Title: Seed production of vegetable, Tuber and spice crops

A **grain** is a small, hard, dry seed, with or without an attached hull or fruit layer, harvested for human or animal consumption.

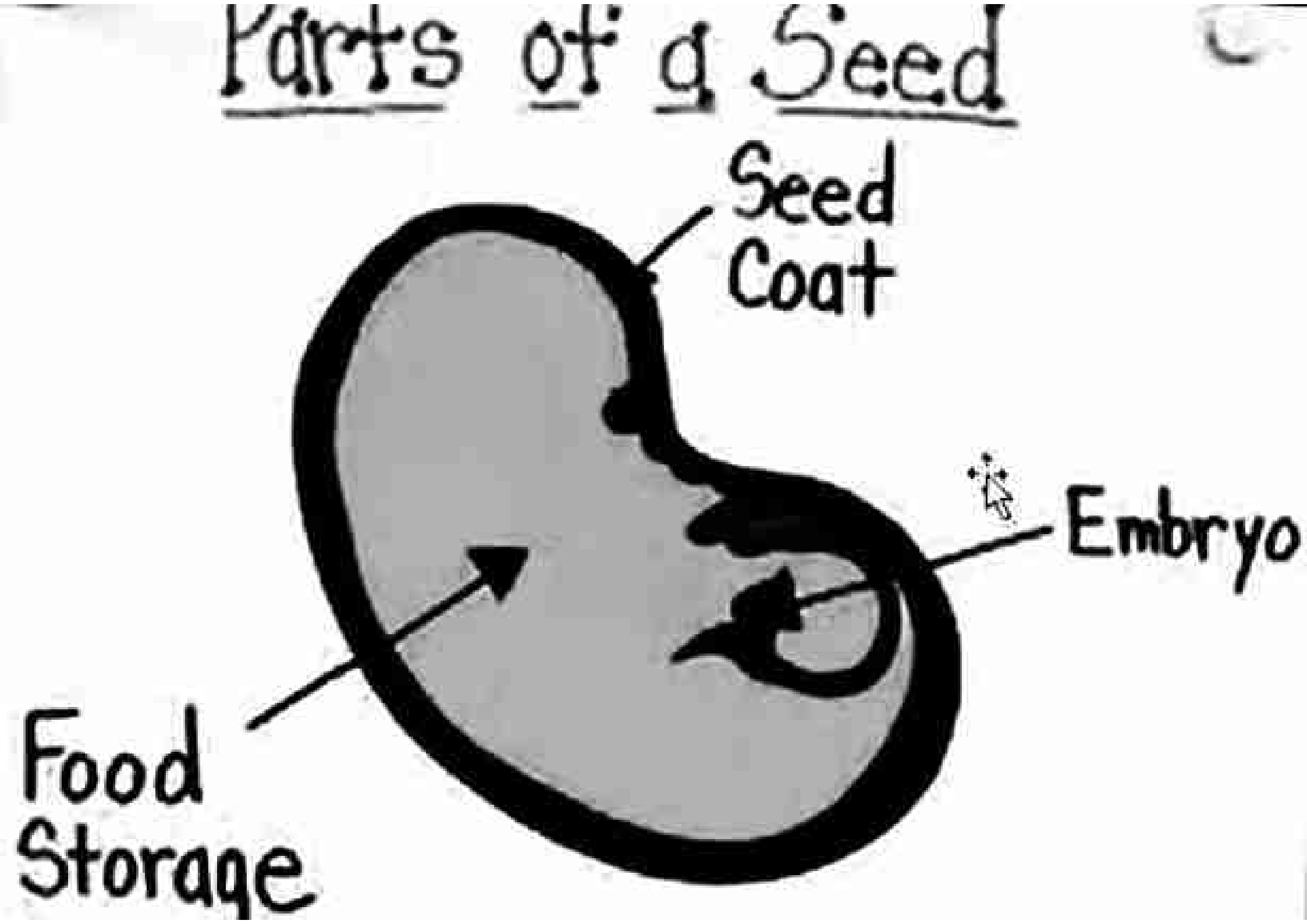
Seed is **defined** as a small embryonic "plant," enclosed by a covering called **seed** coat, with some stored food materials.

