ultimate authority is the Conference of the Parties (COP), consisting of all governments (and regional economic integration organizations) that have ratified the treaty.

Source: <https://www.cbd.int/convention/>

In response to actions required to be taken up under the Convention and being the party of United Nation's CBD, Govt. of India enacted the BD Act in 2002. Subsequently, Biological Diversity Rules were notified in 2004 to spell out procedures and mechanisms for the implementation of the BD Act, 2002 throughout the nation. India is a forerunner in bringing out such umbrella legislations with the objective of protecting the country's rich biodiversity

& associated Traditional Knowledge. The BD Act, 2002 is implemented through a three-tier institutional mechanism throughout the nation:

- National Biodiversity Authority (NBA), Chennai at National Level
- State Biodiversity Boards (SBBs), at State Level
- Biodiversity Management Committees (District, Block, Village & Urban Local Bodies) at local Level

Biodiversity Profile of Punjab

Punjab is predominantly an agrarian state (also known as food bowl of India) having:

- Dominant cropland ecosystem with 83% area under agriculture
- 6.83% of its total geographic area under forest (3.67%) and tree cover (3.16%) as per recent India State of Forest Report, 2019
- Six wetlands (Harike Lake, Ropar Lake, Kanjli Lake, Keshopur Miani Community Reserve, Nangal Wildlife Sanctuary and Beas Conservation Reserve) of International importance (Ramsar sites)
- Large number of flora and fauna recorded from forests, agricultural areas & wetlands
- Rich crop and domesticated animal diversity
- Shivalik area comprising of sub-mountainous zone and undulating land below the hills in the districts of Gurdaspur, Hoshiarpur, Pathankot, Shaheed Bhagat Singh Nagar and Ropar
- Protected areas as under:

Protected Area	Total Number
Wild life Sanctuaries	13
Ramsar Sites	6
Botanical Gardens	5
Zoological Parks	1
Deer Park	4
Community Reserves	3

Source: Statistical Abstract of Punjab, 2020

- Taxonomic diversity as under:

TAXONOMIC GROUP	NO. OF SPECIES	TAXONOMIC GROUP	NO. OF SPECIES
FAUNAL SPECIES		FLORAL SPECIES	
Platyhelminthes	41	Algae	371
Phylum Protozoa	84	Fungi	560
Nematoda	157	Lichens	21
Annelida	34	Bryophytes	29
Arthropoda	1147	Pteridophytes	30
Mollusca	85	Gymnosperms	21
Pisces	113	Angiosperms	1939
Amphibia	15	TOTAL FLORAL SPECIES	2,971
Reptilia	35		
Aves	442		
Mammalia	43		
TOTAL FAUNAL SPECIES	2,196		
GRAND TOTAL (FLORA+ FAUNA)=5,167			

Source: Biodiversity in the Shivalik Ecosystem of Punjab, 2006, EnviStats India, 2020

Biodiversity related Initiatives

1. Constitution of Punjab Biodiversity Board (PBB):

Taking cognizance of the provisions of the BD Act, 2002, and to deal with the management of biological resources of the State, Govt. of Punjab established Punjab Biodiversity Board as a statutory body u/s 22 of BD Act, 2002 in 2004. The main objectives of the Board are to promote conservation & sustainable use of biological resources and to ensure fair and equitable sharing of benefit arising out of commercial utilization of biological resources in the state. Board is functioning from the O/o Punjab State Council for Science & Technology, Chandigarh under the administrative control of Department of Science, Technology & Environment, Govt. of Punjab. Further, Govt. of Punjab vide notification no. G.S.R.78/C.A.18/2003/S.63/2016 dated 11th Nov. 2016 notified Punjab Biological Diversity Rules. The major mandate of the Board is as under:

- Advise the State Govt. and provide technical assistance on matters related to conservation & sustainable utilization of biological resources.
- Facilitate setting up of Biodiversity Management Committees (BMCs) and preparation of People's Biodiversity Registers (PBRs) at District/Block/Village and ULBs level
- Regulate access to biological resources for commercial utilization.
- Identify and take steps to promote conservation of 'Biodiversity Heritage Sites' and rehabilitate threatened flora and fauna of the State.

