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Q1 Define crop and write down types of crop with their classification.

Crop :- A cultivated plant that is grown on a large scale commercially, especially a cereal, fruit, or vegetable.

Types of crops

The major crops can all be divided into four main types depending on their usages.

1] Food crops (Wheat, Rice, Millets, Pulses, etc)
2] Cash crops [Sugarcane, Tobacco, cotton, Jute & oilseeds, etc].
3] Plantation crops [Coffee, Coconut, Tea and rubber, etc].
4] Horticultural crops [Fruits and vegetables].

Classification of crops

1] classification based on growing season

A) Kharif / Rainy / Monsoons crops

→ The crops grown in monsoon months from June to Oct - Nov require warm, wet

weather at major period of crop growth, also required short day length for flowering, eg:- cotton, Rice, Jowar, bajara.

B) Rabi / winter / cold season crops

→ Required winter season to grow well from oct - Nov to march month. Eg :- wheat, gram, sunflower,

C] Summer / 2nd crops

→ Crops grown in summer month from march to June. Require warm day weather for major growth period and longer day for flowering Eg- groundnut, watermelon, pumpkins, Gourds.

2] Based on climate

A] Tropical :- crop grow well in warm & hot climate. eg - Rice, sugarcane, Jowar, etc.

B] Temperate :- crops grow well in cool climate eg - wheat, oats, Gram, potato, etc.

3] Classification Based on Agronomic / use.

A] Grain crops :- may be cereals as millets cereals are the cultivated grasses grown for their edible starchy grains. The larger grain used as staple food is cereals eg:- Rice, Jowar, wheat, maize, barley & millets

B] Pulse / legume crops

→ seed of leguminous crops plant used as food on splitting they produced dal which is

rich in protein Eg:- green gram, black gram, soybean, pea, cowpea, etc.

C] Oil seed crops

crop seeds are rich in fatty acid, are used to extract vegetable oil to meet various requirements.
eg:- Groundnut, mustard, sunflower, seasamum, linseed, etc.

D] Forage crops

It refers to vegetative matter fresh as preserved utilized as food for animals. crop cultivated and used for fickler, hay silage, eg:- sorghum, elephant grass, berseem, lucern, etc.

E] Fibre crops

crown for fibre yield. Fibre may be obtained from seed. Eg:- cotton, Jute, sunhemp etc.

F] Roots crops

Roots are available for economic purpose in root crops eg:- sweet potato, sugarbeet, carrot, etc.

G] Tuber crops

crop whose edible portion is not a root but a short thickened underground stem
Eg:- potato, yam, elephant.

H] Sugar crops

→ The crop generally grown for sugar production
eg:- sugarcane, sugarbeet, etc.

I] Spices & condiments crops.

→ crop plants as their products are used to flavour taste and sometime color the fresh preserved food.
Eg:- Ginger, garlic, chilli, cumin, onion, coriander.

J] Vegetables crops

may be leafy as fruity vegetables

Eg:- palak, mesta, Brinjal, Tomato, etc.

K] Medicinal & Aromatic crops

Medicinal plants includes cinchona, isabgoli, opium poppy, and aromatic plants such as lemon grass, palmorsa, Jasmine, henna, etc.

4] Classification Based on life of crops.

i] seasonal crops :- A crop completes its life cycle in one season kharif/ Rabi

eg:- Rice, Jowar, wheat, etc.

ii] Two seasonal crop :- completes its life cyle in two ~~year~~ season eg:- cotton., turmeric, Ginger.

iii] Annual crops

crop require one full year to complete it life cycle eg:- sugarcane.

iv] Biennial crops

which grows in one year and flowers, fruits in the next year eg:- Banana, papaya,