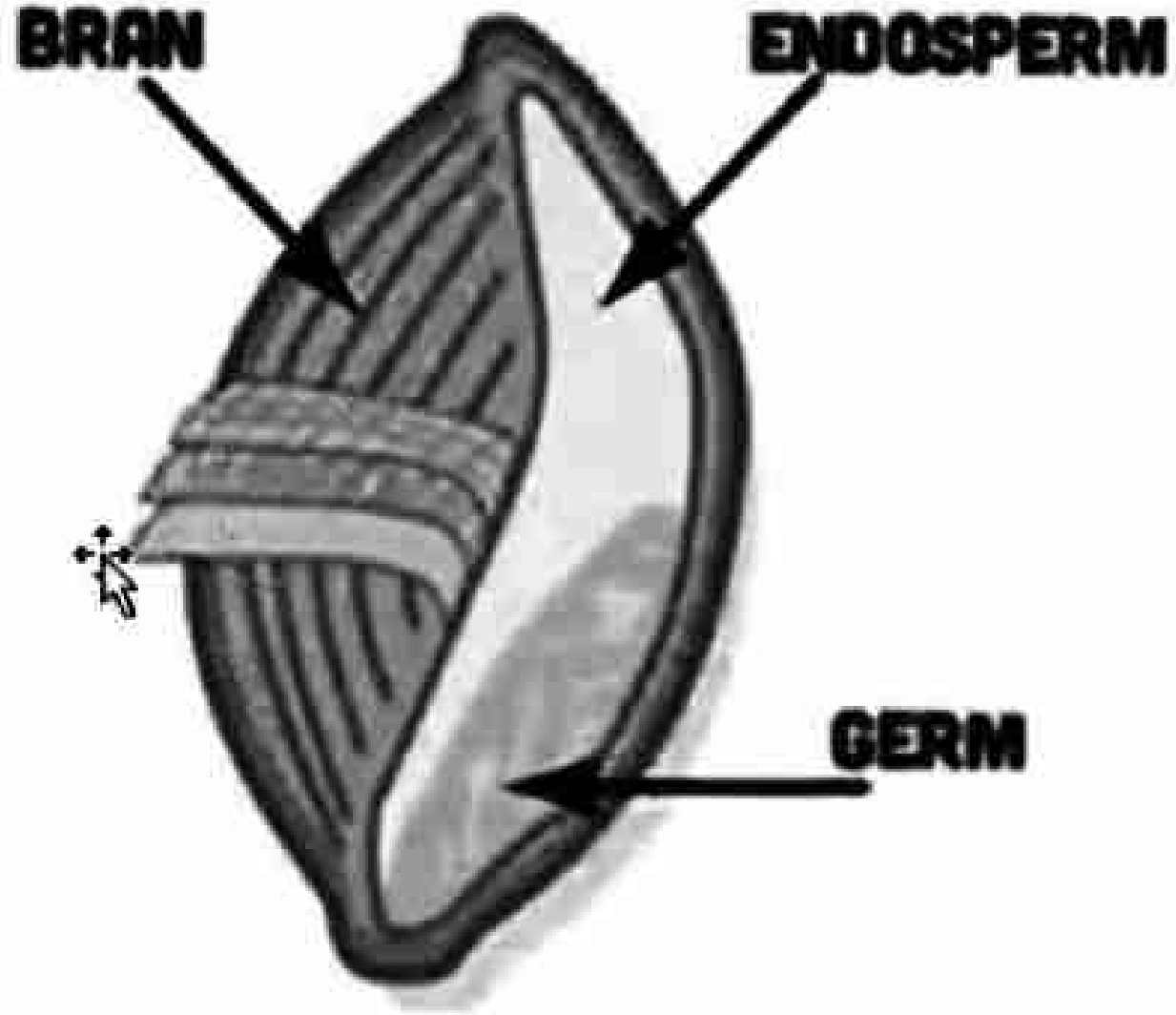
Seed Technology: The science which deals with production, harvesting, processing, testing, packaging, storing and marketing of seeds.