- Create awareness & undertake capacity building activities on biodiversity related issues.

2. Constitution of BMCs and Preparation of PBRs:

As per Section 41 of the BD Act, 2002 and Rule 22 of the Biological Diversity Rules, 2004, every Local Body (District, Block, Village and ULB) is required to constitute BMC for promoting conservation and sustainable use of biological resources and preparation of PBRs for the documentation of local flora & fauna and associated TK within its jurisdiction.

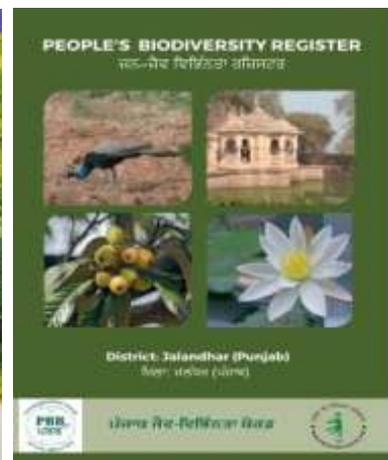
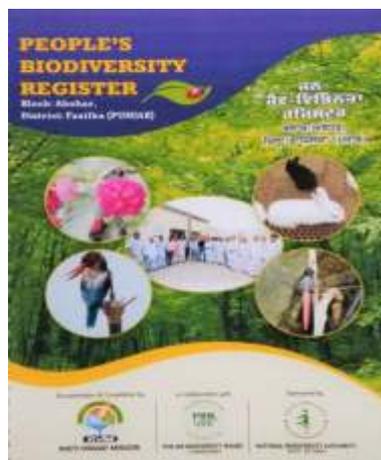
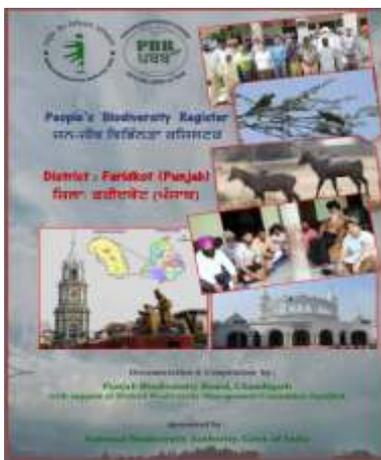
PBR is a Dynamic Document prepared by the Concerned BMCs with the technical support of Board, Local bodies and TSGs (Technical Support Groups) in the prescribed template. Board prepared 53 Model PBRs with active involvement of District Administrations and BMCs as per prescribed Guidelines and financial support of NBA, Gol. Subsequently, PBB facilitated 100% constitution of BMCs and preparation of PBRs at the level of all local bodies throughout the State as under:

Level	BMCs Constituted	PBRs Prepared
District	22	22
Block	150	150
Village	13260	13260
ULBs	167	167

Source: Punjab Biodiversity Board, 2021



BMCs constitution and PBRs preparation Activities



Glimpses of Model PBRs

3. Notified Threatened Flora and Fauna of Punjab: As per the Section 38 of the BD Act, 2002, Govt. of India, in consultation with the concerned State Govt. may notify any species which is on the verge of extinction or likely to become extinct in the near future as a Threatened Species. MoEFCC, Govt of India has notified 13 species (8 Floral and 5 faunal species) as threatened species of Punjab which are on the verge of extinction in the state.

List of Notified Threatened Species of Punjab

Threatened Floral Species	
1	<i>Tecomella undulata</i> (Sm.) Seem
2	<i>Withania coagulans</i> (Stocks) Dunal
3	<i>Anogeissus sericea</i> Brandis var. <i>nummularia</i> King ex Duthie
4	<i>Alysicarpus bupleurifolius</i> (L.) DC var. <i>hybridus</i> DC
5	<i>Hibiscus hoshiarpurensis</i> T.K. Paul & M.P. Nayar
6	<i>Ceropegia bulbosa</i> Roxb. Var. <i>lushii</i> (J. Graham) Hook.f [= <i>Ceropegia lushii</i> (J. Graham)]
7	<i>Ophioglossum gramineum</i> Willd
8	<i>Ophioglossum polyphyllum</i> A. Braun ex. Seub
Threatened Faunal Species	
1	<i>Plantista gangetica</i> ssp minor
2	<i>Gyps bengalensis</i> Gmelin, 1788
3	<i>Grus antigone</i> Linnaeus, 1758
4	<i>Python molurus</i> Linnaeus, 1758
5	<i>Pangshura tecta</i> Gray, 1830