v] Perennial crops

crops live for several years

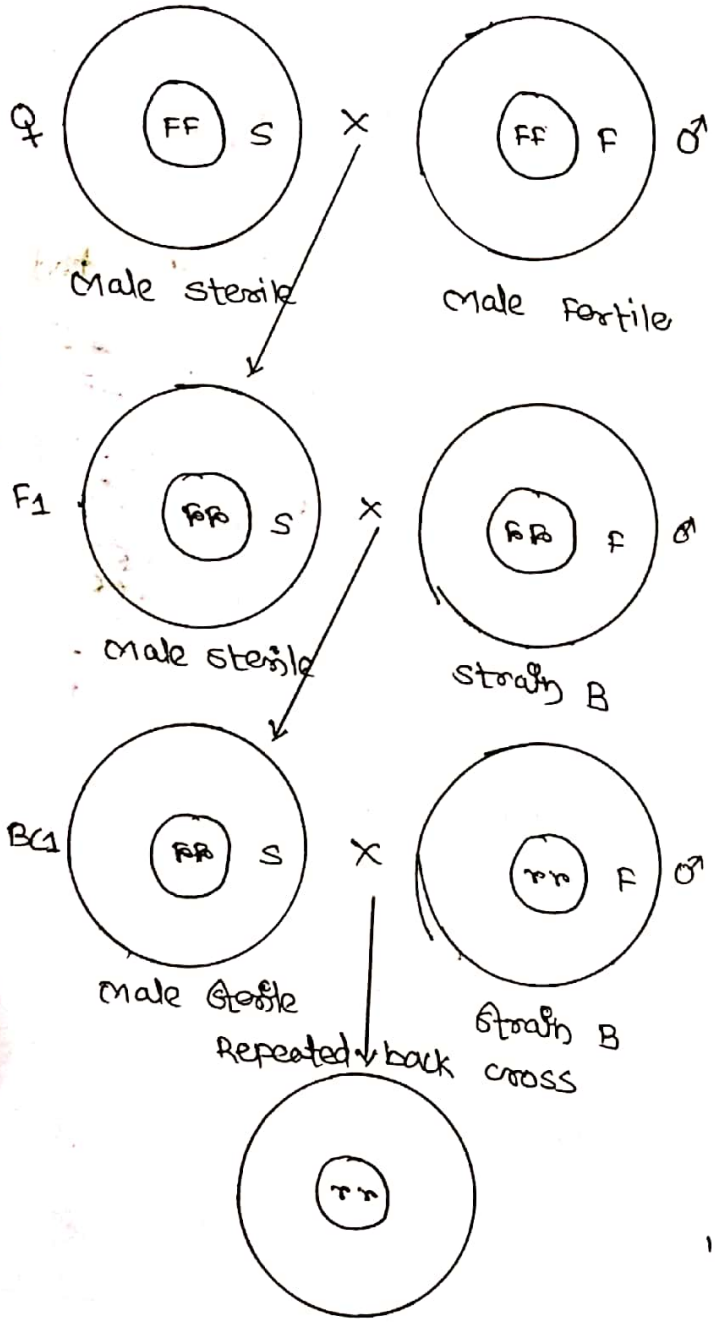
eg:- Fruit crops, mango, gauva, etc.

Q2. Define male sterility, Explain the transfer of CMS to a new strain & maintainance of male sterility & limitations.

Male sterility :- A condition in which pollen is either absent or non-functional in flowering plant is called MS.

Transfer of CMS to new strain (Diversification).

Strain A Strain B



Cross the male sterile B (male parent) to a cytoplasmic male sterile strain A (used as female parent).

i) The F1 would be male sterile
ii) 50% of the nuclear genes of F1 would be from strain B.
iii) Backcross the F1 to strain B.

i) 75% of the nuclear genes would be from strain B.
ii) Backcross to strain B.

i] This is the male sterile version of strain B.
ii] maintained by crossing with male fertile strain B.

* Maintainance of male sterility *

→ Genic or pollen male sterity

MSMS (male sterile) x MSMS (male fertile)

