

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
МИКОЛАЇВСЬКИЙ НАЦІОНАЛЬНИЙ АГРАРНИЙ УНІВЕРСИТЕТ

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початкового рівня (короткий цикл) спеціальності
201 «Агрономія» денної форми навчання

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ЗМІСТ

ПЕРЕДМОВА	4
I. СЛОВНИК ФАХОВИХ ТЕРМІНІВ	6
II. ЧИТАННЯ	7
Текст 1	7
Текст 2	8
Текст 3	8
Текст 4	9
Текст 5	9
III. ПИТАННЯ ДО ТЕКСТІВ	10
IV. ЛЕКСИКО-ГРАМАТИЧНІ ТЕСТИ	10
Тест 1	10
Тест 2	11
Тест 3	12
Тест 4	13
Тест 5	14
Тест 6	15
Тест 7	16
V. ВПРАВИ	17
VI. ФАХОВІ ТЕКСТИ ДЛЯ САМОСТІЙНОГО ЧИТАННЯ	18
VII. ГОВОРІННЯ (питання для обговорення спеціальність 201 «Агрономія»)	32
ЛІТЕРАТУРА	35

ПЕРЕДМОВА

Вища освіта є фундаментом розвитку людства і кожного суспільства зокрема. Безумовно, вона також є гарантом індивідуального розвитку особистості, сприяє формуванню інтелектуального, духовного і виробничого потенціалу суспільства. Тому розвиток держави, структурні перетворення на мікро- і макроекономічному рівнях мають гармонійно поєднуватися з модернізацією освіти, щоб задовольнити потреби і прагнення людей, особливо молоді, сформувати нову систему суспільних цінностей у сфері діяльності, в громадському і приватному секторах. Підготовка здобувачів в Миколаївському національному аграрному університеті здійснюється з урахуванням вищевказаних умов та вимог сучасності за відповідними освітніми та освітньо-науковими програмами на різних рівнях вищої освіти: початковий рівень (короткий цикл); перший (бакалаврський) рівень; другий (магістерський) рівень; третій (освітньо-науковий/освітньо-творчий) рівень.

Знання іноземних мов як засобу соціального спілкування є невід'ємною частиною суспільного розвитку нашого часу. Геополітичне місце та сучасний економічний стан України, сусідство з Європейським Союзом, все тісніші політичні, економічні, культурні та інші суспільні контакти з англійськими країнами, а також процес інтеграції в Європу вимагають знання іноземних мов, зокрема англійської мови як обов'язкового компоненту у галузі вищої освіти. Дані методичні рекомендації та навчальний матеріал призначені для аудиторних занять та самостійної роботи здобувачів вищої освіти освітнього ступеня «Молодший бакалавр» початкового рівня (короткий цикл) спеціальності 201 «Агрономія» денної форми навчання з дисципліни «Іноземна мова за професійним спрямуванням (англійська)» (загальна кількість годин 150: практичні заняття 126 год, самостійна робота 24 год.).

Мета даних методичних рекомендацій – розвиток навичок читання фахових текстів та навичок говоріння за різними напрямками спеціальності 201 «Агрономія», активізація лексико-граматичного матеріалу фахової термінології у здобувачів вищої освіти та перевірка їх знань шляхом виконання різнорівневих вправ та тестів. Методичні рекомендації складаються з семи блоків (I. Словник фахових термінів, II. Читання, III. Питання до текстів, IV. Лексико-

граматичні тести рівня (A1–B2), V. Вправи, VI. Фахові тексти для самостійного читання, VII. Говоріння (питання для обговорення спеціальність 201 «Агрономія»). Видання підготовлено згідно з трансферно-модульною системою. Методичні рекомендації містять тексти фахової спрямованості, що допомагають здобувачам вищої освіти поглибити та систематизувати їхній активний словниковий запас, необхідний у майбутній професії, а також набути практичних умінь і навичок англійського мовлення. На кожен блок методичних рекомендацій відводиться 3-4 години аудиторних занять та 3-5 годин самостійної роботи. За роботу на аудиторних заняттях здобувач може отримати 15-25 балів. Кожен текст зі спеціальності має два типи завдань: дати відповіді на запитання до тексту та пояснити значення термінів з фаху, поданих у тексті. За кожне завдання здобувач може отримати 5-10 балів. Говоріння ділиться на монологічне та діалогічне. Метою блока говоріння є навчити здобувачів вищої освіти логічно і послідовно, відповідно до навчальної ситуації робити розгорнуте повідомлення в межах тематики, визначеної програмою; передати зміст прочитаного або почутого у формі розповіді, опису; дають оцінку прочитаному або почутому; робити підготовлене повідомлення, самостійно добираючи матеріал. За доповіді в обсязі 10-20 речень здобувач може отримати від 10-20 балів.