Source: MoEFCC, GoI 2014

Some Threatened Floral and Faunal Species of Punjab



4. State Symbols: Govt. of Punjab has notified the following Flora & Fauna as State Symbols to create awareness and promote their conservation:

State Symbols	Scientific Name	Vernacular Name
State Tree	<i>Dalbergia sissoo</i>	Tahli/ Shisham
State Animal	<i>Antelope cervicapra L.</i>	Kala Hiran /Black Buck
State Bird	<i>Accipiter gentilis</i>	Baaz/ Northern gowshak
State Aquatic Animal	<i>Platanista gangetica minor</i>	Indus River Dolphin

5. Identification of Biodiversity Rich Areas (Potential Biodiversity heritage Sites): Punjab Biodiversity Board has been making consistent efforts for identification of biodiversity rich sites located outside Protected Area Network of the State to promote their conservation & management as Biodiversity Heritage Sites (BHSs) u/s 37 of the BD Act, 2002. BHSs are well defined areas that are unique ecologically fragile ecosystems-terrestrial, freshwater or marine having rich biodiversity comprising of any one or more of the components such as; species richness, high endemism, presence of rare, endemic and threatened species, keystone species, species of evolutionary significance, wild ancestors of domestic/cultivated species or land races or their varieties, past pre-eminence of biological components represented by fossil beds and having cultural or aesthetic values and are important for the maintenance of cultural diversity, with or without a long history of human association with them. (Source: NBA, India)

Box 2. Significance and objectives of Biodiversity Heritage Sites

To strengthen the biodiversity conservation in traditionally managed areas and to stem the rapid loss of biodiversity in intensively managed areas, such areas need special attention. To have a BHS in or around a community should be a matter of pride and honour to such community and this virtuous act of community shall work as an example to the entire nation apart from ensuring availability of the resources to their own future generation. It is necessary to instil and nurture conservation ethics in all sections of the society. The creation of BHS will ensure bringing home these values in the society and thereby put an end to over exploitation of natural resources and avoid environmental degradation. The creation of BHS shall not put any restriction on the prevailing practices and usages of the local communities, other than those voluntarily decided by them. The purpose is to enhance the quality of life of the local communities through this conservation measure.

PBB in consultation with concerned local bodies has identified the following biodiversity rich sites outside the protected area network having the potential to be declared as BHSs:

- **Kaya Kalp Vriksh village Cholti Kheri, District Fatehgarh Sahib:**

The Kaya Kalp Vriksh a great banyan tree (*Ficus bengalensis*) located at village Cholti Kheri, Block Khera, District Fatehgarh Sahib, Punjab. The sprawling canopy of the tree spreads to 2 acres approx. on private land and resembles a small forest as its many aerial roots have now become stems. According to locals, great banyan is a few hundred years old and known as 'Kaya Kalp Vriksh' (transformation). The local belief is that nobody can stop the relentless spread of the tree. As the tree is surrounded by private land, the adjoining land owners not dare to cut any branch which may grow and cover their land. It is believed that any person in the past who tried to stop the spread of the tree had to face grave misfortunes. The usage of waste wood or fallen leaves of the tree is also considered equally unpropitious. People of the surrounding villages believe that the tree has unique healing and medicinal power, therefore, people suffering from different ailments visit this place to spend some time under its shade in order to get cured. A fair is organized by local people annually under its shade on 15th February to worship the