↓

1 MSMS : 1 MSMS
(roughed out).

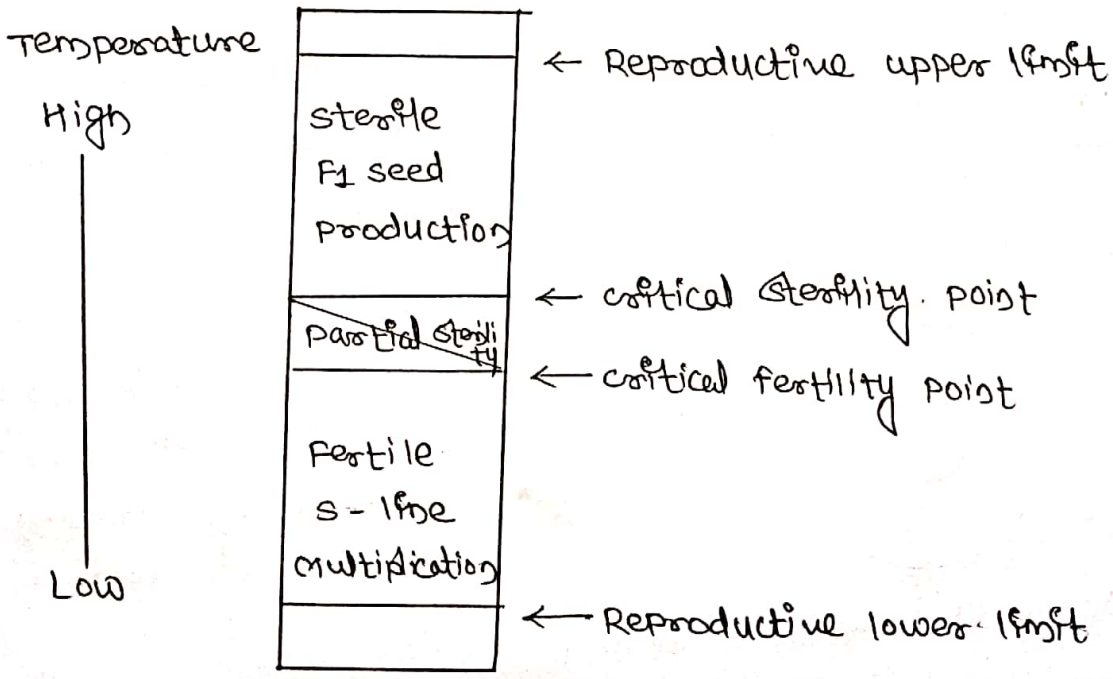
→ Functional sterile plants can easilty maintained by forced selfing.

→ Male sterile plants can also be maintained vegetatively by cuttings and tissue culture.

Male sterilty system in two lines self pollinated crops for hybrid seed production.

Two - line hybrid.

→ Based on the discovery of GMS mutant
→ Male sterility controlled by 1 or 2 pairs of recessive genes.



Advantages of 2-line hybrid system.

→ simplified procedure of hybrid seed production
→ multiple and diverse germplasm available as parents
Any line could be bread as female
97% (2-line) vs (5% (3-line)
→ Increase change of developing desirable & hetro-rotic hybrids.
→ multiple cytoplasm courses as female parents.

Disadvantages

→ Environmental effect on sterility could cause seed purity problem.

Limitations of male sterility

1) In some crops, sterile cytoplasm has adverse effect on yield.
2) unsatisfactory restoration of fertility.
3) Difficult to identify line with GMS.
4) unsatisfactory or poor pollination

Types of MS

1) cytoplasmic male sterility :- Governed by cytoplasmic gene.
2) Genetic male sterility :- Governed by Nuclear gene.
3) Cytoplasmic genetic male sterility :- Govened by both nuclear gene & cytoplasmic gene.

Q3 Define hybrid & features of hybrids, maintaince of nuclear seed and breeder seed.

Hybrid :- Hybrid is the offspring resulting from combining the qualities of two organisms of different breeds, varieties, species or genera through sexual reproduction.

Features :- 1) Genetic material
2) Productivity
3) Adaptability
4) Application
5) Resistance

1] Genetic material :- All the material individual plant of a hybrid variety and genetically similar thus hybrid varieties are the heterozygous & homozygous population high attractive homogeneous nature.

2] Productivity :- Hybrid variety are highly productive because hetrosis of hybrid full exploited such variety.

3] Adaptability :- Hybrids are wider adaptability to environmental changes from inbreed lines & pure line variety to high suffering capacity.

4] Capacity :- Developed in cross & self pollinated crops depending upon the magnitude of heterosis hybrid are more common incross pollinated & self pollinated crops.

5] Resistance :- These hybrid are generally more tolerant biotic & abiotic stress than the inbread line & pure line variety.

* Methods of maintainance of nuclear and breeder seed in self fertilised crop *

1] Maintainance of newly released varieties.

2] Maintainance of established varieties.

1) Maintainance of nucleus seed of pre-realesed or newly released variety.