Seed	Grain
Unit of reproduction of a higher plant, capable of developing into another such plant	A single fruit or seed of a cereal used as food
seed is the embryonic plant produced as a result of sexual reproduction	grain is a type of seed or fruit which occurs mainly in grasses.
three main components of seed are the embryo, endosperm, and the seed coat	four components of grain are the embryo, endosperm, seed coat, and the bran
fruit covers the seed of flowering plants while gymnosperms produce naked seeds without a fruit.	grains contain a fusion of the seed coat and the fruit.
viability of seeds is important	viability of grains is not important

Seed	Grain
seed can develop into a new plant	grains are used as food.
Endosperm is used as food in seeds	while the fruit part is used as food in grains
Seeds may be treated with fungicides and pesticides	grains are not treated with fungicides or pesticides.
seeds come under the preview of seed acts	grains come under food acts.
pumpkin seeds, sunflower seeds, and sesame seeds	grains are wheat, rice, corn, and oats.

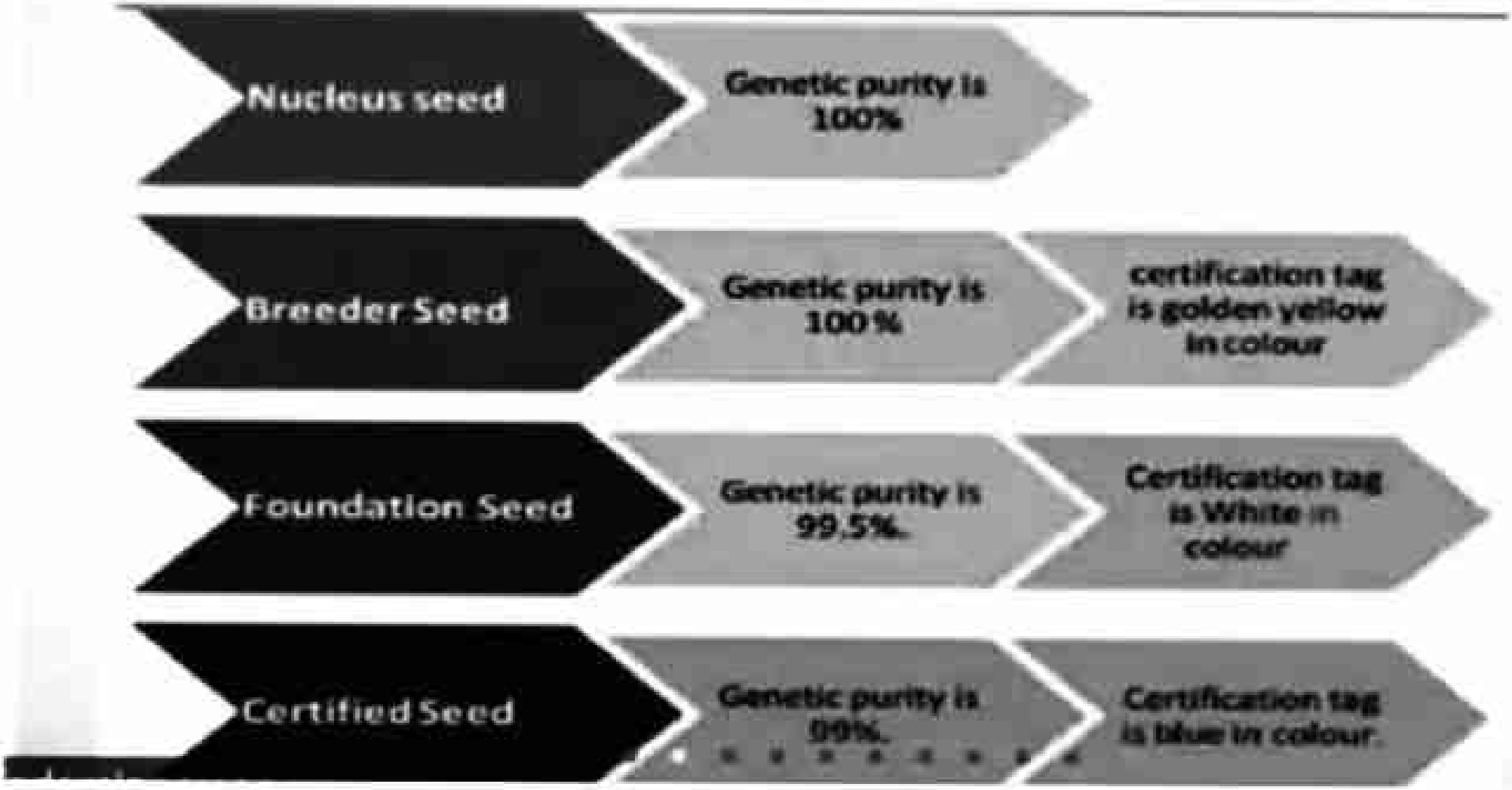
Parts of a Seed





GRAIN ANATOMY

Classes of seeds



FOUNDATION SEED

- It is the progeny of breeder seed or certified Foundation Seed itself.
- When it is the progeny of breeder seed it is called Foundation Seed Stage I.
- When it is the progeny of certified foundation seed-I, it is called; Foundation Seed Stage II

CERTIFIED SEED

- Certified seed is the seed, which is certified by a Seed Certification Agency notified under section 8 of the Indian Seeds Act (1966) or by any other foreign certification agency provided the concerned agency is recognized by the Government of India through notification in the Official Gazette. Contd-

- Generally, it is known as the progeny of foundation seed and its production is so handled as to maintain specified genetic identity and purity standards as prescribed for the crop being certified

Types of Certified Seed	Certified Seed