divine powers of Great Banyan of Punjab. The tree has created its own unique eco system in the area as it supports large number of birds such as peacock, mayna, parrot, crow, owl, egret, etc. and many insect species. The site has a tourism and heritage potential as it attracts many visitors including people from nearby areas, students' groups, tourists and the spiritually inclined. Though great banyan tree continues to grow undisturbed, however, it needs to be conserved from the vagaries of time, weather and human behaviour. The under canopy of tree is habitat to many other floral species such as *Capparis decidua*, *Calatropis procera*, *Ziziphus nummularia*, *Leptadenia pyrotechnica*, *Dalbergia sissoo*, *Acacia nilotica*, *Ficus religiosa*, *Euphorbia nivulia*, *Salvadora oleoides*, *Phoenix sylvestris*, *Argemone mexicana*, *Ageratum conyzoides*, *Desmostachya bipinnate*, *Cassia tora*, *Cleome viscosa*, *Crotolaria sp.*, *Euphorbia hirta*, *Croton bonplandianum*, *Leucas sp.*, *Spergularia sp.*, *Vicia sp.*, *Lantana camara*, *Parthenium hysterophorus*.



Kaya Kalp Vriksh: Great Banyan Tree

- **Chatpatt Bani, Village Kataru Chak, District Pathankot:**

A sacred grove — ‘Charpat Bani’, 30 acres of biodiversity rich dense forest from where no one even takes a twig home, is believed to be the seat of a local deity called Charpat Yogi. On the edge of the grove is a temple dedicated to Yogi. As per belief of locals, the forest appeared overnight so its name is name ‘Chatpat’ comes from ‘Jhatpat’ (quickly). The old tale is that the trees would walk down the mountains at night when people would be asleep but one day a woman saw them before dawn and they all stopped there. The word ‘Bani’ comes from ‘Vani’ (forest).

The site has abundance population of *Putranjiva roxburghii* (Puttar Datta), *Ficus racemose* (Gular) trees, murraya species and many other native herbs & shrubs. The grove also acts as a colony of giant bats, cobras and many other micro-organisms.

Another popular story is that Charpat Yogi was meditating in the fields when farmers came to plough the land. When Yogi did not move, they went ahead with their work. Yogi was covered with dust and as he fell down, his elbow dug into the ground and a spring erupted. Farmers saw it as a miracle and stopped ploughing and bowed to the sacred land. The sacred natural water springs still exists and pass through the site.



Sacred Grove Charpat Bani

- **The Sacred Grove at Tibba & Taparia, District Roopnagar:**

The site is known by locals as ‘Dargah Peer Baba Majnu Shah Ji’, is situated on the bank of river Sutlej at Village Tibba & Taparia, District Roopnagar. As informed by the

locals, the site is around 300 years old and is believed that Peer Baba Majnu Shah Ji having spiritual powers worshiped at the site for 200 years. He used to eat only fruit of *Ficus racemosa* (Gular). The site is undisturbed and being preserved by the

locals as sacred grove and a Dargah of Peer Baba Majnu Shah Ji has been constructed by the Panchayat of Village Tibba & Taparia. A 200 years old stone associated with the Peer Baba Majnu Shah Ji is also kept in the Dargah. One room and a verandha have also been constructed for the caretaker of the Shrine. An Annual Fair is being organized at the site on 1st Thursday of Jeth month (May) to worship the divine powers of Peer Baba Majnu Shah Ji.

The site is spread in pristine and calm area of 7 acres approximate of Panchayat Land consisting naturally occurring cluster of lush green trees and shrubs. The local belief is that any harm to any tree of the area could lead to misfortune to the individual. Therefore, nobody dares to use any part of the trees. Local people neither use fallen dead wood/dried leaves nor graze cattle within the area due to associated religious beliefs. The local fishing contractor has also voluntarily stopped fishing in the adjoining stretch of the river Sutlej.

The common flora of the site comprises of *Dalbergia sisso*, *Acacia nilotica*, *Cordia dictoma*, *Ficus benghalensis*, *Phoenix sylvestris*, *Prosopis cineraria* (single tree), *Aegle marmelos*, *Acacia modesta*, *Morus alba*, *Terminalia bellirica*, *Azadirachta indica*, *Acacia catechu*, *Ficus racemosa*, *Lawsonia inermis*, *Syzygium cumini*, *Mangifera indica*, *Carica papaya*, *Terminalia chebula*, *Ziziphus jujuba*, *Psidium guajava*, *Capparis decidua* (Della).