Для підготовки методичних рекомендацій використовувались матеріали із новітніх підручників, автентичних джерел та періодичних видань.

I. СЛОВАНИК ФАХОВИХ ТЕРМІВІВ (KEY VOCABULARY)

Baler/ baling machine (n.)= an agricultural machine for making bales of hay

Crop (n.)= cultivated plants or agricultural produce like vegetables, fruit, Cereals

Cultivator (n.) = an implement/machine for loosening the soil and destroying weeds around growing plants

Harrow(n.) = agricultural implement used to level the ground, stir the soil, destroy weeds

To harrow(v.) = to draw a harrow over land

Harvest(n.) = the process of harvesting a crop

To harvest (v.) = to gather a crop

Herbicide(n.) = a chemical substance that destroys plants especially one used to control weeds

Plow/ plough (n.) =a farm implement consisting of a strong blade at the end of a beam usually used for breaking up soil in preparation for sowing

To plow/ plowed/plowing/ plows

To plough /ploughed/ploughing/ ploughs = to break and turn over earth with a plow

Reaper (n.) =an implement/machine used in agriculture for harvesting grain/ crop

To reap (v.) = to cut grain for harvest with a sickle or reaper

Baler/ baling machine (n.)= an agricultural machine for making bales of hay

Crop (n.)= cultivated plants or agricultural produce like vegetables, fruit, cereals

Cultivator (n.) = an implement/machine for loosening the soil and destroying weeds around growing plants

Harrow(n.) = agricultural implement used to level the ground, stir the soil, destroy weeds

To harrow(v.) = to draw a harrow over land

Harvest(n.) = the process of harvesting a crop

II. ЧИТАНИЈА (READING)

ТЕКСТ 1.

CULTIVATION

Preparation of crops requires several stages and practices. The first stage refers to the preparation of the soil. This includes:

- soil acidity can be improved with the help of lime, sulphur, phosphorous;

- nutrient-deficient soil needs fertilizers;

- some fields require treatment with herbicide;

During the seeding stage the farmer has to take into account the following aspects: seeding rate, plant density.

Before cultivation it is very important to prepare the topsoil. If the soil is nutrient-deficient, farmers must add fertilizer. Once the soil temperature is right, planting can begin. The planting of seeds will vary by crop. Agricultural sites have different growing seasons based on elevation, growing degree days, last frost dates. When the crop matures the farmers need to harvest it. Harvesting, the gathering of a ripened crop is the most important stage of the cultivation process. Farmers need the appropriate equipment for planting and cultivating the crop. The machines and implement farmers use for planting and for preparing the field include:

- broadcast seeder which spreads seeds and fertilizer;

- the rototiller used for turning the soil perfectly;

- seed drill for planting;

- chisel plow/cultipacker used for preparing fields

- tractors which are used to harrow fields and to plow;

- harrow, a traditional farm / agricultural equipment consisting of a heavy frame with sharp teeth or up right disks; Harrows are suitable for topsoil, they were used traditionally for cleaning away stubble of plants before tillage.

- cultivators, designed to destroy weeds with shallow roots and to break up surface soil near plants for aeration.

- ploughs are used in farming for initial cultivation of soil in preparation for sowing seed or planting.

Harvesting equipment saves time and reduces the quantity of waste. The mechanization of agriculture reduces the overall cost of production and increases the total agricultural yield. Harvesting equipment consists of a reaping part and a baler part. Therefore, the rear

several types of harvesting machines which are generally classified by crops:

- reapers are used for cutting cereal grains.
- threshers for separating the seed from the plant.

Harvesting equipment includes:

- combine harvester, a farming machine that harvests crops of grain
- gleaner, harvestmachine that is not powered by gas or fuel

TEKCT 2.

