

BT401 - GENETIC RESOURCES & CONSERVATION

ALL OBJECTIVES & SUBJECTIVES FROM PAST FILES FOR FINAL TERM

: ANAYA | : ARHAM (+923351328979) | : AIZA WRITES



OBJECTIVES

1. Field gene bank also called plant gene banks area of land in which collections of growing plants are assembled _____ **Germplasm**
2. Ex-situ conservation includes _____ **All Given**
3. Threatened species of Rann of Kutch is _____ **All of Above**
4. In 1984 gene sanctuaries for conservation of wild relatives of coffee was setup in _____ **Ethiopia**
5. The Buler's Fruit bat is listed as on the IUCN red list _____ **Critically Endangered**
6. that the usefulness of the specimen for PCR-based assays is greater than 4 years when stored at _____ **-18 C°**.
7. how long a seed remains viable is known as its _____ **Viability**
8. is the secure long-term storage of an individual's genetic material. _____ **DNA Banking**.
9. an area where in controlled hunting and shooting is permitted on "permit basis" is known as _____ **Game Reserve**
10. The IUCN has listed Great Indian Bustard as ... in 2011 _____ **Critically Endangered**
11. Which of the following statement is correct about the sanctuary _____ **A Reserved Area Meant for Preservation and Development of Endangered Species?**
12. Gene sanctuaries not only preserve the existing genetic diversity present in a population due to which new ----- combination would appear with time. _____ **Allele and Gene 41.**
13. The sum total of all the genes present in a crop and its related species constitutes its _____ **Germplasm**
14. Gene's sanctuary is generally established in the center of _____ **Diversity**
15. ----- can be considered complementary conservation _____ **DNA Banks**
16. Cryopreservation is storage of materials at ----- temperature. _____ **Low**
17. Threatened species of Runn of Kutch is _____ **All of Above**
18. Plant seeds are stored in _____ for long term storage. _____ **In-Vivo Gene Bank**
19. The removal of the medium and transfer of cells from its previous culture into fresh growth medium for further propagation of the cell is called _____ **Sub Culturing**
20. The first genomic libraries were cloned in _____ . **Plasmid**
21. The bulmers fruit bat is listed as ----- on the IUCN RED LIST _____ **Endangered**
22. Madagascar Pochard dies at young age due to _____ **All of Them**
23. High humidity increases the ----- growth _____ **Fungus**
24. What is Dimethyl Sulfoxide used for _____ **Chelating Agent**
25. In the ----- major focus is animals _____ **Game Reserve**
26. There are two main drawbacks of gene sanctuary one of which is that. _____ **It Cannot Be Easily Maintained.**
27. Lyophilization during DNA storage process helps to ---- the DNA _____ **Preserve**

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28. Runn of Kutch wildlife sanctuary is part of the _____ **Thar Desert**
29. Population has more chances of survival _____ **Large Gene Pool**
30. Darwin's finches' classical example of _____ **GENETIC DRIFT**
31. Bottleneck effect elephant seal _____ **Over Hunting**
32. services generally more efficient _____ **Decentralized Quarantine**
33. Since ---- in situ conservation has received high priority to the world _____ **1980**
34. The cutting of tree act _____ **1992**
35. Genetic stocks can be divided into _____ Cytological stocks, Mutant stocks, Germplasm set _____ **ALL**
36. Genetic diversity is the variation of individuals in _____ Genes, Alleles, cells, ---- **BOTH A & B**
37. In 19th century only.....individuals of Elephant whales were present _____ **20**
38. Northern areas of Pakistan are serving as _____ **Habitat for Many Species.**
39. Climate change-related traits including _____ **All Given**
40. Hybridization may also introduce the new genetic variation required by trees to adapt to _____ **Novel Environments**
41. Some insects use tree terpenes as precursors for their communication or incorporate them into their own defence systems. _____ **Pheromones**
42. Invertebrates accounts for % of the animals on earth _____ **95**
43. help to maintain soil structure and the availability of water throughout the soil profile _____ **Earthworms**
44. The lack of genetic diversity may inhibit the ability of the population to respond to change _____ **Climate**
45. The ability of one genotype to produce more than one phenotype when exposed to different environment conditions without genetic change is called _____ **Phenotypic Plasticity**
46. the capacity of ecosystems to adapt is diminished when biodiversity of is lost _____ **Invertebrate**
47. are needed to be able to cope with changing climatic conditions, and increasing demands for food and retain the capacity to adapt to potential changes in the types of crops grown _____ **Pollinator Populations**
48. Natural selection favours genotypes with _____ **ALL given**
49. Wild beest are the part of _____ **Sardine Run Migration**
50. Largest migration was observed in _____ **Arctic Term Bird**
51. Species that are threatened are sometime characterized by _____ **Population**
52. Dynamics Measure of critical dispensation, A mathematical measure of bio mass. _____ **All of Above**
24. Encourage the conservation of agro biodiversity and aquatic biodiversity ---- **Land Sea Scape**
25. ---- as a mass of complimentary conservation----- **DNA BANK**
26. Tree population rely on interplaying mechanisms to respond to environmental change _____ **3**
27. Nagoya protocol ratified byparties _____ **97**

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28. Forest trees are known for showing great in their response to climate changes _____ **Plasticity**
29. Forests are important due to _____ **All Given**
30. Changes in climate also make it possible for and diseases to invade new areas, destroying the forests there _____ **Pests**
31. The most important causes of extinction of animals and plants is _____ **Habitat Loss**
32. A situation where two (or more) species reciprocally affect each other's evolution describes as _____ **Co-Evolution**
33. Tree populations rely on three interplaying mechanisms to respond to environmental change _____ **All Given**
34. Factor/factors can affect the services of invertebrates to the environment _____ **ALL Given**
35. Forests majorly remove from the atmosphere and produce oxygen. _____ **Carbon Dioxide**
36. Seed orchards, clone banks and clonal archives are examples of conservation units _____ **Static Ex Situ**
37. ensures the success of species in environments that are highly variable and subject to change _____ **Genetic Diversity**
38. Climate change may however cause range expansion is _____ **HERBIVORE INSECTS**
39. Thermal gradient can induce _____ due to uneven expansion or contraction in the biochemical system _____ **Mechanical Stress**
40. _____ are preserved by cryopreservation method _____ **Genetic Material**.
41. Which one of the following is culturally influenced in natural reserve _____ **Cave Dwelling?**
42. Genetic resources for food, agriculture and forestry include _____ **Both Wild and Domesticated Species**
43. Earthworms, ants and termites, have been described as _____ **Ecosystem Engineers**
44. Anthropogenic climate change leading to future large-scale dieback in _____ **Amazonian Rain Forest**.
45. National Park spreading in an area of ---- **100 SQ. KM. TO 500 SQ. KM.**
46. Pollinators are _____ major group of invertebrates. ----- **SECOND**
47. Insects pollinate how much plant species _____ **35%**
48. Ramsar convention came into _____ **21 DECEMBER 1975**
49. Dolphin is a _____ **MAMMAL**
50. -----% of 5488 mammal species and 12 out of 9.990 bird species are considered to be change **21%**
51. WCPA stands for _____ **World Commission on Protected Areas**
52. In Europe one estimate put the role of value marketed ---- from forest _____ **2.3 BILLION**
53. Since the population of Indus has significantly increased here _____ **1970**
54. Largest national park of Pakistan _____ **Hingul National Park**.
55. If hunting is prohibited a game reserve may be considered _____ **Nature Reserve**.
56. A sanctuary is protected area which is reserved for the conservation of only animals and human activities like _____ **Harvesting of Timber**



57. Bahawalpur zoo covers _____ **25 acres**
58. Black buck became virtually extinct in the cholistan desert but the species has been reintroduced to _____ **Lal Suhana.**
59. Hingol national park declared reserved in _____ **1988.**
60. Pakistan animal quarantine _____ **1979**
61. The wild birds and animal protection act _____ **1912**
62. NCCP stands for _____ **National Culture Collection for Pakistan**
63. Peste des petites ruminants are called ----- **Sheep and Goat Plaque**
64. Which disease is spread by consuming mercury poisoned fish _____ **MINAMATA Disease?**
65. Pakistan is the ----producer of knows oranges in the world--- **Sixth Largest**
66. A ---- can be taken to analyses G across E interactions ____ **Polygenic Approach**
67. Sterculia khas is endemic tree of the ----- **Khasi Hills**
68. OHSS stands for _____ **Ovarian Hyper Stimulation Syndrome.**
69. Genetic resource is sometimes called _____ **First Resource**
70. Phenyl Ketonuria caused by----- **Mutation.**
71. Which species has been reintroduced in Lal suhanra national park? __ **Black Buck**
72. If the advantage gene is removed then the effect is called ----- **Genetic Effect**
73. Darwin's finches are example of _____ **Adaptive Radiation**
74. _____ produce by dart poison frog _____ **Toxins**
75. Himalayan brown bear _____ **15-200**
76. Crow flow migration_____ **Daily**
77. Special care unit _____ **EX_SITU**
78. Closely related individuals _____ **Inbreeding**
79. Sea Weeds population is _____ **13000**
80. Snow leopard population in Pakistan left _____ **200**
81. Report on fish sperm cryopreservation published in ____ by____ **Blaxter1953**
82. Natural geological and geo morphological features ____ **Waterfalls, Cliffs, Clatters, Caves).**
83. Cryopreservation in liquid in _____ **-196 Degrees**
84. Vegetative propagation is _____ **Tissue Culture**
85. Cartagena protocol was adopted on____ at Cartagena-Spain____ **June 2001**
86. Using micro-array analysis, detected that up to _____ genes, were significantly induced by drought into Mediterranean pine tissues -----**113**
87. Large natural areas come into_____ **category VI**
88. In 2013, rasmer sites has been declared in Pakistan _____ **19**
89. In the game reserve the major focus is specifically ----- **The Animals**
90. Climate has direct effect on ----- **FGR.**