The common fauna of the site comprises Monkey, Wild Boar, Python, Cobra, Hare, Owl, Peafowl, Nilgai, Mongoose, Indian Squirrel, Indian Pangolin, Rats, Garden lizard, Red Jungle Fowl, House Sparrow, Barking Deer, Fruit Bats, Red Munia, etc. and many insects, arthropods, millipedes

and nematodes.

- **‘Baba Sukhia Ji’ in Village Kartoli, District Hoshiarpur:**

The site is known by locals as ‘Baba Sukhia Ji’. It is situated at Village Kartoli, District Hoshiarpur. Around 200-250 years old site, it is believed by locals that Sidh Baba Sukhia Ji having spiritual powers worshiped below a giant Banyan tree at this site and the village was cursed by Sidh Baba Sukhia due to disgraceful behaviour of a specific community to him. This village was again re-habitated when the people began to worship this place.

The site is presently being preserved by the local residents as sacred grove and a Temple of Sidh Baba Sukhia Ji has been constructed by the Panchayat of Village Kartoli. An Annual Fair is being organized at the site during the months of April (14 April) and September (17th September) by the local community. The site is spread in approximate 3-4 acres land and has rich floral and faunal diversity and is inhabited by some rare, important medicinal and timber plant species like *Diospyros tomentosa*, *Holoptelea integrifolia*, *Bombax ceiba*, *Carrisa spinarum*, *Flacourtia indica*, *Aegle marmelos*, *Bauhinia variegata*, *Mallotus philippensis*, *Murraya koenigii*, *Adhatoda vasica* etc.

The common fauna of the site comprises Monkey, Wild Boar, Python, Cobra, Hare, Owl, Peafowl, Mongoose, Indian Squirrel, Indian Pangolin, Rats, Garden lizard, Red Jungle Fowl, House Sparrow, Fruit Bats, Red Munia, etc. and many insects, arthropods, millipedes and nematodes.

- **Bir Sikhanwala, Distt. Faridkot:**

‘Bir Sikhanwala’ is a forest area in the Faridkot District. The word ‘Bir’ stands for ‘Forest’ and ‘Sikhanwala’ is an adjacent

village to this forest, so people started calling this place as 'Bir Sikhanwala'. There are some references found in the literature that Bir Sikhanwala was used by Sikhs for hideout-cum-guerrilla camp during their fight with the Mughal forces and even the army also used it for their camps during war times. The site has one Gurudwara of Baba Marana also known as "Baba Kala Mehar". Baba Marana is the ancestor and founder of Sandhwan then known as "Dholla Bhagga". Baba Marana was the leader of the Sandhu clan so site is worshipped by Jatt Sikhs of Sandhu Clan (Gott).

As per the land records and sources of Maharawal Khewaji Trust (Regd.), which is managing the site, total area of Bir Sikhanwala is 280.2 acres. The Bir is surrounded by mud wall from some parts and also has a wetland in the middle.

More than 50 species of trees, herbs, shrubs have been recorded from site. The site is dominated by Acacia & Ziziphus species. Some of threatened native species of flora recorded from site include *Ephedra foliata* (Shrubby Horsetail), *Tecomella undulata*, *Salvadora oleoides*, *Salvadora persica*. The site is heavily infested by *Prosopis juliflora*. Around 100 species of Native & Migratory Birds have been also recorded from the site. An annual function is being organized on 18th March, where whiskey is also offered to deity as prashad.

- **Dhakki Sahib, District Ludhiana:**

Centuries old jungle outside village Maksudra, Block Doraha, District Ludhiana known as Tapoban Dhakki Sahib. Sant Baba Darshan Singh Ji Khalsa consecrated Dhakki by mediation there for long time in 1986-87.