TRACTORS

Tractor is useful when it supplies power to machines. Power can be supplied by the tractor in various forms. The tractor can pull or push machines, it can supply power to machines from the power-take-off shaft and it can drive machines by means of a belt from a belt pulley. The tractor power is produced by the engine and is measured by horsepowers (hp) or kilowatts. There are tractors with engine power from 3 to 300 hp. Tractors are classified according to the maximum power that their engine can produce. The crawlers or tracklaying tractors are large; they are used for heavy operations, such as road making or dam building.

Large tracks increase the grip of the tractor on the ground, and the crawlers are able to push or pull heavy loads and machines.

TEKCT 3.

COMBINE HARVESTERS

Combine harvesters are used to harvest various crops. The combine cuts the crop, threshes it, separates the grain from the straw and chaff. The mechanism of a combine harvester can be divided into three sections. They are cutting, threshing and finally separating the grain from the straw and chaff. To cut the crop a reciprocating type cutter bar is used. There is a divider at each side of the cutter bar. It separates the crop to be cut from that which will be left for the next round. The crop is cut while held against the cutter bar by the reel. After the crop is cut, the reel directs it to the cutter bar platform. The reel is one of the main parts of a combine. It has tines which can be angled to provide better cutting of the crops. A large auger moves the crop to the centre of the platform. By means of tines the auger directs the crop to the main elevator which lifts the crop to the threshing mechanism. The threshing mechanism consists of front beater, a heavy rotating drum, a concave and a rear beater.

TEKCT 4. TILLAGE MACHINES

Tillage Machines. Research has demonstrated that normally the mold-board plow is the most efficient machine for pulverizing the soil and covering the trash to provide a satisfactory seed-bed. Extra tillage can be obtained during the plowing and planting operations so that no additional trips over the field are necessary. Other tillage machines have been studied, however, and deserve mention. On soils that are easy to pulverize, a seed-bed can be prepared with a field cultivator without using a plow. Narrow chisels on the machine make it possible to till deeper with less power. These chisels tend to leave the soil open, which is an advantage in the fall because rain and snow can enter the open soil easily. If chisels are used in the spring, however, moisture may be lost from the open soil, so it is desirable to pull a harrow behind the cultivator to level the soil.

TEKCT 5. PLOUGHS

The plough has been used in its different forms for many centuries. It has become the main implement used for the preparation of seedbeds.

A plough is an implement with one or more mould boards which cut and turn the soil. Modern ploughs are commonly fully mounted on the tractor hydraulic system. Some are semi-mounted with the front supported by the tractor hydraulic linkage and the rear by one or more wheels. A semi-mounted plough is not lifted off the ground. The number of mouldboards on a plough will depend on the type of soil and the tractor size. Ploughs with up to six mouldboards are in common use. There are three main types of ploughs: 1) Conventional ploughs with right-handed mouldboards. They are usually fully mounted but some semimounted and trailed models are also in use. 2) Reversible ploughs having left- and right-handed mouldboards, we can plough up and down in the same furrow Most of them are mounted, but some of the larger models are semi-mounted. Reversible ploughs produce a very level finish. 3) Disc ploughs are rarely used in Great Britain. In place of the mouldboards they have large rotating discs which cut and turn the soil slice.

III. ПИТАННЯ ДО ТЕКСТІВ

Answer the following questions:

1. What factors must farmers take into account during the seeding stage?
2. What examples of harvesting equipment can you give?
3. What must farmers do before cultivation?
4. Is soil preparation important?
5. What are reapers used for?
6. What machines/ implements plow the land?
7. What machines / implements are used to destroy weeds?

IV. ЛЕКСИКО-ГРАМАТИЧНІ ТЕСТИ

ТЕСТ 1

1. Farmers will develop fertile by rotating crops and using compost.
 - a. soil;
 - b. crop;
 - c. nutrients;
2. If farmers use zero tillage methods, they will leave residues in place.
 - a. fertilizers;
 - b. crop;
 - c. harvesting;
3. equipment consists of a reaping part and a baler part.
 - a. harvesting;
 - b. crop;
 - c. gathering;
4. are used in farming for initial cultivation of soil in preparation for sowing seed or planting.
 - a. ploughs;
 - b. tractors;
 - c. cultivators;
5. Reapers are used for cutting cereal grains.
 - a. harrows;
 - b. tractors;
 - c. reapers;
6. Cultivators are designed to destroy with shallow roots and to break up surface soil near plants for aeration.
 - a. plants;
 - b. weeds;