→ The procedure outline by Harrington (1952) for the maintenance of nuucleus seed of newly released varieties as below :-

a) sampling of the variety to obtain nuclus seed New numbers, lines or selection which are highly promising, on the basis of performance in breeding nuseries & yield trials, should be sampled for seed purification

b) Table examination of samples
The two hundred plants of each sample should be threshed separately and the seed should be examined in piles on the table. Discard any pile appearing obviously off type, diseased or otherwise unaccepted.

c) Locating and seeding of nucleus
Each nucleus seed should be grown on clean fertile land at an experiment station in the region or in area in which this new variety could be grown, in event of its release. The land must not have had a crop of the same kind in the previous year.

d) Inspection of nucleus two-row plots and removal of off types :- Throughout the season of growth, from the seedling stage until maturity, the nucleus plot should be examined critically.

e] Harvesting & threshing of nucleus

Each remaining plot, of which there should be at least 180 out the original 200. should be harvested individually with a sickle and tied in bundle. The nucleus bundles of any new variety should be discarded, if it is found unworthy of being continued.

2] Maintainance of breeder seed of pre-released variety.

a] Breeder stock seed from the nucleus should be sown on the clean, fertile land,

b) The field should properly isolated.

c) The best farm procedures should be used in the sowing, raising and harvesting of breeders stock.

d) It should be produced at the experiment station in the area in which the newly variety has been bred.

e) Harvesting the breeders stock

In the breeder stock is harvested and threshed, the equipment used must be scrupulously clean and free from seeds of any other variety.

F) Roughing.

* Maintainance of breeder seed of established variety *

a) By raising the crop in isolation. The breeder seed of local variety could be maintained by growing them in isolated plots by very rigorous roguing during various stages of crop growth.

b) By Bulk selection :- The genetic purity of established varieties could be satisfactory improved by bulk selection. In this method 2000 to 2500 plants typical of the variety are selected, harvested, threshed separately.

Q4 Define Genetic purity and write down maintainance of genetic purity along with safegaurds & factor affecting.

Genetic purity :- Genetic purity refers to the percentage of contamination by seeds or genetic material of other varieties or species.

Maintainance of genetic purity

The various steps suggested by Hartmann and Kester (1968) for maintaining genetic purity.

The steps are –

a) Providing adequate isolation to prevent contamination by natural crossing or mechanical mixtures.

b) Rouging of seed fields, prior to the stage at which they could contaminate the seed crop.

c) Periodic testing of varieties for genetic purity.

d) Avoiding genetic shift by growing crops in areas of their adaption only.

e) Certification of seed crops to maintain genetic purity & quality seed.

f) Adopting generation system and seeds can be multiplied up to three more generations i.e. foundations, Registered, certified.

g] grow out tests.

h) Used of Approved seed in seed multiplication

i) sampling & selling of clean lots

j) Detection of mixture weed & seed disease.

* Safeguard to maintaine genetic purity *

1) Control of seed source
2) Preciding crop requirement
3) Isolation
4) Rouging of seed field
5) Technique of the breeder
6) Break down of male sterility.
7) Proper seed certification.
8) Neighourhood.

Factors affecting genetic purity

1) Developmental variation
2) Mechanical mixture
3) Mutations
4) Natural crossing
5) Minor genetic variation
6) Technique of breeder
7) Breake down male sterility.
8) improper seed certification system.

Q5 Write down steps and factor affecting on hybrid seed production of (Rice, sorghum, maize, pearl millet, sunflower, cotton, pigeon pea, etc).

Ans :- The following point highlight the four main step of hybrid seed production. The steps of hybrid seed production are :->

1. choice & development of restorer or male parent (R-line).
2. choice and development of seed parent (A-line).
3. maintainance & multiplication of parental seeds.
4. production & improvement of F1 hybrids.

Step 1 :- choice and development of seed parent (A-line)

→ The seed parent or the female parent of commercial hybrid should be a male sterile line. But in case of non-availability of suitable male sterile line can be used where manual labour will be needed.

In case of these crops where the number of seed produced in each pollination is restricted, there the cytoplasmic genetic male sterility line should be used as seed parent. In case of monoclinous plant like maize, the maize flowers can be removed easily as these are born on apices of the plants after identification of male sterile line (A-line), It should be maintained by an isogenic B-line. Strains can be identified to have the B-line reaction by crossing them to the A-line, then a potential B-line is converted

to A-line by a process of repeated back-crossing till the A & B lines become similar (isogenic).

The desirable attributes which should be considered for a male sterile line or A-line development are :- 1) plant height
2) Duration & span of flowering
3) Tillering ability
4) Productivity potential
5) stable male sterility
6) Free from diseases
7) Combine Ability.