With an approximate area of 125 acres, the site is dominated by *Butea monosperma* (Dhakk/Kesu/ Flame of Forest) and that's why it is called Dhakki Sahib. The site also has a huge water body and rich wildlife

including deers & foxes. The most of floral species recorded in the plains of Punjab, have been found at this site. The site is very popular among all sections of the Society due to religious beliefs and biodiversity richness.

The other important species of the site include *Accacia modesta*, *Jatropha gossypifolia*, *Tectona grandis*, *Terminalia bellirica*, *Zizyphus mauritiana* & *Prosopis spicigera*

- **Tilla Bhagat, Village Bhutti Wala, District Muktsar:**

The 25-acre site is located on Tilla (Sand Dune) having the height 35 ft from the village land and worshipped for Local Diety known as "Puran Bhagat". The floral vegetation at 500 to 700 year old site has typical characteristics of Arid Zone vegetation. The centuries old *Salvadora oleoides* (Peelu /van) tree still exist in a healthy stage in the main temple of site.

The important plant communities of site include *Abutilon indicum*, *Acacia tortilis*, *Albizia lebeck*, *Argemone Mexicana*, *Azadirachta indica*, *Calotropis procera*, *Capparis decidua*, *Ephedra foliata*, *Grewia tenax*, *Prosopis juliflora*, *Prosopis cineraria* (Jhand), *Salvadora oleoides*, *Tecomella undulata*, *Vachellia nilotica* (Kikar), *Zizyphus mauritiana*, *Zizyphus nummularia* (Mala).

- **Sant Sar, Village Khokhar & Harike, Block Bariwala, District Muktsar:**

The 11-acre site is worshipped for Local Diety known as "Bala Gyan Dass". The floral vegetation site has typical characteristics of a desert ecosystem. An annual fair is organized on 4th January every year.

The important plant communities of site include *Abutilon indicum*, *Morus Alba*, *Morus indica*, *Tamarix Indica*, *Albizia lebeck*, *Melia azedarach*, *Ricinus communis*, *Prosopis cineraria*, *Syzygium cumini*.

6. International Day for Biological Diversity (IDB)

International Day for Biological Diversity is being celebrated by PBB every year with the technical & financial support of National Biodiversity Authority, Govt. of India by actively involving the various line departments and stakeholders including Universities, Colleges, Schools, NGO's, BMCs, to create awareness about the importance of biological diversity conservation.

Glimpses of IDB-2021



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Nearly 300 Biodiversity 'Hot Spots' At Risk of Extinction Due To Global Warming: Study

Unless nations dramatically improve on carbon-cutting pledges made under the 2015 Paris climate treaty, the planet's richest concentrations of animal and plant life will be irreversibly ravaged by global warming, scientists warned Friday. An analysis of 8,000 published risk assessments for species showed a high danger for extinction in nearly 300 biodiversity "hot spots", on land and in the sea, if temperatures rise three degrees Celsius above preindustrial levels, they reported in the journal *Biological Conservation*. Earth's surface has heated up 1C so far, and the Paris Agreement enjoins nations to cap warming at "well below" 2C, and 1.5C if possible.

Endemic land species in biodiverse hot spots are nearly three times as likely to suffer losses due to climate change than more widespread flora and fauna, and 10 times more likely than invasive species. National commitments to slash greenhouse gas emissions — assuming they are honoured — would still see temperatures soar well above 3C by century's end, if not sooner. So-called endemic species — plants and animals found exclusively in a specific area — will be hit hardest in a warming world. From snow leopards in the Himalayas and the vaquita porpoise in the Gulf of California to lemurs in Madagascar and forest elephants in central Africa, many of the planet's most cherished creatures will wind up on a path to extinction unless humanity stops loading the atmosphere with CO₂ and methane, the study found. Endemic land species in biodiverse hot spots are nearly three times as likely to suffer losses due to

climate change than more widespread flora and fauna, and 10 times more likely than invasive species.

Trapped in an enclosed sea

"Climate change threatens areas overflowing with species that cannot be found anywhere else in the world," said lead author Stella Manes, a researcher at the Federal University of Rio de Janeiro. "The risk for such species to be lost forever increases more than 10-fold if we miss the goals of the Paris Agreement". More and more scientists concede that capping global warming at 1.5C target is probably out of reach. But every tenth of a degree matters when it comes to avoiding impacts, they say. Some concentrations of wildlife are more vulnerable than others.