c. seeds

TECT 2

1. February is the _____ month of the year.
 - a) third
 - b) fifth
 - c) second
2. November is the _____ month of the year.
 - a) tenth
 - b) eleventh
 - c) twelfth
3. Wednesday is the _____ day of the week.
 - a) third
 - b) fourth
 - c) first
4. May is the _____ month of the year.
 - a) fifth
 - b) fourth
 - c) first
5. December is the _____ month of the year.
 - a) eighth
 - b) eleventh
 - c) twelfth
6. We live in the _____ century.
 - a) nineteenth
 - b) twenty-one
 - c) twenty-first
7. Saturday is the _____ day of the week.
 - a) sixth
 - b) third
 - c) seventh
8. There are four children in the family. Paul is the youngest. He is the _____ child in the family.
 - a) fifth
 - b) fourth
 - c) first
9. September is the _____ month of the year.
 - a) ninth
 - b) nine
 - c) tenth

10. The year begins on the _____ of January.
- a) first
 - b) one
 - c) thirty-first

TECT 3

1. Cinderella had two cruel _____.
- a. step-sisters
 - b. steps-sisters
 - c. step-mother
2. There were ten _____ in the choir.
- a. woman-singers
 - b. women-singers
 - c. womens-singer
3. _____ are so beautiful.
- a. Forget-me-nots
 - b. Forget-mes-nots
 - c. Forgets-me-nots
4. There is nothing like _____ for me.
- a. lilies-of-the-valley
 - b. lilies-of-the-valleys
 - c. lilyes-of-the-valleys
5. She had two _____.
- a. brothers-in-law
 - b. brother-in-laws
 - c. brothers-in-laws
6. Both his grannies are _____.
- a. housewifes
 - b. housewives
 - c. housewife
7. Letters, newspapers and magazines are delivered by _____.
- a. postmen
 - b. postman
 - c. postmans
8. There had been no _____ till the second half of the 19th century.
- a. women-doctor
 - b. women-doctors

- c. womans-doctor
9. There were some thrilling _____ in the park.
- merry-goes-rounds
 - merry-go-rounds
 - merrys-goes-rounds
10. All the _____ smiled at the scene.
- passer-byes
 - passers-by
 - passers-byes

TECT 4

- I... she ... you.
 - think, likes
 - am thinking, is liking
 - think, is liking
- What ... ?
 - does she want
 - does she wants
 - she wants
- Grandmother is in the kitchen. She ... a cake now.
 - is making
 - makes
 - make
- We ... a holiday last year.
 - did not have
 - have not had
 - had not have
- Dad ... on Saturdays.
 - is usually work
 - usually works
 - are usually working
- Where is Jane? – She ...the shops. She will be back soon.
 - went
 - has gone to
 - goes
- I ... glad to see you. How ... you?
 - is, are
 - am, are
 - are, is
- Mag and her sister ... live in Rome.

- a) are not
 - b) does not
 - c) do not
9. ...it raining yet?
- a) Did it stop
 - b) Is it stopped
 - c) Has it stopped
10. Where is John? He ... in the garden.
- a) is working
 - b) works
 - c) does work

TECT 5

1. Boris _____ hard.
- a. study
 - b. studies
 - c. studi
2. We _____ in Berlin.
- a. live
 - b. lives
 - c. life
3. Mike and Bob _____ good friends.
- a. is
 - b. are
 - c. does
4. The teacher _____ tasks on the blackboard.
- a. write
 - b. writes
 - c. writed
5. Mother _____ a lot of work about the house.
- a. do
 - b. does
 - c. is
6. The children _____ in the yard.
- a. play
 - b. plays
 - c. plaing
7. She _____ to watch TV.
- a. like

- b. likes
 - c. liking
8. Mary _____ roses.
- a. picks up
 - b. pick ups
 - c. pick up
9. Boris _____ early in the morning.
- a. gets up
 - b. get ups
 - c. get up
10. Mother _____ the dishes after every meal.
- a. washes up
 - b. wash ups
 - c. wash up