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91. There are ----- types of genome transfer **TWO**
92. -----will be fine for cutting tree in 1992 act **5000 rupees**
93. Convention on biological diversity **1992**
94. FAO stands for **Food Agriculture Organization**
95. GEWIS stands for **Genome Wide Interaction Scan**
96. -----often result of reproductive isolation **Sympatric Speciation**
97. Light intensity for most plants culture requires **50-200 umol-S-1-m-2**
98. ----- protected areas act as buffer **Category V**
99. Cartagena protocols not cover products derived form **LMOs**
100. Cartagena protocols deals with **Biosafety**
101. National strategy for PGRFA may help **Country**
102. Crustaceans migrate for **Breeding**
103. Genetic strong drift mat effect on storage in **Small Population**
104. Coral reefs are also threatened reef for home ____ of marine animals **25%**
105. Earliest modern protected areas **Yellow Stone National Park**
106. The main objective of category V is **Maintain A Balance Interaction of Nature and Culture**
107. Which category area are not associated with presence and intervention **category IV**
108. Main objective of habitat species management area A. to maintain species, B to conserve species,3. to conserve species and maintain habitat) **All of these**
109. Sir Sadiq Muhammad Khan established **Bahawalpur Zoo**
110. Houghton and Goldenrod typically grows on (moist sandy beaches, shallow depressions clow sand ridges **All**
111. Quite small protected area and high visitor value Category III **National Monuments Features**
112. ----is a category wherein samples of animals genetic are preserved cryogenically. **Animals Genetic Resources**
113. Genetic variation is the variation due to genes allele **Both A & B**
113. Habitat management work **All of The Above**
114. The problem in strict nature reserves is (a disease b, climate change, air pollution **Both B & C.**
115. ----can be used to introduce species that left an area. **Ex-Situ Conversion**
116. Ramsar conversion was negotiated in ----by countries and NGOs **1960**
117. Greater efforts are needed to estimate the full value of **PGRFA**
118. Species that are threatened are sometimes characterized by (a, population dynamics, critical dispersion, c. mathematical measure of biomass **All of these**
119. Gene sanctuaries provide way to preserve (a. wild species, natural ecosystem. Natural habitat **All of these**
120. Key focus for regulating many of bio chemical process **Temperature.**
121. Category VI is not designed to accommodate **Large Scale Industrial Harvest**

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122. It is cheap method for conversion broad range of germ-plasma _____ **Seed Storage**
123. To date one of the most extensive programmers to develop trees with resistance to insect pests in temperature regions is in _____ **British Columbia**
124. WCPA stand for _____ **World Commission on Protected Areas**
125. Which of the following category encourage biodiversity aquatic biodiversity _____ **category-V**
126. Tigers for migration _____ **All of these**
127. -----are link for generation to generation for all living matters _____ **Genes**
128. IABGR stands for Institute of Agriculture Biotechnology and Genetic Resources
129. -----by sexual and asexual reproduction _____ **Vertical Gene Transfer**
130. More genetic variation in populations _____ **Natural Selection**
131. ----- is an example allopatric speciation. _____ **Darwin's Finches**
132. Animal genetic resource Animal genetic resource, Animal genetic resource for food and agriculture, 3. farm animal genetic resource. _____ **All of these**
133. Which of the following category encourage the conservation of aquatic biodiversity _____ **category V?**
134. Chashma and Tuansa barrage declared wild life sanctuaries by _____ **Punjab Government**
135. Land race also called local variety of _____ **Domesticated Plants**
136. -----are varieties developed as since the advent of scientific agriculture in the late nineteenth century _____ **Obsolete Varieties**
137. ----- is easily generated from seed _____ **Acacia Nilotica**
138. Anthropogenic impact is apparent in the _____ **Coastal Zone**
139. Mild breeding is type of _____ **Inbreeding**
140. ---are small sites they focus on more prominent natural features _____ **National Monuments**
142. IBPGR stand for _____ **International Board Of Plant Genetic Resource**
143. In ---- the food and agriculture organization of UN published the first state of FGR _____ **2014**
144. Gene bank is a type of _____ **Ex Situ Conservation**
145. Calyha rubrinerv is belong to family _____ **Euphorbiaceae**
146. Number of laboratories in plant genetic resource in Pakistan _____ **Six**
147. Areas of great genetic diversity are protected from human interface _____ **Gene Sanctuary**
148. Sheep were domesticated by humans around _____ **10.000BC**
149. Plant diversity is urgently and effectively conserved is an objective of _____ **GSPC.**
150. Woody plants like trees have ----genetic diversity than vascular plants like grass _____ **Higher**
151. Conversion of plant genetic resource is necessary for food security, agro bio diversity, commercial use _____ **Both A & B**
152. Candidate genes for drought tolerance include those involved in _____ **All Given.**
153. Some larger soil-dwelling invertebrates, such as earthworms, ants and termites help maintain the chemical fertility needed for _____ **Plant Growth**

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154. have created barriers to the migration of invertebrate species _____ **Human Activities**
155. Forest genetic resources or tree genetic resources are of shrub and tree species of actual or future value _____ **Genetic Material**
156. The adaptive capacity of ecosystem is more likely to depend on _____ **Invertebrate Biodiversity**
157. Forest help in driving _____ **Climate Change**
158. The act of moving plants by human to different habitat to experience different environment conditions is term as _____ **Assisted Migration**
159. Tree mortality in ecosystem increase due to change in _____ **All Given**
160. Most invertebrates are expected to change their geographical distribution _____ **In Response to Climate Change**
161. Diversity of forest genetic resources enables the species to adapt to _____ **All Given**
162. Perhaps the most neglected group of all in research, in farming practices, and in policies and strategies for agriculture and biodiversity are the soil-dwelling _____ **Invertebrates**
163. Some larger soil-dwelling invertebrates, such as earthworms, ants and termites, have been described as "ecosystem _____ **Engineers**
164.is defined as the capacity of a particular genotype to express different phenotypes under different environmental conditions _____ **Phenotypic Plasticity**
165. It has been estimated that at least _____ percent of world food production comes from crops that are dependent on insect pollination _____ **35**
166. Almost 35 % of world food production comes from crops that are dependent on _____ **Insect Pollination**
167. Studies have shown that the presence of invertebrates, such as earthworms can help to _____ the effect of drought on crops production _____ **Alleviate**
168. _____ organisms are described as engineers of ecosystem. _____ **Earthworms**
169. Considering the better studied mammals and birds, 100% of the currently described species have been evaluated for their conservation status and, out of these, _____ out of 9990 bird species are considered to be endangered. _____ **12%**
170. Assisted migration may be undertaken _____ **All Given**
171. Sheep was domesticated by human in _____ **10,000bc**
172. Sarus crane is one of Species at Runn of Kutch Wildlife sanctuary _____ **Threatened**
173. is not generally seen in biodiversity hotspots _____ **Lesser Interspecific Competition**
174. Is an example of an ex-situ conservation _____ **Seed Bank?**
175. The type of coiling in DNA is _____ **Right-Handed**
176. ... is defined as the number of species represented in a specific region landscape or an ecological community _____ **Species richness**
177. Which of the following statement truly describe the biosphere reserve _____ **All Of Given**



178. DNA Banks are used for the storage of those species that cannot be conserved in process of conservation _____ **In Situ**
179. The natural protected area for the conservation of genetic diversity is called _____ **Gene Sanctuaries**
180. Gene sanctuaries are the type of _____ **In Situ Conservation**
181. Suitable light intensity range must of the plant culture is μmol **10 to 1000**
182. If hunting is prohibited, a particular area may be considered a Nature Reserve"
183. Gene bank are also known as _____ **All Given**
184. Ex-sito conservation is also known as _____ **Static Conservation.**
185. Endemic species are _____ **Species Localized in A Specific Region**
186. During tissue culture growth room temperature range from depending on species requirements _____ **22°C to 28°C**
187. Desert wolf is in Cholistan Wildlife Sanctuary _____ **Rare**
188. An International Board for Plant Genetic Resource (IBPGR) was established in _____ **1972**
189. Plant is totipotent because _____ **A Single Cell Could Become A Complete Plant**
190. What is the characteristic of the DNA that is used for the construction of library _____ **Naked DNA**
191. In...., conservation of habitats rich in genetic diversity was recommended in the UN conference _____ **1972**
192. A is a large area of land where wild animals live safely or are hunted in a controlled way for sport _____ **Game Reserve**
193. Germplasm conservation is important to conserve the plant _____ **Wild**
194. Tissue Culture Conservation is an alternative to _____ **Vegetative Propagation**
195. In plant tissue culture what is the term ORGANOGENESIS means _____ **Formation of Root And Shoot From Callus Culture**
196. Gene sanctuaries are the type of _____ **In Situ Conservation**
197. DNA of plant can be preserved by rapid drying of plant samples with the help of material _____ **Silica Gel**
198. What is callus _____ **An Unorganized Actively Dividing the Mass Of Cells Maintained In A Cultrue**

SUBJECTIVES

1. Write The Variations In Gene Variation?

There are three primary sources of genetic variation, which we will learn more about:



- ❖ Mutations are changes in the DNA.
- ❖ Gene flow is any movement of genes from one population to another and is an Important source of genetic variation
- ❖ Sex can introduce new gene combination in population

2. Objectives Of Cartagena Protocol

The Protocol states that it aims to:

- ❖ Contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse Effects on the conservation and sustainable use of biological diversity,
- ❖ It takes into account risks to human health, and specifically focusing on transboundary Movements.
- ❖ It seeks to protect biodiversity from the potential risks of living modified organisms (LMOs) Resulting from modern biotechnology.
- ❖ Transboundary movement, transit, handling and use of all living modified

3. Name Research Botanical Garden In Pakistan ?

Abdul Wali Khan University Botanical Garden, Mardan

- ❖ Botanical Garden, Governor's House, Lahore
- ❖ Botanical Garden, Govt Zamindar College, Gujrat
- ❖ Danishmandan Botanic Garden, Lahore
- ❖ Botanical Garden, University of the Punjab, Quaid-e-Azam Campus, Lahore
- ❖ Faisalabad Botanical Gardens (part of Gatwala Wildlife Park), Faisalabad
- ❖ Forman Christian College Botanic Garden, Lahore
- ❖ Government College University Botanic Garden of GCU, Lahore

4. Name Physical Factors Growth Limit?

- ❖ Low temperature
- ❖ Low light/restricted photoperiod
- ❖ Minimal containment
- ❖ Minimal O₂
- ❖ Osmotic (water) stress

5. Applications Of Storage Technologies For Germplasm Conservation ?

- ❖ The conservation of germplasm involves the preservation of the genetic diversity of a particular plant or genetic Stock. It can be used at any time in future.
- ❖ It is important to conserve the endangered plants or else some of the valuable genetic traits present in the Existing and primitive plants will be lost.



