Sangam SKM College – Nadi
Lesson Notes – Week 1
Year 13
Agricultural Science

Strand: Agronomy
Sub-strand: Horticulture
Content Learning Outcome: Demonstrate the skills of plant breeding and discuss its importance in plants.

Lesson Outcome i) define plant breeding.

ii) discuss the importance of plant breeding.

Lesson Notes

Plant breeding: is the art and science of changing the traits of plants in order to produce desired characteristics.

Importance of Plant Breeding

1. Food Security - developing varieties with higher productivity and better yield stability.

2. Social Benefits - developing more profitable varieties for poverty alleviation.

3. Economic benefits - developing drought resistant varieties that help reduce production costs, improving viability in marginal agribusinesses. - more profitable agribusiness results in more revenue and higher gross domestic product.

4. Environmental benefits - developing varieties less dependent on pesticides or more efficient in water and nutrient use.

STUDENT ACTIVITY 1. Define plant breeding.

2. State 2 importance of plant breeding.

LESSON 2 TYPES OF PLANT BREEDING

LESSON OUTCOME:

1. identify the different types of plant breeding

2. explain the advantages and disadvantages of each type of plant breeding.

Notes

1. **Inbreedin**g: is defined as the production of offspring via the mating between close relatives.

2. **Line breeding**: mating of selected members of successive generations among themselves in an effort to maintain or fix desirable characteristics.

3. **Out breeding**: is the practice of introducing unrelated genetic material into a breeding line.

4**. Crossbreeding**: the pollinating or breeding of plants that belong to different species, races, breeds, varieties to produce a hybrid.

Advantages and Disadvantages of Different Types of Plant Breeding

Type of Plant Breeding	Advantages	Disadvantages
Inbreeding	• increased uniformity (homozygosity) • increased pre-potency (ability to pass on traits to offspring) • "fixing" of desired traits and breed type	• lower fertility • lower "vigor" • birth defects • smaller size • fewer offspring • slower growth • higher offspring mortality • shorter lifespan • increase in genetic diseases • reduced "genetic potential" (ability to improve a trait)
Linebreeding	• increases a particular trait in a population • less likely to cause problems in the first generation	• reduces genetic diversity • small gene pool
Outbreeding	• it produces hybrids with desirable characters like high yielding, resistance to diseases etc.	• pure lines are created in outbreeding • hybrid plant is not always fertile • can destroy well adapted genotype because genotypes may not be viable
Crossbreeding	• Hybrid vigor or heterosis is maintained • Chances of acquiring broad genetic base are always there. • Process of evolution continues.	• Seed formation always depend on availability of pollinator • Lots of variability leads to heterozygosity and inconsistency in phenotypes. • Mixing of inferior genes takes place if pollinators are not controlled.

STUDENT ACTIVITY

1. List the four types of plant breeding.

2. Differentiate between outbreeding and inbreeding.

3. Explain the term heterosis.

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Lesson Notes- Week 2

Subject: Agricultural Science Year: 13

Strand	Agronomy
Sub strand	Horticulture
Content Learning Outcome	Explore innovative sustainable modern farming methods practiced in urban suburbs.

LESSON 1 INTRODUCTION

LESSON OUTCOME: Describe appropriate sustainable farming methods and how it benefits the community socially, economically and environmentally.

NOTES

Sustainable farming is farming ecologically by promoting methods and practices that are economically viable, environmentally sound and protect public health. Sustainable farming helps the farmers innovate and employ recycling methods. A very good example of recycling in sustainable farming would be the crop waste or animal manure. The same can be transformed into fertilizers that can help enrich the soil. Another method that can be employed is crop rotation. This helps the soil maintain its nutrients and keeps the soil rich and potent. Collection of rainwater via channeling and then its utilization for irrigation is also a good example of sustainable farming practices.

Benefits of Sustainable Farming

1. Environment Preservation
2. Economic Profitability
3. Most efficient use of non-renewable resources
4. Protection of Public Health
5. Social and Economic Equity

Student Activity

1. Define sustainable farming.
2. State two examples of sustainable farming practiced in Fiji.
3. Explain one benefit of sustainable farming in relation to protecting the environment.