TECT 6

1. There had been no _____ till the second half of the 19th century.
- a. women-doctor
 - b. women-doctors
 - c. womans-doctor
2. There were some thrilling _____ in the park.
- a. merry-goes-rounds
 - b. merry-go-rounds
 - c. merrys-goes-rounds
3. All the _____ smiled at the scene.
- a. passer-byes
 - b. passers-by
 - c. passers-byes
4. Boris _____ hard.
- a. study
 - b. studies
 - c. studi
5. We _____ in Mykolayiv.
- a. live
 - b. lives
 - c. life
6. Mike and Bob _____ good friends.
- a. is

- b. are
- c. does
- 7. The teacher _____ tasks on the blackboard.
 - a. write
 - b. writes
 - c. writed
- 8. Mother _____ a lot of work about the house.
 - a. do
 - b. does
 - c. is
- 9. The children _____ in the yard.
 - a. play
 - b. plays
 - c. plaing
- 10. She _____ to watch TV.
 - a. like
 - b. likes
 - c. liking

TECT 7

- 1. The Hills managed to arrive exactly in time because they ... a taxi.
 - a. took
 - b. had taken
 - c. taked
- 2. The sun ..., it ... dark, and we went home.
 - a. set, got
 - b. had set, got
 - c. had got, set
- 3. What ...? –She is a secretary at our college.
 - a. is she doing
 - b. she does
 - c. does she do
- 4. I think I ...it tomorrow.
 - a. does
 - b. do
 - c. shall do
- 5. Who ...the window?
 - a. open
 - b. opened
 - c. did opened

6. I did not ... he was at home.
 - a. to think
 - b. think
 - c. thought
7. My friend is a writer. He ...6 stories.
 - a. has already written
 - b. wrote already
 - c. writed
8. ... you like swimming?
 - a. Do
 - b. Does
 - c. Are
9. We _____ in London.
 - a. live
 - b. lives
 - c. life
10. Mike and Bob _____ good friends.
 - a. is
 - b. are
 - c. does

V. BIIPABU (EXERCISES)

1. Fill in the blanks with the correct words and phrases:

harvest, planter, seeding, no-till, chisel plow, cultivators, harrow.

1. Farmers different parts of the plants: seeds, fruit, root.
2. To get rid of weeds farmers can use which break apart soil and weeds.
3. The implement that breaks soil and smoothens the ground is the
4. Theis an instrument which is attached to a tractor and goes deep in earth to turn soil.
5. The is the implement attached behind a tractor that lays seeds down in rows.
6. farming is a technique that reduces soil erosion. 7. Many farmers work hard to raise a crop from to harvest.

2. Match the words with their definitions:

1. broadcast seeder.
2. rototiller.
3. cultipacker
4. seed drill

5. tractor.
6. stone picker
 - a. a device that flattens soil
 - b. a device that spreads seeds and fertilizer over a field
 - c. a device that puts seeds into the ground
 - d. a device that turns over soil
 - e. a device that separates stones from soil
 - f. a vehicle that pulls farm equipment

3. Translate:

1. Let's talk about signs of summer. What can we see and where can we go in summer?
2. Can we go to the garden/ to the dacha? Yes we can.
3. What usually grows in the garden? Vegetables and fruits!
4. What kinds of vegetables grow in our garden? Tomatoes, cucumbers, carrots, cabbages, beetroot, pumpkins, eggplants and zucchinis!
5. What fruits and berries grow in our garden? Apples, cherries, strawberries, pears, apricots, plums, wild apples, current, gooseberries.
6. What greens grow there? Parsley, dill, leek, lettuce know where all these fruit and vegetables come from?
7. They all come from a seed.
8. Look, this is a seed. We take it and plant it in the ground.
9. Then it appears above the ground.
10. It grows and grows and grows finally into a big plant, flower or a tree.

VI. ФАХОВІ ТЕКСТИ ДЛЯ САМОСТІЙНОГО ЧИТАННЯ ТЕКСТ 1

AGRICULTURE AS ART, SCIENCE AND BUSINESS OF CROP PRODUCTION

Agriculture is defined as the art, the science and the business of producing crops and the livestock for economic purposes.

As an art, it embraces knowledge of the way to perform the operations of the farm in a skillful manner. The skill is categorized as; Physical skill: It involves the ability and capacity to carry out the operation in an efficient way for e.g., handling of farm implements, animals etc., sowing of seeds, fertilizer and pesticides application etc.