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- ❖ Main crops produce recalcitrant or short-lived seeds.
- ❖ Similarly, in case of clonal crops seeds are not the best material to conserve due to their genetic heterogeneity and unknown worth. Their genes need to be conserved.
- ❖ The roots and tubers loose viability rapidly. Their storage requires large space, low temperature and is Expensive. In addition, materials modified by genetic engineering may some, times be unstable. Such materials Are needed to be conserved intact for future use

6. Name Lab Of Plant Genetic Resources?

Germplasm exploration lab

- ❖ seed preservation lab
- ❖ in vitro conservation lab
- ❖ germplasm evaluation lab
- ❖ plant introduction and seed health lab
- ❖ Data management lab

7. Features Of Species Management Areas

The Contracting Parties (160) commit to:

- ❖ Work towards the wise use of all their wetlands.
- ❖ Designate suitable wetlands for the list of Wetlands of International Importance.
- ❖ Cooperate internationally on trans boundary wetlands, shared wetland systems and Shared species.

8. Define Haploid?

Haploid refers to a cell or organism that has a single set of chromosomes, representing half of the full genetic material. In contrast, diploid cells have two sets of chromosomes.

9. GM Crops?

GM crops, or genetically modified crops, are plants whose genetic material has been altered using genetic engineering techniques. This involves the introduction of specific genes from other organisms, often unrelated species, to confer desired traits to the crop. The goal of genetically modifying crops is to enhance their characteristics, such as resistance to pests, tolerance to herbicides, improved nutritional content, or better adaptation to environmental conditions.

10. Benefits Of Bio-Pesticides?

- ❖ Target Specificity
- ❖ Low Residue Levels



- ❖ Short Residual Effect
- ❖ Minimal Harm to Non-Target Organisms
- ❖ Biodegradability
- ❖ Reduced Risk of Resistance
- ❖ Integrated Pest Management (IPM)
- ❖ Suitable for Organic Farming
- ❖ Public Perception and Acceptance

11. Why Synthetic Seeds Are Beneficial Over Natural Seeds?

Synthetic seeds are beneficial over natural seeds just because of following characteristics;

- ❖ Uniformity
- ❖ Disease-Free
- ❖ Reduced Genetic Variation
- ❖ Accelerated Germination
- ❖ Year-Round Availability
- ❖ Ease of Handling and Transportation
- ❖ Customized Traits
- ❖ Less Susceptibility to Environmental Conditions
- ❖ Reduced Need for Seed Storage Space
- ❖ Precision Agriculture

12. Strategies And Managing And Avoiding Pesticides Seeds?

Implementing effective strategies for managing and minimizing pesticide use in seed treatment is crucial for sustainable agriculture. Integrated Pest Management (IPM) practices, such as crop rotation, using resistant varieties, and adopting biological control methods, can help reduce reliance on chemical pesticides. Additionally, employing precision agriculture technologies to target specific areas with pest issues can minimize overall pesticide application. Regular monitoring and early detection of pest infestations enable timely intervention, reducing the need for extensive pesticide use. Emphasizing education and awareness among farmers about sustainable practices further contributes to the responsible management and avoidance of excessive pesticide application in seed treatment.

13. Mutagenesis?

Mutagenesis is the process by which the genetic information of an organism is altered or mutated. This can occur naturally or be induced by external factors known as mutagens, such as certain chemicals, radiation, or viruses. Mutations can affect a single nucleotide or involve larger segments of DNA, potentially leading to changes in an organism's traits or characteristics. In genetic research, mutagenesis is often intentionally induced to study gene function and the impact of specific genetic changes.



14. Threats Of Gmos On Crop Diversity?

Genetically modified organisms (GMOs) can pose certain threats to crop diversity, primarily due to the following concerns:

- ❖ Risk to Wild Plant Species
- ❖ Dependency on Few Traits:
- ❖ Gene Flow and Crossbreeding
- ❖ Erosion of Farmer Seed Systems
- ❖ Loss of Traditional Crop Varieties

It's important to note that views on the impact of GMOs on crop diversity vary, and ongoing research continues to assess the long-term consequences. Some argue that biotechnology can also contribute to crop diversity by introducing traits such as drought resistance or enhanced nutritional content. The coexistence of GMOs and non-GMOs, along with effective regulatory measures, is essential to address potential threats and preserve crop diversity.

15. Pesticides Effect on Environment

Pesticides, while effective in controlling pests and increasing agricultural productivity, can have significant negative effects on the environment. Some of these impacts include:

- ❖ Water Contamination
- ❖ Residue Accumulation
- ❖ Non-target Species Harm
- ❖ Impact on Soil Health
- ❖ Air Pollution
- ❖ Disruption of Natural Predators
- ❖ Development of Resistant Pests

16. How SOD Work In Defense Mechanism?

Superoxide dismutase (SOD) functions in the following way:

- ❖ **Antioxidant Defense:**
- ❖ **Cellular Protection:**
- ❖ **ROS Neutralization**

In the context of defense mechanisms, the role of SOD is crucial for cellular health and resilience against oxidative stress, which can be induced by factors such as environmental pollutants, radiation, and normal metabolic processes. It's a part of the body's intricate defense system that works to maintain cellular integrity and function.

17. Composituon Of Culture Medium?



Use culture growth rooms with temperature control, lighting and shelving.

- ❖ Aim for a room where the humidity is 40–50%. High humidity increases fungal growth, while Low humidity dries cultures and creates dust problems.
- ❖ Use an isolated growth room for in vitro explants of materials taken directly from the field to Allow time to detect insect infestations and prevent their spread to other cultures.
- ❖ Ensure a light intensity in the range from 10 to 1000 $\mu\text{mol S-1 m-2}$. Most plant cultures require 50–200 $\mu\text{mol S-1 m-2}$.
- ❖ Use ventilation systems or air-conditioning units to regulate temperature. Air should not flow Directly onto the cultures. Common growth room temperatures range from 22°C to 28°C, Depending on species requirements.
- ❖ Back-up generators are advisable for areas with frequent power cuts to control temperature And light.

18. National Park Purpose?

National parks serve several important purposes, contributing to the conservation of natural and cultural resources, scientific research, education, and recreation. Key purposes include:

- ❖ Conservation
- ❖ Preservation of Scenic and Cultural Values
- ❖ Scientific Research
- ❖ Education and Interpretation
- ❖ Recreation and Enjoyment
- ❖ Preservation of Wilderness
- ❖ Mitigation of Environmental Threats

19. DNA BANK Disadvantages?

There are problems with subsequent gene isolation, cloning and transfer of DNA back to a plant and it Currently does not allow the regeneration of the same genotype as the original sample.

20. Primary Goal of Category VI

Definition:

IUCN Management Category IV (Habitat/Species Management Area) refers to areas that Are managed to protect particular species or habitats. They are defined by IUCN as “protected areas Aiming to protect particular species or habitats and management reflect this priority.

Primary objective:

To maintain, conserve and restore species and habitats.

Other objectives



- ❖ To protect vegetation patterns.
- ❖ To protect fragments of habitats as components of landscape or seascape-scale Conservation strategies.
- ❖ To develop public education and appreciation of the species or habitat
- ❖ Developed by the International Union for Conservation of Nature (IUCN) with support of the World Commission on Protected Areas (WCPA) and other international institutions such as The Convention on Biological Diversity (CBD), and assigned by national governments.

21. Game Reserve?

A game reserve is an area wherein controlled hunting and shooting is permitted on Permit basis”

- ❖ A game reserve (wildlife preserve) is a large area of land where wild animals live safely or are Hunted in a controlled way for sport.
- ❖ In the game reserves the major focus is specifically the animals.
- ❖ If hunting is prohibited, a game reserve may be considered a” Nature Reserve”
- ❖ Wherein all aspects of naturally-occurring life in the area are considered.
- ❖ Most of the areas in game reserves have created to provide habitat protection for animal Species commonly referred to as game (huntable species for sport or meat)

22. Botancial Garden?

It Is a garden dedicated to the collection, cultivation and display of a wide range of plants labeled with Their botanical names. It may contain specialist plant collections such as tropical plants, or other species Of plants.

23. Quarantine Successful Principal?

Isolation and quarantine help protect the public by preventing exposure to people who Have or may have a contagious disease. Quarantine separates and restricts the movement Of people who were exposed to a contagious disease to see if they become sick Modern quarantine does not have to be absolute to be effective

- ❖ Even partial or “leaky” quarantine can reduce disease spread
- ❖ Partial quarantine can be an effective supplement to vaccination

24. 23.Nogoya Protocol?

The Nagoya Protocol focuses on the equitable sharing of genetic material (plant, animal, microbial, Other) including the traditional knowledge associated with the genetic resources, and the benefits That arise from their use. Components.

25. 24.Human Activities and Weather Effect On Invertebrates Species?



Human activities

The current world is very different from that of the early Quaternary Period. Human activities have created Barriers to the migration of invertebrate species. These barriers are likely to affect species in natural Ecosystems rather more severely than those associated with agro-ecosystems. The movement of the latter Is likely to be facilitated rather than hindered by human-induced landscape changes. In situ adaptation of Invertebrate species is expected to be most marked where movement is not an option (e.g. on low, Isolated islands)

Weather effect

Because of the many ecosystem services that they provide, invertebrates have a key role to play in Adapting agriculture to the effects of climate change. The extent to which the individual services provided by invertebrates will be enhanced or impeded by climate change is difficult to predict. However, if Invertebrate biodiversity is lost, the capacity of ecosystems to adapt is likely to diminish. Healthy soils – and healthy, diverse soil invertebrate communities – will be vital to climate Change adaptation. For example, earthworms help to maintain soil structure and the availability of Water throughout the soil profile. Studies have shown that the presence of these animals can help To alleviate the effects of drought on crop Production. Studies have also revealed the remarkable Ability of diverse soil invertebrate communities to restore the structure of degraded soil. He Potential for managing soil invertebrates to enhance their beneficial roles has been little explored. Few if any deliberate attempts have been made to introduce soil invertebrates into new countries Or ecosystems. Given the potential for such species to become invasive, it is inadvisable to attempt Any such introductions until soil ecology is much better understood than it is today. However, every Effort should be made to avoid agricultural practices that disrupt resident soil invertebrate Communities and the services they provide. It is likely that some pests, as they move into new areas in response to climate change, will at least Temporarily escape from their natural enemies. This is likely to increase demand for classical biological control agents, especially in places where the newly established pest population is Separated from its original home by a physical barrier such as the sea or a mountain range. For This reason, access to new classical biological control agents is likely to be particularly important For island countries

26. Threats To Angr

- ❖ Despite the importance of animal genetic resources and their diversity, their diversity has been Continually decreasing over time.
- ❖ One of the greatest threats to livestock diversity is pressure from large-scale commercial Production systems to maintain only high-output breeds.
- ❖ Changes in climate will have an impact on livestock and food production in many ways.
- ❖ Some major disease threats that livestock currently face include, rinderpest, foot and mouth Disease, and Peste des petits ruminants (PPR), also known as sheep and goat plague.