1] plant height :- male sterile line should be not too tall or too dwarf. since plant height of the hybrid is the function of both parents. plant height of A-line should be lower than that of R-line (male fertile).

2] Duration & span of flowering.
This is an important attribute for commercial hybrid seed production sucesful hybrid seed production depends on the sychrony between the flowering of seed parent (A-line) & (R-line).

3] Tillering ability
Profuse & synchronous tillering on a male sterile is advantageous both for harvesting male sterility seed & also hybrid seed.

Step 2 :- choice & development of Restorer or male parent (R-line) :- The second component which is required for hybrid production is the male parent or restore line which are essentially inbreeds lines, like A-lines. Their development is done through pure line selection method where forced selfing is practised.

Step 3 :- maintainance & multiplication of parental seeds

→ In case of cross pollinated crops, the hybrid programme is based on 3 lines - A-line (CMS), B-line (maintainance) & R-line (Restorer) all homozygous inbreed are maintained by the breeder. Any kind of change in the population should be discarded by the breeder which may occure due to random pollination & mutation. For proper maintainance, the A-lines & B-lines are grown in field in ideal agronomic condition, and in rows 4:2 ratio. For maintainance, The A-lines and B-lines are grown should be completely isolated from other.

Step 4 :- Production and Improvement of F1 hybrids

→ Hybrids for F1 hybrid seed production A & R line are grown together in 4:2 ratio in hybrid production block In many crops like pearl millet, sorghum, maize, hybrid seed production programme has been pursed & many of the hybrid varieties have been released.

* Factors affecting hybrid seed production *

1] Planting ratio
2] Non- synchronization of flowering
3] Genetic drift
4] Detasseling
5] Mechanical Admixtures
6] Roughing
7] physiological maturity of the crop.
8] Harvested seed crop.
9] pest harvested operation.

* Hybrid varieties of various crops *

1] Rice :- KRH-2, Pant sankar Dhan-1, PHB-71, CORH-2.
2] Maize :- DHM-103, DHM-105, DHM-1.
3] Sorghum :- BSR-1, TNAU sorghum hybrid CO5, KTAH, CO(S) 28.
4] Sunflower :- KBSH-1, TNAU sunflower hybrid CO2.
5] Pigeon pea :- ICPH 2740, ICPL-14003 (PGR) 176.
6] Pearl millet :- 86M32, 85M34, 86M52.

Q6 Write down the principles of quality seed production of vegetable crop under open & protected environment.

General Agronomic principles of seed production

1) Selection of suitable Agro-climatic zone
2) selection of Land
3) Isolation Distance of the seed crop.
4) Preparation of the land.
5) selection of variety.
6) seed treatments.
7) Time of sowing, spe rate
8) Roguing, etc.

Production system for vegetable crops under protected cultivation.

1] Geoponics or soil system

In this system crops are grown in natural soil under protected cultivation. It has some demerits such as more disease and insect incidence in soil.

2] soilless cultivation

In recent decades use of the soilless cultivation method has increased significantly due to the use of methyl bromide as a soil disinfectant between crop cycles is or will be banned soon. several types of substrate are used as soil less media and it protect the crops from different soil infections like coconut fibre, perlite, vermiculite, rock wool, peanut hulls, rice hulls and coco peat, etc.

3] Temperature maintainance

The several crops can be grown in a wide range of temperature, but for better growth and development individual crops requires a specific range of temperature. It is possible under protected cultivation.

4] Climate control system

Production of vegetable crops during unfavorable climatic conditions, such as high temperature, flooding, and strong winds suffered from incidence of diseases high. It needs to control for the successful crop production.

5] Water managment.

Water is most important factor that affect the production system of vegetable crops. It is not possible to grow the vegetable crop during the high rainfall, high rainfall will drops the quality of vegetable crops.

6] pest & disease control

To control the insect pest inside the house, insect proof screen have been used to cover the ventilation opening. By keeping away the vector.

7] Higher yield

Poly-houses (PH) & shade-net houses (SNH) (35%) found fairly useful to create favorable microclimate for plant growth and higher yield and also for minimization of pest infestation.

* Production system for vegetable crops under open environment

⇒ vegetable crops faces tremendous challenges in the production of disease free, healthy and genetically pure seed for commercial cultivation. conventional practises of seed production in open fields faces common problems like lack of sufficient isolation, insects, diseases and a virus free environment.

⇒ Compare to conventional practices, protected cultivation can deliver higher seed yield with better quality.