In mountain regions, 84 percent of endemic animals and plants face extinction in a 3C world, while on islands — already devastated by invasive species — the figure rises to 100 percent. "By nature, these species cannot easily move to more favourable environments," explained co-author Mark Costello, a marine ecologist from the University of Auckland. Marine species in the Mediterranean are especially threatened because they are trapped in an enclosed sea, he added. Overall, more than 90 percent of land-based endemic species, and 95 percent of marine ones, will be adversely affected if Earth warms another two degrees, the international team of researchers found. Safe havens not so safe In the tropics, two out of three species could perish due to climate change alone. The findings may impel conservationists to rethink how to best protect endangered wildlife. Up to now, the main threats have been habitat loss due to expanding urban areas, mining and agriculture, on the one hand, and

hunting for food and body parts to sell on the black market, on the other.

A key strategy in the face of this onslaught has been carving out protected areas, especially around biodiversity hot spots. But these safe havens may be of little use in the face of global warming. "Unfortunately, our study shows that those biodiversity rich-spots will not be able to act as species refugia from climate change," said co-author Mariana Vale, also from Federal University. Even before the impact of global warming has truly kicked in, scientists have ascertained that Earth is at the outset of a so-called mass extinction event in which species are disappearing at 100 to 1,000 the normal, or "background", rate.

There have been five previous mass extinctions in the last 500 million years.

Source: First Post, APR 09, 2021

PAU develops new 'Punjab Basmati 7' variety

Aiming at diversification and preservation of depleting underground water table, Punjab Agricultural University (PAU), Ludhiana, has developed a new variety of basmati, 'Punjab Basmati 7' for commercial cultivation in the upcoming season in the state. This variety has been developed by involving the strongly scented traditional basmati variety, 'Basmati 386', and the most popular basmati variety, 'Pusa Basmati 1121'. Dr GS Mangat, Head, Department of Plant Breeding and Genetics, says: "Being a major export item, the 'Queen' of rice, basmati, is making a significant impact on our national economy. During 2019-20, about 44.54 lakh metric tonnes of basmati, amounting to Rs 31,025.87 crore, was exported to different countries".

Referring to salient characteristics of the variety, Dr Mangat says 'Punjab Basmati 7' yielded consistently better than the check

varieties in the multi-locational trials. Overall, it has an edge of 11.4 and 6.1 per cent, respectively, over the popular basmati varieties, Pusa Basmati 1121 and Pusa Basmati 1718. It gives an overall yield of 48.58 quintals per hectare (19.4 quintals per acre), he says. It performs better when transplanted in the first fortnight of July, he adds. 'Punjab Basmati 7' matures about one week earlier than the check varieties, Pusa Basmati 1121 and Pusa Basmati 1718, and also has medium height (111 cm), he says. Dr RS Gill, a rice expert, says 'Punjab Basmati 7' is resistant to all 10 pathotypes of bacterial blight pathogen prevalent in Punjab, while the most popular variety, Pusa Basmati 1121, is susceptible to the disease.

"The specific feature of 'Punjab Basmati 7' is that like traditional basmati varieties, it possesses a strong aroma. The other characteristics like grain dimensions, milling quality and cooking quality are comparable to the most popular Basmati variety, Pusa Basmati 1121," he observes. Dr Buta Singh Dhillon, another rice expert, says: "In research trials under direct seeded conditions, 'Punjab Basmati 7' gave 17.7 per cent higher yield than the check variety, Pusa Basmati 1121, hence it has also been recommended for planting under direct sowing technology to save water. "Qualities such as higher yield, shorter duration, strong aroma and good milling feature make 'Punjab Basmati 7' a viable alternative for basmati growers and other stakeholders," he says. The seeds of 'Punjab Basmati 7' and other basmati and non-basmati varieties are available at all regional research stations, seed farms, Krishi Vigyan Kendras and Farmer Advisory Service Centres of PAU.

Source: The Tribune, 15 April, 2021