27. Pakistan Terrestrial & Maritime Zone Act 1976?



It includes provisions for preservation, development and protection of marine Environment

- ❖ This law controls marine pollution and exploration, development, conservation and Management of living resources in Pakistan's Exclusive Economic Zone (EEZ)
- ❖ This law means that a ship carrying nuclear and hazardous substances will have to Inform the Government of Pakistan.

28. Cryopreservation In Animal Genetic Resources?

Conservation of animal genetic resources is a strategy wherein samples of animal genetic Materials are preserved cryogenically.

- ❖ Animal genetic resources, as defined by the Food and Agriculture Organization of the United Nations, are "those animal species that are used, or may be used, for the production of food and Agriculture, and the populations within each of them
- ❖ Genetic materials that are typically cryogenically preserved include Sperm, oocytes, embryos and somatic cells.
- ❖ Cryogenic facilities are called gene banks and can vary greatly in size usually according to the Economic resources available.
- ❖ They must be able to facilitate germplasm collection, processing, freezing, and long-term storage, All in a hygienic and organized manner.
- ❖ Cryo-conservation is the process of freezing cells and tissues using liquid nitrogen to achieve Extreme low temperatures with the intent of using the preserved sample to prevent the loss of Genetic diversity.
- ❖ Semen, embryos, oocytes, somatic cells, nuclear DNA, and other types of biomaterial such as Blood and serum can be stored using cryopreservation, in order to preserve genetic materials.

29. Limitation Of Germplasm

- ❖ Viability of seeds is reduced or lost with passage of time.
- ❖ ii. Seeds are susceptible to insect or pathogen attack, often leading to their destruction.
- ❖ iii. This approach is exclusively confined to seed propagating plants, and therefore it is of no use for vegetative propagated plants e.g. potato, Ipomoea, Dioscorea.
- ❖ iv. It is difficult to maintain clones through seed conservation.
- ❖ Certain seeds are heterogeneous and therefore, are not suitable for true genotype maintenances

30. Food Security

Food security refers to the condition in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. It involves not only the availability of food but also factors like accessibility, utilization, and stability in access over time.

31. What Is The Conservation Status Of Hingol National Park?



Hingol National Park spread over an area of about 1,650 square km along the Makran Coast, Balochistan

- ❖ It is the largest of National Parks of Pakistan
- ❖ The area was for the first time declared reserved in 1988.
- ❖ Hingol is known to support threatened invertebrates in addition to a variety of bird species
- ❖ The park is an excellent habitat to wild animals including over 3000 ibexes, and 1500 Urials And more than 1200 Chinkara
- ❖ A number of resident and migratory birds are supported by this park.

32. Steps Of Allopatric Speciation

- ❖ A geographic change separates members of a population into more than one group.
- ❖ Different gene mutations occur and build up in the different populations over time.
- ❖ The populations become so different that members of the different populations can no longer Breed with each other anymore if were they to be in the same habitat in the same time. If this is the case, allopatric speciation has occurred.

Example:

Darwin finches (adaptive radiation).

33. Working Storage In DNA Bank?

Once extracted DNA is a stable biomolecule, although it can easily be degraded during extraction and Storage. Quality declines within days in hydrated samples held at room temperature or in refrigerators. Drying the sample or storing it in freezers or liquid nitrogen achieves better preservation of DNA Molecular size. For this reason, DNA is better conserved in a form that is close to the original state and Most DNA banks store cells or tissues and extract DNA upon request.

There is little information on the long-term stability of extracted DNA during frozen storage, but most Repositories consider several years to decades as realistic. Information on the stability of purified DNA Dissolved in buffer suggests that the overall fragment size decreases with storage time, and that the Usefulness of the specimen for PCR-based assays may be 1–2 years when stored at 4 °C, 4–7 years When stored at -18 C° and greater than 4 years when stored at -80 C° (Madisen et al. 1987; Visvikis et Al. 1998). The choice of temperature usually depends on the moisture level within the sample.

34. Protocol Of Landscape And Seascapes

- ❖ Protect critically endangered populations of species.
- ❖ Protect rare or threatened habitats.
- ❖ Provide flexible management strategies and options in buffer zones around, or connectivity Conservation corridors between, more strictly protected areas that are more acceptable to Local communities and other stakeholders;



- ❖ Maintain species that have become dependent on cultural landscapes where their original Habitats have disappeared or been altered.

35. Fgr (Forest Genetic Resources)

Forest genetic resources are essential for forest-depending communities who rely for a substantial part Of their livelihoods on timber and non-timber forest products (for example fruits, gums and resins) for Food security, domestic use and income generation.

- ❖ These resources are also the basis for large-scale wood production in planted forests to satisfy The worldwide need for timber and paper.

Genetic refers to variation of genetic DNA origin, and variation of genes at different levels:

- ❖ Variation between species,
- ❖ Variation between populations within species
- ❖ Variation between individual trees within populations. The largest variation is between species, And loss of whole species is therefore also the most dramatic loss of future options.

Resources refers to the use of genetic variation—in the broad sense stated above—considered To be of potential value for humans at present or in the future.

36. Category V

Definition:

A protected area where the interaction of people and nature over time has produced an Area of distinct character with significant ecological, biological, cultural and scenic value.

Primary objective:

To protect and sustain important landscapes/seascapes and the associated nature Conservation.

Other objectives

- ❖ To maintain a balanced interaction of nature and culture.
- ❖ To contribute to broad-scale conservation by maintaining species associated with cultural Landscapes and/or by providing conservation opportunities in heavily used landscapes;
- ❖ To provide opportunities for enjoyment, well-being and socio-economic activity through Recreation and tourism;
- ❖ To provide natural products and environmental services;
- ❖ To provide a framework to underpin active involvement by the community in the management Of valued landscapes or seascapes and the natural and cultural heritage that they contain;
- ❖ To encourage the conservation of agrobiodiversity and aquatic biodiversity;
- ❖ To act as models of sustainability so that lessons can be learnt for wider application.

37. Three Pillars Of Ramsar



The Contracting Parties (160) commit to:

- ❖ Work towards the wise use of all their wetlands.
- ❖ Designate suitable wetlands for the list of Wetlands of International Importance.
- ❖ Cooperate internationally on transboundary wetlands, shared wetland systems and shared Species.

38. Bacteria Transfer Through Horizaently?Describe Methods?

Horizontal gene transfer is basically the transfer of genes between organisms via Methods other than asexual or sexual reproduction.

- ❖ Genes and the characteristics code for are passed down from parent to progeny.
- ❖ There are three ways for bacteria to transfer their DNA horizontally

Conjugation

The transfer of DNA directly from one cell to another through cell-cell contact often Involving plasmids

Transformation

Bacteria are capable of taking up DNA directly from their environment and Incorporating it into their genomes known as natural transformation

Transduction

Transduction is the transfer of DNA from one cell to another by a virus

39. Important Reservoir To Control Biological Agents

The term “reservoir” in the context of controlling biological agents typically refers to a host organism or environment where a pathogen or harmful organism resides and can proliferate. Identifying and managing these reservoirs is crucial for effective control. Some key examples include:

Targeted Control:

Identify specific reservoirs for precision in managing biological agents.

Proactive Measures:

Implement interventions early to disrupt the life cycle of pests or pathogens.

Sustainability:

Adopt environmentally friendly practices, minimizing reliance on chemicals.

Economic Impact:



Enhance agricultural productivity, reducing losses for economic benefit.

Biodiversity Preservation:

Maintain a balanced ecosystem by controlling reservoirs.

40. What is Legislation?

The process of making or enacting laws.

OR

The preparing and enacting of laws by local state or national legislatures.

In other words, it is sometimes used to apply to municipal ordinances and to the rules and regulations of administrative agencies passed in the exercise of delegated legislative functions.
(INTERNET)

41. Which Type of Material DNA Bank Are Useful?

Most DNA provided by DNA banks is used for studies to attempt to develop more productive or more environmentally friendly agricultural species. Some DNA banks also store the DNA of rare or endangered species to ensure their survival. The DNA bank can be used to compare and analyze DNA samples.

42. Mission of Ramsar Conservation?

Mission

The Convention's mission is "The conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world"

43. Name Lab of Plant Genetic Resources?

Plant Genetic Resources Institute hosts the sole National Gene bank of Pakistan for conservation of plant genetic resources and six labs including

- ❖ germplasm exploration lab
- ❖ seed preservation lab
- ❖ in vitro conservation lab
- ❖ germplasm evaluation lab
- ❖ plant introduction and seed health lab
- ❖ Data management lab



44. Why Do Forest Genetics Resources Matter?

Diversity of forest genetic resources enables the potential for a species (or a population) to adapt to climatic changes and related future challenges such as temperature changes, drought, pests, diseases and forest fires.

45. Cartagena Protocol?

Cartagena protocol was adopted on June 2001 in Cartagena, Spain. It entered into force on September 11th; 2003. Pakistan signed the Cartagena protocol in June 2001. Pakistan has ratified it in May 2009.

Objectives of Cartagena Protocol on Biosafety

- ❖ Contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity
- ❖ It takes into account risks to human health, and specifically focusing on transboundary movements.
- ❖ It seeks to protect biodiversity from the potential risks of living modified organisms (LMOs) resulting from modern biotechnology

46. Conservation Role of Botanical Garden?

The first role of botanical gardens in plant conservation is the horticulture and cultivation functions towards the plants. With the better growth of plant, our environment also can become better because plants help to absorb the carbon dioxide when undergo photosynthesis process.

47. Explain Method Processing of Sampling in DNA Bank? Method Processing Sample in DNA Bank?

Processing of samples: DNA preserved in DNA banks will be stored either within cells and extracted upon retrieval from storage or extracted from cells and purified before storage. The quality of the DNA is expressed through yield, purity, molecular weight, amplification efficiency and authenticity of sequences. The quality of DNA extracted from plant specimens is dependent on the condition of the specimen before storage, the storage environment and the duration of storage. Rapid drying of plant samples with silica gel or lyophilization helps to preserve the DNA.