⇒ The present review provides comprehensive information on significant research work done in India in hybrid seed production of vegetables under various protected and open field environment.

⇒ This concept has shown significant results not only in quality seed production but also in increasing the per unit seed yield in vegetables.

Q7 Write about the development of parental lines and cultivors by asther & pollen culture.

Development of parental lines

(Total seeds of parental line for screening 30,000 each).

↓ 52% germination

seedling germinated (15750)

↓ Uniform seedlings for screening (50%)

seedlings selected (7875)

↓ screened through TIR

seedling survive (2,362)

↓ Establisment

seedling established in the field (1653)

↓ Roughing & selection

plants for crossing (600)

↓

crossing and development of hybrid seed)
(parental line developed).

Cultivors by asther culture

1) wheat :- Jinghua 1 (China), Florin (France
2) Rice :- Hua yu I & II, Late keng 959, by China.
3) Tobacco :- KDH 926, 959, 960 by USA.
4) Maize :- Huayu - 1 (China).

Cultivors by pollen culture

* Types of plant tissue culture culture technique. ⑪

Types of tissue culture

1] seed culture
2] Embryo culture
3] callus culture
4] organ culture
5] protoplast culture

Major step of tissue culture (plants)

1] Initiation phase (Stage 1)
2) multiplication phase (Stage 2)
3] Root formation phase (Stage 3)

Technique for plant in-vitro culture

1] somatic cell genetics
used for haploid production & somatic hybridization.

2] Transgenic plants
used for expression of mammalian genes or plant genes for various species it has prou beneficial for the engineering of species that are resistant against viruses and insects.

Q8. Discuss in detail about IPR issue in commercial plant breeding.

Intellectual property rights

→ A right that is had by a person or by a company to have exclusive rights to use its own plans, ideas, or other assets without the worry of competition, at least for specific period of time. This right can include copyrights, patents, trademarks, and trade secrets.

OR Ideas and knowledge are an increasingly important part of trade Investors or creaters have the right to protect their Inventions, designs or other creations. This rights are known as Intellectual Property rights (IPR).

Classification / types of IPR.

① Patents :- Provide exclusive right to make, use, Import, sell and offers for sale a Product and process Invention for upto 20 years.

② Utility patent

Protect useful processes, machines, articles of manufacture, and compositions of matter.

eg:- fibre optics, computer hardware, medications.

③ Design patent

Guard the unauthorised use of new, original, and ornamental designs for articles of manufacture. The look of an shoe, bicycle, helmet. protect by design patents.

④ Plant patent

Are the way we protect invented or discovered asexually reproduced plant varieties, Hybrid Tea, roses, silver queen corn, etc.

⑤ Trademarks.

Protect words, names, symbols, sound or colours.

⑥ Copyright

protect works of authorship, such as writting, music, and works of art that have been tangibly express. images, video, drama, movies, news, etc.

Features of IPR

i) In terms new idea / process product information and develop a person.

ii) It required lot of internal fund input in terms thinking / planning finally new idea / product process.

iii) It require amount of funds and other resource to develop new product process.

iv) The main problem in IPR, Intellectual problem it can be copy reproduce use by other then resulting in lost to inveters.

Q9 Explain the protection of plant varieties and farmers right Act, 2001 (PPVFR, 2001) with, objective, power, duties, criteria for Protein, etc.

Ans ⇒ The protection of plant variety and farmers Right Act, 2001 (PPVFR Act) is an act of the parliament of India that was enacted to provide for the establishment of an effective system for protection of plant varieties, the rights of farmers and plant breeders, and to encourage the development and cultivation of new varieties of plants.

This act received the assent of the President of India on the 30 october 2001.

An Act to provide for the establisment of an effective system for protection of plant varieties, the rights of farmers and plant breeders and to encourage the development of new varieties of plants.

Objectives of PPVFR Act

① To stimulate investments for research and development both in the public and the private sectors for the developments of new plant varieties by ensuring approprite returns on such investments.

② To facliate the growth of the seed industry in the country through domestic and foreign investment which will insure the availability.

of high quality seeds and planting material to Indian farmers.

(3) To recognise the role of farmers as cultivators and conservers and the contribution of traditional, rural and tribal communities to the country agro biodiversity by rewarding them for their contribution through benefit sharing and protecting the traditional right of the farmers.