•	• Certified Foundation Stage I & II • Certified Seed Stage I & II

Seed multiplication system

- **A. Three - Generation model**

  Breeder seed - Foundation seed - Certified seed

- **B. Four - Generation model**

  Breeder seed - Foundation seed (I) Foundation seed (II) - Certified seed

- **C. Five - Generation model**

  Breeder seed - Foundation seed (I)- Foundation seed (II) -Certified seed (I) - Certified seed (II)

Types of seeds

(1) Dicotyledonous Exalbuminous Seeds

(2) Dicotyledonous Albuminous Seeds

(3) Monocotyledonous Albuminous Seeds

(4)Monocotyledonous Exalbuminous Seeds.

POLLINATION BEHAVIOUR IN VEGETABLE CROPS

A complete flower contains all four parts.

If only one of the essential organs is present or absent in a flower, it is called an incomplete flower.

Perfect or hermaphrodite : A flower consisting both stamens and pistil.

Staminate or male flower : A flower contains stamens but not pistil.

Pistillate or female flower : A flower contains pistils but not stamen.

Sex Expression

Gynoecious : Pure female flowers at every node.

Monoecious : Male and female flowers borne separately on same plant.

Gynomoecious : Female as well as hermaphrodite flowers on same plant.

Andromoecious : Male as well as hermaphrodite flowers on same plant.

[redacted] : Male and female flowers borne on separate plants.

The crop plants are broadly placed into three groups according to mode of their pollination.

a. Self pollinated crops
b. Often cross pollinated crops
c. Cross pollinated crops

Pollination - Transfer of pollen grains from anthers to stigmas.

or

Pollination - Transfer of pollen grain from the stamen (male flower part) to the pistil (female flower part).

Self-pollination

Pollen from an anther may fall on to the stigma of the same flower leading to self-pollination or autogamy.

Development of seed by self pollination is known as autogamy.

e. g. Beans, cluster bean, cowpea, garden pea, fenugreek, tomato, lettuce, brinjal, chillies, potato