48. Social Cluster Value of National Monument?

Category III areas are likely to hold socio-cultural values as they may have features such as sacred groves, springs, waterfalls, mountains, sea coves etc. of importance to one or more faith groups. These areas are often of significant tourism value and can be managed with the objective of promoting sustainable tourism.



49. What Is Botanical Garden?

It is a garden dedicated to the collection, cultivation and display of a wide range of plants labeled with their botanical names. It may contain specialist plant collections such as tropical plants, or other species of plants.

50. Application Storage Technique Germplasm?

Germplasm is living genetic resources such as seeds or tissues that are maintained for the purpose of animal and plant breeding, preservation, and other research uses. Germplasm collections can range from collections of wild species to elite, domesticated breeding lines that have undergone extensive human selection.

51. Issue Should Not Strict Nature Reserve?

Category 1A:

Strict Nature Reserve

Issues for Consideration

- ❖ There are few areas not under some kind of legal or at least traditional ownership, so that finding places that exclude human activity is often problematic.
- ❖ Most apparent problem is with climate and air pollution
- ❖ New and emerging diseases.
- ❖ In an increasingly modified ecology, it may become increasingly difficult to maintain pristine areas through non-intervention.

52. When Nagoya Protocol Adapt?

The protocol was adopted on 29 October 2010 in Nagoya, Japan, and entered into force on 12 October 2014. It has been ratified by 97 parties, which includes 96 UN member states and the European Union. It is the second protocol to the CBD; the first is the 2000 Cartagena Protocol on Biosafety

53. Game Reserve?

“A game reserve is an area wherein controlled hunting and shooting is permitted on permit basis”

- ❖ A game reserve (wildlife preserve) is a large area of land where wild animals live safely or are hunted in a controlled way for sport.
- ❖ In the game reserves the major focus is specifically the animals.



54. Name of Second Largest National Park?

Kirthar National Park is the second largest national park of Pakistan spread over an area of **3000 square kilometers**.

55. Define Strict Nature Reserve.?

Protected areas that are strictly set aside to protect biodiversity where human visitation, use and impacts are strictly controlled to ensure protection of the conservation values.

56. Define Phenotypic Plasticity.?

Phenotypic plasticity is defined as the capacity of a particular genotype to express different phenotypes under different environmental conditions.

57. Assisted Migration?

Assisted migration involves human movement of tree seed and seedlings from current locations to sites modelled to experience analogous environmental conditions in the future. Assisted migration may be undertaken over long distances, or just beyond the current range limit of particular genotypes and populations, or within the existing range.

58. Central Goal of Zoo?

- ❖ Unfortunately, not all zoos are scientific in nature, and extreme controversy has arisen regarding how the animals are treated
- ❖ Suffice to say, regulation is necessary to ensure proper care.
- ❖ Conservation (not exploitation) should always be the central goal behind any legitimate zoo.
- ❖ Zoos provide the opportunity for people to see a glimpse of this side of nature.
- ❖ Zoo plays important role in conservation of many threatened/endangered species.

59. Role of Earthworm in Soil?

- ❖ Earthworms help to maintain soil structure and the availability of water throughout the soil profile.
- ❖ Studies have shown that the presence of these animals can help to alleviate the effects of drought on crop Production.
- ❖ Studies have also revealed the remarkable ability of diverse soil invertebrate communities to restore the structure of degraded soil
- ❖ The potential for managing soil invertebrates to enhance their beneficial roles has been little explored.



60. Types of Gene Bank?

Under suitable conditions genetic resources are conserved for a long term as gene bank. Such gene bank is of two types:

- ❖ In vivo Gene Bank
- ❖ In vitro Gene Bank

61. Disadvantages of DNA Bank?

There are problems with subsequent gene isolation, cloning and transfer of DNA back to a plant and it currently does not allow the regeneration of the same genotype as the original sample.

62. Clonal Repository?

Clonal repository is field Gene bank where genetic resources of clonally propagated crops like fruits are preserved as living plants. Various institutions are involved in the capacity building to develop AnGR, in the country.

63. Two Types of Cryoprotectants?

- ❖ Membrane permitting which can freely diffuse the membrane such as glycerol (G), ethylene glycol (EG) and Dimethyl Sulfoxide (DMSO)
- ❖ Glycerol is used primarily for cryoprotection of red blood cells, and DMSO is used for protection of most other cells and tissues
- ❖ Non-Membrane permitting which cannot permeate the cell membrane such as sugars

64. Role of National Park in Landscape and Seascapes?

- ❖ Protecting some of the earth's richness that will not survive outside.
- ❖ Protecting additional ecosystem services.
- ❖ Providing areas where ecosystems can be studied in as pristine an environment as possible.
- ❖ Protecting natural sites that are also of religious and cultural significance.

65. Criteria of National Park?

Distinguishing Features

- ❖ The area should contain representative examples of major natural regions, and biological and environmental features or scenery.
- ❖ It should be of sufficient size to maintain ecological processes.
- ❖ The composition, structure and function of biodiversity should be to a great degree in a "natural" state.



66. Sites Of Panjab Ramsar ?

- ❖ Uchhali Complex
- ❖ Taunsa Barrage
- ❖ Chashma Barrage

67. State of Worlds Forest Genetic Resources?

In 2014, the Food and Agriculture Organization of the United Nations published the first State of the World's Forest Genetic Resources. The publication addressed the conservation, management and sustainable use of forest tree.

68. Biodiversity of Habitat Species Management Area.?

Definition:

IUCN Management Category IV (Habitat/Species Management Area) refers to areas that are managed to protect particular species or habitats. They are defined by IUCN as “protected areas aiming to protect particular species or habitats and management reflect this priority.

69. Objective of Category?

Primary Objective

- ❖ To protect natural ecosystems.
- ❖ Use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.

70. Name the Physical Growth Limitations In Median Term Storage?

Physical growth limitation

- ❖ Low temperature
- ❖ Low light/restricted photo period
- ❖ Minimal containment
- ❖ Minimal O₂
- ❖ Osmotic (water) stress

71. Different Variation of Gene Variation?

Genetic refers to variation of genetic DNA origin, and variation of genes at different levels:

- ❖ Variation between species,
- ❖ Variation between populations within species



- ❖ Variation between individual trees within populations.
- ❖ The largest variations between species, and loss of whole species is therefore also the most dramatic loss of future options.
- ❖ Resources refers to the use of genetic variation—in the broad sense stated above—considered to be of potential value for humans at present or in the future.

72. Three Pillars Of Ramsar Site?

The Contracting Parties (160) commit to:

- ❖ Work towards the wise use of all their wetlands.
- ❖ Designate suitable wetlands for the list of Wetlands of International Importance.
- ❖ Cooperate internationally on trans boundary wetlands, shared wetland systems and shared species.

73. Founder Effect 3 Examples?

In population genetics, the founder effect is the loss of genetic variation that occurs when a new population is established by a very small number of individuals from a larger population

The Amish People

Around 200 German immigrants settled in Pennsylvania within community marriages. Developed syndrome named Ellis-van Creveld syndrome.

Sickle Cell Disease

For most of humanity's existence, sickle cell disease usually meant an early death, most likely as a young child. (It still does in underdeveloped nations.) In fact, the average life span for a sufferer in the US in 1973 was only 14 years. Now it's 40–60 years in the US. The cause of this disorder: genetic changes meant to protect against malaria. As a result, those who suffer from sickle cell disease overwhelmingly come from tropical areas or places where malaria is common.

Huntington's Disease

Huntington's disease (aka Huntington's chorea) is a genetic disorder which results in slowly progressing brain cell death. There are two distinct populations in which the disorder occurs much more often.

- ❖ The first group is the Afrikaner population of South Africa.
- ❖ The second group is the residents of the Lake Maracaibo region of Venezuela.

74. Three Botanical Gardens?

- ❖ Cacti and succulent plants.
- ❖ Herb gardens



- ❖ Greenhouses, shade houses.
- ❖ Tropical plants.
- ❖ Medicinal Plants.
- ❖ Aromatic or textile plants
- ❖ Other exotic plants.

75. Features of Habitat Species Management Area?

- ❖ Protection of particular species
- ❖ Protection of habitats
- ❖ Active management to maintain target species
- ❖ Active management of culturally-defined ecosystems

76. Link Between Climate Change and Botanical Garden?

Plants can alter the temperature of the Earth's atmosphere. Through the process of photosynthesis, plants use energy from the sun to draw down carbon dioxide from the atmosphere and then use it to create the carbohydrates they need to grow. Since carbon dioxide is one of the most abundant greenhouse gases, the removal of the gas from the atmosphere may temper the warming of our planet as a whole.

- ❖ Transpiration in plants can increase water vapor in the atmosphere, causing more precipitation and cloud cover in an area.
- ❖ The additional cloud cover often reinforces the cooling by blocking sunlight.
- ❖ Contribute to soil fertility and prevent soil erosion.

77. Ramsar Sites of Punjab?

There are three Ramsar sites (wetlands of International importance) in the state- Harike, Kanjli and Ropar. These wetlands are important habitats for waterfowl, fish and diversity of other flora and fauna including endangered and vulnerable species. Two other wetlands- Ranjit Sagar and Nangal are National wetlands.

78. Category Three Define?

Category III: National Monument-Feature

Definition:

Protected areas set aside to protect a specific natural monument. They are generally quite small protected areas and often have high visitor value. Primary objective to protect specific outstanding natural features. Their associated biodiversity and habitats.

79. Threat of FGR?



Forest genetic resources (FGR) are the heritable materials maintained within and among tree and other woody plant species that are of actual or potential economic, environmental, scientific or societal value.

80. Habitat of Species That Affect Climate Change?

Global warming resulting from human emissions of greenhouse gases. The consequences include habitat loss; shifts in climatic conditions and in habitats that surpass migrational capabilities; altered competitive relationships.

81. How Plant Cope Changes Climate?

Maintaining insect species that can provide pollination services for a wide range of crops is also vital to the future of agriculture in the face of climate change. Pollinator populations not only need to be able to cope with changing climatic conditions, they must also be able to provide the pollination services needed to meet increasing demands for food and retain the capacity to adapt to potential changes in the types of crops grown.

82. Treaty?

“Treaty, a binding formal agreement, contract, or other written instrument that establishes obligations between two or more subjects of international law”. Treaties do not need to follow any special form. A treaty often takes the form of a contract, but it may be a joint declaration or an exchange of notes.