* FR authority criteria for Proteiction *

→ In order to provide for the establishment for the effective system for protection of plant breeders, varieties, the right of farmers and plant breeders and to encourage the development of new varieties of plants it has been considered necessary to recognise and protect the rights of the farmers and plant breeder.

* Protectoded plant variety *

If the variety confirms the criteria of Novelty, Distictiveness, uniformality, and Stability, they can be protected. Any person claiming to the breeder of variety can apply for protection. The criteria for distictiveness, uniformality and Stability have their usual meanings, However there are some unique features that the denomination must Sisitfy to qualify as a registrable variety, and it cannot be registered if the denomination given to such variety.

* Registration of new plant variety *

1] A new variety shall be registered under this Act if it conforms to the criteria of novelty, distinctiveness, uniformity and stability.

2] No variety shall be registered under this Act if it contains any gene or gene sequence involving any technology including terminator technology which is injurious to the life or health of human beings, animals or plants.

* Compulsory licensing

→ At any time after the expiry of three years after registration of a variety, any person may apply to the Authority alleging that the reasonable requirements of the public for seeds or other propagating material of the variety have either not been satisfied or unavailable at a reasonable price and request for grant of compulsory license to produce, distribute and sell the seed or other propagating material of a variety. (section 41-49).

* DUS Testing centre *

There are certain requirement for making a variety eligible for protection. The variety must be distinct, uniform and stable (DUS). The variety must have a denomination and must be novel. For being novel, the variety should not have

been sold or marketed earlier than one year for the country and four years for other countries where protection is desired. In the case of trees and wines it is six years.

→ In India for DUS testing, we need to be ~~worked~~ set up centres, which can carry out these tests. Crop wise standardization of field testing parameters and table of characteristics for DUS testing needs to be worked out. Location for testing needs to be identified. We should undertake collection of reference varieties and other varieties as standard for phenotypic expression of a character.

→ A National research centre for DNA fingerprinting which is set up at National Bureau of Plant Genetic Resources (NBPGR), New Delhi can help in the identification of a plant variety using molecular markers. We need to identify and strengthen more centres for DUS testing.

Q10 Write down the general procedure of plant variety testing.

Procedure :- Identification of best culture from the segregating generation

↓

Row yield Trial (RYT)

↓

Replicated Row yield Trial (RRYT)

↓

preliminary yield trial

↓

comparative yield trial

↓

Multi location trial

↓

Adaptive Research Trial (ART)

↓

Variety Release Proposal

↓

state variety Release committee (SVRC)

↓

Released of State variety.

↓

Notification

↓

certified seed production.

OR Procedure

1) Organisation are invited to submit proposal.
2) The board for plant variety selects projects that fulfill the criteria.
3) A priority is established and are approved depending on available budget.
4) Results are reported to the Board.
5) A summary is published on the social sites.

Q.10 [continued :-> Write about central variety testing committee, state variety released committee & seed production organizations (NSC, CSSC).

Ans :- Release and notification major steps in India.

steps :- 1) Evalution
2) Identification
3) Release and notification

1) Evalution :- consists of various trials and tests to determine its superiority over the best existing variety in yield, agronomic traits and its suitability for consumption.

2) Identification

Outstanding cultures are identified for release as a new varieties at the Annual workshops of the coordinated projects on respective crops. proposals for the identification of cultures may be prepared by the respective breeder in a prescribed format.

3] Release & Notification

→ After identification, the variety is to be tested for at least one year for disease and quality tests..

→ The breeder should be submit a proposal for release as a new variety for approval by the centre sub-committee on crop standards, Notification and release of variety.

→ After a variety has been released for a zone by the central sub-committee, The director, HVY, ministry of agriculture and irrigation, GOI notify the concerned authorities of the states within that zone for seed multiplication and distribution of variety This is known as notification of variety.

2] Release of variety by a State variety Released committee.

→ The breeder concerned should submit variety Released Proposal (12 copies) in the prescribe format to Director of Research, TNAU, Coimbotore. They will initially scrutinize the proposals, After scrutinization, it will be examined by state variety Release committee consist of the following members —.