LESSON 2 URBAN AGRICULTURE

LESSON OUTCOME:

1. Define urban agriculture.
2. Identify different types of urban agriculture.
3. State the advantages and disadvantages of agriculture.

NOTES

Urban Agriculture can be defined as the growing, processing, and distribution of food and other products through plant cultivation and seldom raising livestock in and around cities for feeding local populations. Urban agriculture has increased in popularity due to concerns about climate change and sustaining food security in urban areas.

Examples of Urban Agriculture

- Community Gardens
- Small Urban Farms
- Farmer's Markets
- Home Vegetable Gardens
- Hydroponic Gardening
- School Gardens
- Roof Top Vegetable Gardening
- Backyard Poultry
- Beekeeping
- Fish Farming

Advantages of Urban Agriculture

1. Contributes to food security, nutrition and livelihoods in a combination of ways
2. Provides for family self-consumption.
3. Provides a source of income.
4. Improves the supply of local markets with fresh and micronutrient rich food.
5. Creates community bonds and social interaction.

Disadvantages of Urban Agriculture

1. The use of waste water for irrigation can result in the spread of diseases.
2. Cultivation on contaminated land also represents a health hazard for the consumers.
3. Cultivating along roadsides is also a risky practice since it exposes food to car pollution.
4. Legal restrictions and economic impediments to accessing land and resources.
5. Lack of security of tenure also acts as a preventive for farming.

Student Activity

1. Define urban agriculture
2. State 2 advantages of urban agriculture.

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Lesson Notes- Week 3

Subject: Agricultural Science Year: 13

Strand	Agronomy
Sub strand	Horticulture
Content Learning Outcome	Explore innovative sustainable modern farming methods practiced in urban suburbs.

LESSON 1 PERMACULTURE

LESSON OUTCOME:

1. Define permaculture
2. State the advantages of permaculture

NOTES

Permaculture is an innovative framework for creating sustainable ways of living. It is a practical method of developing ecologically harmonious, efficient and productive systems that can be used by anyone. • Permaculture encourages us to be resourceful and self-reliant. It is an ecological design system which helps us find solutions to the many problems facing us - both locally and globally.

Advantages of Permaculture

1. **Reduced Cost** -Using all the natural components of the ecosystem like composting.
2. **Less Waste** - Waste products are recycled and manure back to the earth.
3. **Chemical Resistance** -Natural fertilizers and mulch are used for farming and gardening.
4. **Less Pollution**-The natural way of agricultural cultivation, pollution is reduced
5. **Self- reliance and diversity-** Anyone can produce a diverse range of produce.
6. **Promotes Green Living-** Permaculture uses natural fertilizers, natural pesticides, and freshwater reserves.
7. **Helpful in Improving Environmental Conditions**-Teaches different ways of attaining sufficient and sustainable agriculture in a way beneficial for the environment.

STUDENT ACTIVITY

1. Define permaculture.
2. State 2 advantages of permaculture.

LESSON 2 ROOF GARDENING

LESSON OUTCOME:

1. Define roof gardening
2. State the advantages and disadvantages of roof gardening

NOTES

Roof garden is the practice of cultivating food on the rooftop of buildings. Besides the decorative benefit, roof plantings may provide food, temperature control, hydrological benefits, architectural enhancement, habitats or corridors for wildlife, recreational opportunities, and in large scale it may even have ecological benefits.

Advantages of Rooftop Garden

1. Increase access to private outdoor green space-at home.
2. Support urban food production
3. Promote individual, community, and cultural diversity
4. Improve air quality and reduce CO2 emissions
5. Delay storm water runoff
6. Increase habitat for birds
7. Insulate buildings
8. Increase the value of buildings for owners and tenants alike
9. Create job opportunities.

Disadvantages of Rooftop Garden

1. Needs regular maintenance
2. Establishment cost is high
3. Attracts pest, insects which can be harmful to human
4. Needs close monitoring in terms of drainage and irrigation
5. Suitable for only certain type of crops and vegetables.

STUDENT ACTIVITY

1. Define roof gardening.
2. State one purpose of roof gardening
3. Differentiate between a backyard garden and a roof garden in relation to the selection in vegetables to be planted.