83. Strict Nature Reserve?

Category IA:

Strict Nature Reserve Primary Objective To conserve Regionally, Nationally, globally outstanding ecosystems, Species (occurrences or aggregations studies, to minimize disturbance through careful planning, to conserve cultural and spiritual values associated with nature.

Distinguishing features the area should generally:

- ❖ Have a largely complete set of expected native species.
- ❖ Be capable of being managed to ensure minimal disturbance.
- ❖ Be free of significant direct intervention by modern humans.
- ❖ Have a full set of expected native ecosystems, largely intact with intact ecological processes, or processes capable of being restored with minimal management intervention.

84. Limitation of Germplasm Conservation?



The germplasm conservation through the conventional methods has several limitations such as short-lived seeds, seed dormancy, seed-borne diseases, and high inputs of cost and labor. The techniques of cryopreservation (freezing cells and tissues at -1960c) and using cold storages help us to overcome these problems.

85. The Services Provided By PEPA?

Pakistan Environmental Protection Act, 1997

- ❖ Protection
- ❖ Conservation,
- ❖ Rehabilitation and
- ❖ Improvement of the environment;
- ❖ PEPA provide framework for prevention and control of pollution Helps in protection of sustainable development.

86. Impact of Climate Changes On FGR? And Climate Effect Organisms Which Are Changes Associate with Tree?

Climate change may also result in high variability in temperature and precipitation, with an increase in incidence of extreme events, such as flooding, late frosts and intensive summer droughts, amongst other events. In some areas, such as the Mediterranean and the Neo-tropics, an increase in seasonality is also expected. Under such conditions, natural selection may not result in efficient adaptation because selection pressures are multi-directional, involving traits that may be inversely correlated at the gene level. The standing genetic variation in populations may then not be large enough to create the rare new genotypic combinations that are required.

Ecosystems affected by abrupt change may sustain rapid and widespread transformation as ecological tipping points are exceeded. Given the pivotal role of trees in ecosystem function, abrupt climate change impacts on them may thus have profound consequences for forests as a whole. Irreversible loss of ecosystem integrity and function may follow, with replacement by new nonendemic ecosystems.

Effects of changing climate on organisms associated with trees in particular, changes in the biology of insect pests and diseases may make ecosystems more susceptible to tree mortality. Because of improved environmental conditions for the pest and reduced tree resistance due to increased stress, pests may react to climate change with range expansions and/or increases in attack severity.

87. Briefly Explain State of World's Forest Genetic Resources.?

In 2014, the Food and Agriculture Organization of the United Nations published the first State of the World's Forest Genetic Resources. The publication addressed the conservation, management and sustainable use of forest tree and other woody plant genetic resources of actual and potential value for human well-being in the broad range of management systems.



88. What Are Three Pillars of Ramsar Convention?

Ramsar is one of the global inter-governmental environmental agreements. The treaty was negotiated in 1960s by countries and NGOs. To avoid the increasing loss and degradation of wetland habitat for migratory water birds. In 18 nations meeting it was adopted in the Iranian city of Ramsar on 2nd February 1971. Came into force in 21st December 1975

The “three pillars” of the convention.

The Contracting Parties (160) commit to:

- ❖ Work towards the wise use of all their wetlands.
- ❖ Designate suitable wetlands for the list of Wetlands of International Importance.
- ❖ Cooperate internationally on trans boundary wetlands, shared wetland systems and shared species.

89. What Is the Extreme Weather Effect on Invertebrate's Genetic Resources?

Because of the many ecosystem services that they provide, invertebrates have a key role to play in adapting agriculture to the effects of climate change. The extent to which the individual services provided by invertebrates will be enhanced or impeded by climate change is difficult to predict. However, if invertebrate biodiversity is lost, the capacity of ecosystems to adapt is likely to diminish.

Healthy soils – and healthy, diverse soil invertebrate communities – will be vital to climate change adaptation. For example, Earthworms help to maintain soil structure and the availability of water throughout the soil profile. Studies have shown that the presence of these animals can help to alleviate the effects of drought on crop production. Studies have also revealed the remarkable ability of diverse soil invertebrate communities to restore the structure of degraded soil. The potential for managing soil invertebrates to enhance their beneficial roles has been little explored. Few if any deliberate attempts have been made to introduce soil invertebrates into new countries or ecosystems. Given the potential for such species to become invasive, it is inadvisable to attempt any such introductions until soil ecology is much better understood than it is today. However, every effort should be made to avoid agricultural practices that disrupt resident soil invertebrate communities and the services they provide.

It is likely that some pests, as they move into new areas in response to climate change, will at least temporarily escape from their natural enemies. This is likely to increase demand for classical biological control agents, especially in places where the newly established pest population is separated from its original home by a physical barrier such as the sea or a mountain range. For this reason, access to new classical biological control agents is likely to be particularly important for island countries

90. Discuss the Impact of Climate Change On FGR. Also Discuss How This Changing Climate Effect Organism Which Is Associated with Trees?



Forest genetic resources are essential for forest-depending communities who rely for a substantial part of their livelihoods on timber and non-timber forest products (for example fruits, gums and resins) for food security, domestic use and income generation.

Forest Genetic Resources and Climate Change

Diversity of forest genetic resources enables the potential for a species (or a population) to adapt to climatic changes and related future challenges such as temperature changes, drought, pests, diseases and forest fires. Though forest trees are known for showing great plasticity in their response to climate changes, not all species are naturally capable to adapt at the pace necessary.

Climate change may also result in high variability in temperature and precipitation, with an increase in incidence of extreme events, such as flooding, late frosts and intensive summer droughts, amongst other events. In some areas, such as the Mediterranean and the Neo-tropics, an increase in seasonality is also expected. Under such conditions, natural selection may not result in efficient adaptation because selection pressures are multi-directional, involving traits that may be inversely correlated at the gene level. The standing genetic variation in populations may then not be large enough to create the rare new genotypic combinations that are required. Ecosystems affected by abrupt change may sustain rapid and widespread transformation as ecological tipping points are exceeded. Given the pivotal role of trees in ecosystem function, abrupt climate change impacts on them may thus have profound consequences for forests as a whole. Irreversible loss of ecosystem integrity and function may follow, with replacement by new non endemic ecosystems.

Direct Impacts of Climate Change

These include high tree mortality through extreme climatic events, particularly drought in combination with widespread regeneration failure, for example, examined the evidence for anthropogenic climate change leading to future large-scale “dieback” in Amazonian rain forest. Analysis suggested that dry season water stress is likely to increase in eastern Amazonia over the 21st century, with the region tending toward a climate more appropriate to seasonal forests.

Effects of Changing Climate on Organisms Associated with Trees

In particular, changes in the biology of insect pests and diseases may make ecosystems more susceptible to tree mortality. Because of improved environmental conditions for the pest and reduced tree resistance due to increased stress, pests may react to climate change with range expansions and/or increases in attack severity.

Changes in Abiotic Disturbance Regimes:

These include changes in fire regimes, flooding, landslides and/or hurricanes. Fire and climate are closely linked and are also associated with changes in land use. Coupled climate and fire-risk models suggest not only an increase in the frequency of fires but also in fire size and length of the fire-risk season, with some areas subject to risk that were not before. Malhi et al. (2009) considered how tipping points may be reached in Amazonian rainforest by a combination of increased dryness and an increased incidence of fire events

Invasion by organisms foreign to local ecosystems



This includes the increased risk of establishment by invasive species which accidentally arrive into ports of entry, through globalized commerce. By making new niches available, climate change will facilitate the survival of mammals, insects, diseases and/or weeds foreign to endemic ecosystems.

91. Describe Purpose Of Panel Code?

The polluter of the environment can be punished under this code for certain types of pollution. These punishments are of following types;

- ❖ Punishment for water pollution
- ❖ Punishment for atmospheric pollution
- ❖ Punishments for general pollution

92. Write the Variations In Variation Gene?

There are three primary sources of genetic variation, which we will learn more about:

- ❖ Mutations are changes in the DNA.
- ❖ Gene flow is any movement of genes from one population to another and is an important source of genetic variation
- ❖ Sex can introduce new gene combinations into a population.

93. Give Different Variant of Gene Variant?

The phenomenon of change in the frequency of alleles (variants of a gene) in a population of organisms due to chance or random

94. Who Is Responsible for A Botanical Gardens?

Botanical gardens are often run by universities or other scientific research organizations, and often have associated herbaria and research programmers in plant taxonomy or some other aspect of botanical science.

95. Define Seed Storage?

Storage of seed is indispensable to most of plantation forestry, and the practice should not be dismissed too readily as a basic tool in maintaining genetic diversity.

Conventional seed storage offers several advantages:

- ❖ Seeds of many valuable species can survive long-term storage ('longterm' is defined as spanning a period of time longer than one rotation)



- ❖ Good storage facilities are now available in most of the world, and they are used extensively for tree seed storage for various regeneration purposes.
- ❖ Seed storage is a relatively cheap method for conserving a broad range of germplasm
- ❖ Large land areas are not tied up in conservation
- ❖ International exchange of genetic material is facilitated by seed storage.

96. What Is Cold Storage. Discuss?

Cold Storage - it involves storage in low and nonfreezing temperature.

Slow Freezing- Slow thawing

With this method organs are labeled into vials after equilibration with a Cryoprotectant solution and then cooled at rate of 0.5-2 C per minute down to -1 C. Seeding is then induced and a holding period of 5 to 15 minutes allows equilibration of the temperature. Thereafter embryos are cooled to -60 C or lower at a rate of 0.3 to 0.5 C per minute before being transfer to liquid nitrogen. Frozen embryos must be slowly thawed at a rate of less than 25 C per minute to prevent osmotic shock

Rapid cooling and rapid thawing

In this technique, however cooling is terminated at -30 to -40 C and embryos are then plunged into liquid nitrogen for rapid cooling to -196 C. Thawing is therefore performed rapidly (200 to 500 C per minute) to prevent recrystallization

Vitrification

Vitrification is the process of cooling where the water in the tissue becomes glass rather than crystals. Glass is a liquid that is too cold (too viscous) to flow. In other words, vitrification is solidification due to increased viscosity rather than crystallization.

Ultrarapid Freezing

In this technique serial equilibration of embryos in high concentration of DMSO (3-5 M) supplemented with sucrose (0.3 to 0.5 M). The embryos are then plunged into liquid Nitrogen. Thawing is then done with warm water bath (approximately 500 C per minute)

97. Name Physical Method for Storage?

There are various methods of storage:

- ❖ Cryopreservation - generally involves storage in liquid nitrogen.
- ❖ Cold storage - it involves storage in low and non-freezing temperature.
- ❖ Low pressure – it involves partially reducing the atmospheric pressure of surrounding.
- ❖ Low oxygen storage - it involves reducing the oxygen level but maintaining the pressure.