No.	Officials	Position.
1]	Secretary to Government of Tamil nadu Agricultural department.	Chairman
2]	Vice - chancellor, TNAU, Coimbotore	member
3]	Director of Agriculture	member
4]	Chief Engineer (Agril. Engg)	member.
5]	Director of seed certification Coimbotore	member.
6]	Professor & Head, Dept, TNAU Coimbatore	member.
7]	Joint Director of Horticulture	member
8]	Dean, Faculty of Agriculture, Annamalai university Chidambaram	member.
	Non - official members	
1]	leading farmers - 2 Nos	
2]	President, Tamil nadu seed Association, Coimbotore.	

* ~~Ste~~ Seed production organisation [NSC, CNSSC]

1] National seed corporation (NSC)

→ It was initiated in 1961 under the Indian council of Agriculture Research. later on 7 march 1963 it was registered as a limited that is national seed corporation Limited. And started function from July 1963.

Objectives of NSC

① To promote the development of industry in India.
② To produce and supply the foundation seeds of various crops.
③ Now a day its started production of breeder seed also.

Functions of NSC

① Production and supply of foundation seeds.
② To maintain improved seed stocks of improved varieties.
③ Interstate marketing of seeds.
④ Export & import of seeds.
⑤ production of certified seed where require
⑥ Planning the production of breeder seed in consultation with ICAR.
⑦ Provide technical assistance to state seed corporation for production of certified seed.
8] providing certification services to state lacking establishment.

2] Maharashtra state seeds corporation Limited (MSSC)

MSSC state seeds corporation Ltd, popularly known by its brand name MAHABEEJ is one of the largest and leading state seed corporation among all state seed corporations in India.

MSSCL was established on 28th april 1976 at Akola. Akola was a natural choice for the headquarter as initially the seed activities had been taken up in Akola and nearby districts i.e. Buldhana, Parbhani, Nanded, Later on the production and seed distribution work has been extended to all districts of Maharashtra.

The authorised share capital of MSSC as on is Rs 10 crores divided into equally shares of Rs 100 each. The shares have been held by following categories of share holders.

①	Government of Maharashtra	49.00 % shares
②	National seed corporation	35.44 % -11-
③	Farmers / seed growers	12.70 %
④	state Agril University	02.86 %

Q11 Write down the principle & characteristics of Genetic and Agronomic seed production. (16)

1] Gentic principle

A] Deterioration of varities

i) Development variation
ii) Mechanical mixture
iii) Mutation
iv) Natural crossing
v) Minor genetic variation
vi) selective influence of diseases.
vii) The Techniques of the plant Breeder.

B] Maintenance of genetic purity.

2] Agronomic principle

i) selection of Agro-climatic region.
ii) selection of seed plot
iii) Isolation of seed crops
iv) Preparation of land
v) selection of variety.
vi) seed treatment
vii) seed plantation
viii) Farm operations
ix) Harvesting of seeds
x) After harvest care

A] Deterioration of varieties

i) Development variation :- seed grown in difficult environment condition such as different soil and fertile condition under different photoperiod or

different evolution or different stress conditions for several constitute generation the development variation may arise different growth response.

2] Mechanical mixture

i) more than one variety is sown in some pieces of land.

ii) when same drill used for sowing no. of variety.

Agronomic principle

1] selection of suitable Agro-climatic region.

→ variety should be adapted to photoperiod and temperature of that area.

→ moderate rainfall and humidity is good for seed production.

2] selection of seed plot

→ soil texture & fertility should be according to the requirement of the seed crops.

→ should be free from volunteer plants, weed plants, and other crop plant.

3] Isolation of seed crops

→ Done by providing distance between seed fields and contaminating field.

→ After harvesting isolation of seed produced of different varieties is necessary to avoid mechanical contamination.

4] Preparation of land

i) The land for seed crop must be prepared well.

ii) Good land preparation helps improved germination, good stand establishment & destruction of potential weeds.

Q12. Definations

1] plant breeding :- plant breeding is an art and science of changing genetic makeup of crop plants. in relation to their economic use.

2] Hybrid :- Hybrid refers to the progeny of cross between genetically different plant. hybrid is F1 generation of matting between genetically dissimal plants.

OR – The product of cross between genetically unlike individuals.

3] Genetic purity :- Genetic purity refers to the percentage of contamination by seeds or genetic material of other varieties or species.

4] Quality seed :- The seed of an improved variety which is genetically & physically pure, show high germination and high vigour have optimum moisture contain.

OR- seed have high genetic purity high germination percentage high physical purity.

5] Parental line / strain

Parental strains are defined as 'pure breeding' strain / line. This implies that they are homozygous for the alleles associated with a particular phenotypes.