98. Write Two Derived Resources?



2 Derived Genetic Resources

- ❖ Obsolete varieties
- ❖ Breeding lines with particular genes and performances
- ❖ Advanced cultivar
- ❖ Parents of hybrid varieties
- ❖ Cytogenetic stocks/ tester
- ❖ Mutants

99. What Are the Needs Of Genetic Preservation?

A genetic preservation is the first step in the cloning process, allowing you to produce an identical genetic twin or clone, which will be born at a later place in time.

A genetic preservation serves as an insurance policy for breeders and owners of valuable cattle by enabling them to extend and develop a specific bloodline when additional production is needed or untimely losses or reproductive inabilities occur.

The DNA, cryogenically preserved from the tissue sample, can permanently store the genotype of the elite donor animal, providing a genetic blueprint to recreate that cow, bull, heifer - or even a steer at any time in the future.

100.61. Define Tertiary Gene Pool?

Tertiary Gene Pool

Members of this gene pool are more distantly related to the members of the primary gene pool. The primary and tertiary gene pools can be intermated, but gene transfer between them is impossible without the use of "rather extreme or radical measures" such as:

- ❖ Embryo rescue (or embryo culture, a form of plant organ culture)
- ❖ Induced polyploidy (chromosome doubling)
- ❖ Bridging crosses (e.g., with members of the secondary gene pool)

101.62. What Is Pakistan Animal Resource Management Program?

Pakistan is endowed with diverse livestock genetic resources. In fact, it is postulated that one of the centers of animal domestication lies in this part of the world. Pakistan has nearly 50 million goats. Goats are kept for milk and meat production and contribute significantly to the income of the rural farmers.

- ❖ Snow Leopard
- ❖ Alpine Markhors

The primary objectives of the Round table were to:



- ❖ Provide a forum for senior livestock scientists and developers for the exchange of views and experiences; and
- ❖ Raise the level of awareness of a far wider and influential audience with regard to the potential and the constraints facing animal agriculture in low-income countries.
- ❖ This section draws on the initial presentation of Simeon Ehui, who was the principal organizer of the Round table at ILRI

Specific Immediate Objectives

The immediate objectives of the Round table were to:

- ❖ Review the contribution and potential of livestock to increase sustainable food production, and contribute to income generation in low-income countries with a forward perspective to 2020 ("The Global 2020 Vision for Livestock")
- ❖ Identify major social, economic, technical and institutional constraints limiting livestock's contribution to achieving food security and economic development; and
- ❖ Define appropriate strategies to alleviate these constraints and propose a framework for international action to enhance animal productivity in its broadest sense.

Expected outputs

The expected outputs of the Round table were:

- ❖ An analysis of past and present trends in livestock productivity and consumption of livestock products which would be used in part as an input to a "2020 Vision" paper to be further developed after the meeting;
- ❖ A statement of a defined set of objectives within the time frame specified and a related description of the constraints that must be overcome for the objectives to be achieved; and
- ❖ formulation of the set of measures ("a framework for action") or strategies needed for increasing livestock productivity in low-income countries and securing better management of the natural resource base from the present to the end of the second decade of the 21st century.

102.63. What Is Phenylketonuria?

Phenylketonuria (PKU)

It is a human genetic condition caused by mutations to a gene coding for a particular liver enzyme. In the absence of this enzyme, an amino acid known as phenylalanine does not get converted into the next amino acid in a biochemical pathway, and therefore too much phenylalanine passes into the blood and other tissues. Change in environment (lowering Phenylalanine consumption) can affect the phenotype of a particular trait, demonstrating a gene-environment interaction

103. Define Threatened Species?

Threatened species are any species (including animals, plants, fungi, etc.) which are vulnerable to endangerment in the near future. Species that are threatened are sometimes



characterized by the population dynamics measure of critical dispensation, a mathematical measure of biomass related to population growth rate

104. State Quarantine Principle?

Isolation and quarantine help protect the public by preventing exposure to people who have or may have a contagious disease. Quarantine separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick. Modern quarantine does not have to be absolute to be effective.

- ❖ Even partial or “leaky” quarantine can reduce disease spread
- ❖ Partial quarantine can be an effective supplement to vaccination

105. Explain Habitat Lose Cause of Extinction?

Habitat destruction is the process in which natural habitat is rendered unable to support the species present. In this process, the organisms that previously used the site are displaced or destroyed, reducing biodiversity. ... Habitat destruction is currently ranked as the primary cause of species extinction worldwide.

106. What is Molecular Marker?

In genetics, a molecular marker (identified as genetic marker) is a fragment of DNA that is associated with a certain location within the genome. Molecular markers are used in molecular biology and biotechnology to identify a particular sequence of DNA in a pool of unknown DNA.

- ❖ RFLP (or Restriction fragment length polymorphism)
- ❖ SSLP (or Simple sequence length polymorphism)
- ❖ AFLP (or Amplified fragment length polymorphism)
- ❖ RAPD (or Random amplification of polymorphic DNA)
- ❖ VNTR (or Variable number tandem repeat)

107. What Are Three Common Function of Quarantine?

Quarantine practices in most countries have at least three common functions.

- ❖ The first is exclusion or regulatory actions to prevent or reduce the risk of entry of exotic pathogens, pests, or parasites along artificial pathways.
- ❖ Second is the containment, suppression, or eradication of pests or pathogens that have been recently introduced.
- ❖ Third is the assisting of exporters to meet the quarantine requirements of importing countries.

108. Sanctuaries and National Parks?



- ❖ National Parks
- ❖ Hingol National Park
- ❖ Hazarganji Chiltan National Park
- ❖ Kirthar National Park
- ❖ Lal Suhana National Park
- ❖ Margalla Hills National Park
- ❖ Ayubia National Park
- ❖ Deosai National Park
- ❖ Chitral Gol National Park
- ❖ Khunjerab National Park
- ❖ Machiara National Park.
- ❖ Wildlife Sanctuaries of Pakistan are;
- ❖ Astor Wildlife Sanctuary
- ❖ Baltistan Wildlife Sanctuary
- ❖ Chasma and Taunsa Barrage Dolphin Sanctuary
- ❖ Cholistan Wildlife Sanctuary
- ❖ Hab Dam Wildlife Sanctuary
- ❖ Kargah Wildlife Sanctuary

109. Effects of Climate Changes On Invertebrates?

Most invertebrates are expected to change their geographical distribution in response to climate change so as to remain in areas to which they are well adapted. This view is strongly supported by sub-fossil evidence of insect distribution during the glaciations and inter glacial periods of the Quaternary Period.

110. Name of Botanical Institute Of Pakistan?

- ❖ Abdul Wali Khan University Botanical Garden, Mardan
- ❖ Botanical Garden, Governor's House, Lahore
- ❖ Botanical Garden, Govt Zamindar College, Gujrat
- ❖ Danishmandan Botanic Garden, Lahore
- ❖ Botanical Garden, University of the Punjab, Quaid-e-Azam Campus, Lahore
- ❖ Faisalabad Botanical Gardens (part of Gatwala Wildlife Park), Faisalabad
- ❖ Forman Christian College Botanic Garden, Lahore
- ❖ Government College University Botanic Garden of GCU, Lahore
- ❖ Karachi University Botanic Garden of Karachi University, Karachi
- ❖ Lahore Botanical Gardens, Lahore
- ❖ National Herbarium, Islamabad
- ❖ Pakistan Forest Institute Botanical Garden of Pakistan Forest Institute, Peshawar
- ❖ Quaid-i-Azam University Botanical Garden, Islamabad



111. Historical Background Of CBD?

The Convention on Biological Diversity, was opened for signature at the Earth Summit in Rio de Janeiro, Brazil, on June 5, 1992 and by the end of July 1993, 165 countries had signed the treaty. The initial sessions were referred to as meetings of the "Ad Hoc Working Group of Experts on Biological Diversity."

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- ❖ Third is the assisting of exporters to meet the quarantine requirements of importing countries

113. What Is Mechanism of Cryopreservation Name Steps?

Until two decades ago the genetic resources were getting depleted owing to the continuous depredation by man. It was imperative therefore that many of the elite, economically important and endangered species are preserved to make them available when needed. Many methodologies have been devised for long term preservation of material.

Cryo-Preservation

Cryo is Greek word. (karyos – frost). It literally means preservation in “frozen state.” Cryo-preservation or cryo-conservation is a process where organelles, cells, tissues, extracellular matrix, organs or any other biological constructs susceptible to damage caused by unregulated chemical kinetics are preserved by cooling to very low temperatures (typically - 80 °C using solid carbon dioxide or -196 °C using liquid nitrogen)

Cryopreservation Can Be Done At

- ❖ **Over Solid** carbon dioxide (at -79 degree) Low temperature deep freezer (at -80 degree)
- ❖ **In Vapor Phase** nitrogen (at -150 degree)
- ❖ **In Liquid Nitrogen** (at -196 degree)

114. 75. DNA Bank?

DNA banks can now be considered as a means of complimentary conservation. DNA storage is particularly useful for those species that cannot be conserved in traditional seed or field Gene banks and nor conserved in situ due to high risk in that area.

Advantages



DNA banking is an efficient, simple and long-term method to conserve the genetic information.

Disadvantages

There are problems with subsequent gene isolation, cloning and transfer of DNA back to a plant and it currently does not allow the regeneration of the same genotype as the original sample.

Storage Strategy

Determining what to store and for how long is an important consideration, used to determine sample size, capacity of the DNA bank, preparation of samples and documentation. Long-term needs and expected volume and number of samples to be stored will determine organization and repository design.

Processing of samples

DNA preserved in DNA banks will be stored either within cells and extracted upon retrieval from storage or extracted from cells and purified before storage. The quality of the DNA is expressed through yield, purity, molecular weight, amplification efficiency and authenticity of sequences.

The quality of DNA extracted from plant specimens is dependent on the condition of the specimen before storage, the storage environment and the duration of storage. Rapid drying of plant samples with silica gel or lyophilization helps to preserve the DNA. Storage

Once extracted DNA is a stable biomolecule, although it can easily be degraded during extraction and storage. Quality declines within days in hydrated samples held at room temperature or in refrigerators. Drying the sample or storing it in freezers or liquid nitrogen achieves better preservation of DNA molecular size. For this reason, DNA is better conserved in a form that is close to the original state and most DNA banks store cells or tissues and extract DNA upon request.

There is little information on the long-term stability of extracted DNA during frozen storage, but most repositories consider several years to decades as realistic. Information on the stability of purified DNA dissolved in buffer suggests that the overall fragment size decreases with storage time, and that the usefulness of the specimen for PCR-based assays may be **1–2 years** when stored at **4 °C**, **4–7 years** when stored at **-18 °C** and greater than **4 years** when stored at **-80 °C** (Madisen et al. 1987; Visvikis et al. 1998). The choice of temperature usually depends on the moisture level within the sample.

115. Germplasm Exploration Laboratory?

Plant exploration is the avenue to germplasm for crop improvement, which cannot be obtained by exchange. The spread of improved varieties has resulted in the loss of indigenous crop genetic diversity. Whereas, industrialization and urbanization has seriously damaged the natural environment of crop plants. Human population is rapidly eroding the reservoir of genetic diversity. Habitats are disappearing at an alarming rate as forests are cleared, roads and cities expand, grasslands are plowed, burned and overgrazed, land is inundated by lakes impounded by new dams and new lands are irrigated for increased production of modern cultivars. The face of the earth is changing at an



accelerating and alarming rate; and as it changes, more genetic diversity is lost forever. The Plant Exploration Laboratory has organized more than hundred expeditions in different agro ecological regions of Pakistan to collect the targeted plant species. The main emphasis is to collect the major crops and their wild relatives as these species

116. Critical Endangered Species?

A critically endangered (CR) species is one which has been categorized by the International Union for Conservation of Nature (IUCN) as facing an extremely high risk of extinction in the wild.

Examples:

- ❖ Eastern Lowland Gorilla
- ❖ Hawksbill Turtle
- ❖ Javan Rhino

117. Pakistan Terrestrial Water & Maritime Zones Act, 1976?

- ❖ It includes provisions for preservation, development and protection of marine environment
- ❖ This law controls marine pollution and exploration, development, conservation and management of living resources in Pakistan's Exclusive Economic Zone (EEZ)
- ❖ This law means that a ship carrying nuclear and hazardous substances will have to inform the Government of Pakistan.

118. In How Many Ways Bacteria Have Transfer Their DNA Horizontally?

"Horizontal gene transfer is known to occur between different species, such as between prokaryotes and eukaryotes, between the three DNA containing organelles of eukaryotes, the nucleus, the mitochondrion and the chloroplast."

- ❖ Horizontal gene transfer is basically the transfer of genes between organisms via methods other than asexual or sexual reproduction.
- ❖ Genes and the characteristics code for are passed down from parent to progeny.
- ❖ There are three ways for bacteria to transfer their DNA horizontally

Conjugation

The transfer of DNA directly from one cell to another through cell-cell contact often involving plasmids

Transformation

Bacteria are capable of taking up DNA directly from their environment and incorporating it into their genomes known as **natural transformation**

Transduction



Transduction is the transfer of DNA from one cell to another by a virus

119. Algal Blooms?

A rapid growth of microscopic algae or cyanobacteria in water, often resulting in a coloured scum on the surface.

Algal blooms are dense layers of tiny green plants that occur on the surface of lakes and other bodies of water when there is an overabundance of nutrients (primarily phosphorus) on which algae depends. This effect is called eutrophication.

120. Migration?

“**Migration** is the relatively long-distance movement of individuals, usually on a seasonal basis.” e.g. Some crustaceans migrate for breeding

121. What Are the Principles of Successful Quarantine?

One recent study (Plucknett and Smith, 1988) describes six principles of successful quarantine. They are summarized as follows

- Sound scientific and technical principles should form the foundation of quarantine program. Pests and pathogens should be ranked by quarantine services according to the potential danger they pose to crops and the potential for success in excluding them. For example, germplasm from centers of diversity should receive a high priority because of the potential for such accessions to harbor coevolved pests or pathogens.
- Animal and plant quarantine regulations are similar in that they may:
 - Require import permits issued by the quarantine service of the importing country (these may require the exporting country to certify that specified conditions have been met prior to shipment);
 - Specify things that are prohibited from entry;
 - Grant exceptions to the prohibitions for scientific purposes;
 - Require inspection of imported materials upon arrival;
 - Require appropriate treatment, if warranted, as a condition of entry; and
 - Require, after arrival, quarantine or isolation in an approved facility.
- When germplasm must be planted and grown for the purposes of quarantine testing, it should be done in an area geographically and ecologically separated from the major growing areas for that crop, to prevent the establishment of crop-specific pests or pathogens.
-
- When germplasm is endangered or the need for particular accessions is particularly urgent, some discretion should be possible on the part of quarantine officials in allowing exceptions for controlled entry, despite existing regulations to the contrary.
- Decentralized quarantine services are generally more efficient because they enfold a wider range of expertise in germplasm assessment.



- ❖ Because delays in transit can be detrimental for any germplasm accessions, access to good communication and transportation services is essential for quarantine

122. Ecosystem Is Facing Massive Destruction Extinction Species?

There are following major causes of extinction;

- ❖ Climate change
- ❖ Habitat destruction
- ❖ lack of genetic diversity
- ❖ Better-adaptive condition
- ❖ Pollution
- ❖ Human over-population
- ❖ Poaching and hunting

Climate Change

- ❖ Almost half of plant and animal species have experienced local extinctions due to climate change
- ❖ Global warming could trigger not just local but global extinctions of animals and plants
- ❖ Species already threatened by habitat destruction, pollution, alien invasion and over hunting are more vulnerable to climate change
- ❖ Diversity of species in any one ecosystem could be affected by rises in average temperatures or a shift of climate regime

123. Method of Storage?

The maintenance of the frozen cells or material at specific temperature is very important.

- ❖ In general the temperature is kept -70 to -196 degree.
- ❖ Prolong storage is done at temperature of -196 degree in liquid nitrogen.
- ❖ To prevent damage, continuous supply of nitrogen is done

124. Link Between Climate Change and Botanical Garden?

Plants can alter the temperature of the Earth's atmosphere. Through the process of photosynthesis, plants use energy from the sun to draw down carbon dioxide from the atmosphere and then use it to create the carbohydrates they need to grow. Since carbon dioxide is one of the most abundant greenhouse gases, the removal of the gas from the atmosphere may temper the warming of our planet as a whole. Transpiration in plants can increase water vapor in the atmosphere, causing more precipitation and cloud cover in an area. The additional cloud cover often reinforces the cooling by blocking sunlight. Contribute to soil fertility and prevent soil erosion



125. Animals Induced Quarantine?

Animal and plant quarantine programs are intended to protect agriculture from the threat of entry of exotic hazardous organisms. In some countries this objective may be extended to the protection of natural domestic flora and fauna. Both types of programs regulate the importation of living individuals.

The general concepts and objectives of plant and animal quarantine are similar; but differences in biology, agricultural production, marketing, exporting, and importing necessitate a variety of quarantine procedures. Animal and plant quarantine procedures.

Animal and plant quarantine:

Programs are intended to protect agriculture from the threat of entry of exotic hazardous organisms. In some countries this objective may be extended to the protection of natural domestic flora and fauna.

126. Why Do Forest Genetic Resources?

The high levels of genetic variation that are present within many tree species can be beneficially developed and used by foresters and tree growers. Whereas agricultural crop breeders and farmers often substantially modify the growing environment to suit a specific crop species or variety, tree growers commonly identify species and provenances which can provide some improved levels of the goods and services required even without intensive selection and improvement, or intense management requirements, or major modification of the external environment.

127. Strategies followed by effective conservation of ANGR?

Following strategies should be followed for effective conservation and utilization of AnGR:

- ❖ Formulating the National Livestock and wild-life Breeding Policies.
- ❖ Encouraging the Formation of Breed Associations.
- ❖ Developing Professional Human Resources.
- ❖ Strengthening Research and Development Institutions
- ❖ Developing Infrastructure for marketing International co-operation and assistance is needed
- ❖ in capacity building to remodel available livestock farms/research stations to conserve and
- ❖ develop genetic resources

128. Effect of climate change on invertebrates' genetic resources?

Extreme weather events such as heat waves, droughts and floods - which are predicted to increase in frequency due to climate change – are often followed by pest outbreaks. Among other contributing factors, these outbreaks can occur because the extreme event eliminates or weakens a pest's natural enemies.



129. RATIO OF VEGETABLES IN PAKISTAN?

- ❖ Pakistan covering 75% of the total area under vegetables, accounting for 74% of the total production.
- ❖ The major share in the production is of Punjab (63%) followed by Sindh (14%), Baluchistan (12%) and KPK (11%).
- ❖ Maximum area is grown under potatoes and about 88 % occurs in Punjab.
- ❖ About 46% of onion is cultivated in Sindh and 25% in Punjab.
- ❖ Chili is at the third position of which 84% is cultivated in Sindh.

130. Vivo Gene Bank?

Generally, plant seeds, vegetative propagules are used for storage for long time. The whole plants are preserved. This type of conservation strategy is called **vivo gene bank**.

131. What is exclusive economic zone (EEZ)?

The exclusive economic zone comprises an area which extends either from the coast, or in federal systems from the seaward boundaries of the constituent states (3 to 12 nautical miles, in most cases) to 200 nautical miles (370 kilometers) off the coast.

132. Application for permit to import plant material?

Before any plant or plant material is imported, an application for permit shall be submitted to the Director or to the Entomologist (Quarantine).

All such applications shall be signed by the person who intends to import the plant or plant material or his duly authorized agent and shall specify:

- ❖ the kind and quantity of plant or plant material;
- ❖ the country and locality of origin
- ❖ Destination
- ❖ the name and address of the consignor and the consignee
- ❖ means of transport
- ❖ the prescribed port or point of entry
- ❖ the purpose for which the plant or plant material is proposed to be imported
- ❖ e.g., consumption propagation or processing.

133. What is Allopatric speciation?

Allopatric speciation occurs when a species separates into two separate groups which are isolated from one another. A physical barrier, such as a mountain range or a waterway, makes it impossible for them to breed with one another.



134. Role of pollinators?

Nearly ninety percent of wild flowering plants need pollinators like bees to transfer pollen for successful sexual reproduction .in turn, these plants are critical in the functioning of ecosystems. They provide food, form habitats and provide a wide range of other resources for many animal species.



**Education is the passport to
the future, for tomorrow
belongs to the people who
prepare for its todays.**