Mental skill: The farmer is able to take a decision based on experience, such as (i) time and method of ploughing, (ii) selection of crop and cropping system to suit soil and climate, (iii) adopting improved farm practices etc.

As a science : It utilizes all modern technologies developed on scientific principles such as crop improvement/breeding, crop production, crop protection, economics etc., to maximize the yield and profit. For example, new crops and varieties developed by hybridization, transgenic crop varieties resistant to pests and diseases, hybrids in each crop, high fertilizer responsive varieties, water management, herbicides to control weeds, use of bio-control agents to combat pest and diseases etc.

As the business : As long as agriculture is the way of life of the rural population, production is ultimately bound to consumption. But agriculture as a business aims at maximum net return through the management of land, labour, water and capital, employing the knowledge of various sciences for production of food, feed, fibre and fuel. In recent years, agriculture is commercialized to run as a business through mechanization.

TEKCT 2

BRANCHES OF AGRICULTURE

Agriculture has 3 main spheres viz., Geoponic (Cultivation in earth-soil), Aeroponic (cultivation in air) and Hydroponic (cultivation in water). Agriculture is the branch of science encompassing the applied aspects of basic sciences. The applied aspects of agricultural science consists of study of field crops and their management (Arviculture) including soil management.

Crop production - It deals with the production of various crops, which includes food crops, fodder crops, fibre crops, sugar, oil seeds, etc. It includes agronomy, soil science, entomology, pathology, microbiology, etc. The aim is to have better food production and how to control the diseases.

Horticulture - Branch of agriculture deals with the production of flowers, fruits, vegetables, ornamental plants, spices, condiments (includes narcotic crops-opium, etc., which has medicinal value) and beverages.

Agricultural Engineering - It is an important component for crop production and horticulture particularly to provide tools and implements.

It is aiming to produce modified tools to facilitate proper animal husbandry and crop production tools, implements and machinery in animal production.

Forestry - It deals with production of large scale cultivation of perennial trees for supplying wood, timber, rubber, etc. and also raw materials for industries.

Animal Husbandry - The animals being produced, maintained, etc. Maintenance of various types of livestock for direct energy (work energy). Husbandry is common for both crop and animals. The objective is to get maximum output by feeding, rearing, etc. The arrangement of crops is done to get minimum requirement of light or air. This arrangement is called geometry. Husbandry is for direct and indirect energy.

Fishery Science - It is for marine fish and inland fishes including shrimps and prawns.

Home Science - Application and utilization of agricultural produces in a better manner. When utilization is enhanced production is also enhanced. e.g., a crop once in use in south was found that it had many uses now.

On integration, all the seven branches, first three is grouped as for crop production group and next two for animal management and last two as allied agriculture branches. Broadly in practice, agriculture is grouped in four major categories as,

- A. Crop Improvement (i) Plant breeding and genetics
(ii) Bio-technology
- B. Crop Management (i) Agronomy
(ii) Soil Science and Agricultural Chemistry
(iii) Seed technology
(iv) Agricultural Microbiology
(v) Crop-Physiology
(vi) Agricultural Engineering
(vii) Environmental Sciences
(viii) Agricultural Meteorology
- C. Crop Protection (i) Agricultural Entomology
(ii) Plant Pathology
(iii) Nematology
- D. Social Sciences (i) Agricultural Extension
(ii) Agricultural Economics
- Allied disciplines (i) Agricultural Statistics

- (ii) English and Tamil
- (iii) Mathematics
- (iv) Bio-Chemistry etc.

TEKCT 3

IMPORTANCE OF IRRIGATION MANAGEMENT

Plants and any form of living organisms cannot live without water, since water is the most important constituent of about 80-90% of most plant cell. Water is essential not only to meet agricultural needs but also for industrial purposes, power generation, live stock maintenance, rural and domestic needs etc. But the resource is limited and cannot be created as we require.

Irrigation is the artificial application of water made for supplementing the moisture in the soil that is deficient and does not meet the full requirements of growing crops. Irrigation is essentially a practice of supplementing the natural precipitation for increasing production of agricultural and horticultural crops.

(a) Effective irrigation - It is the controlled and uniform application of water to cropland in required amount at the required time, to produce optimum yields. The cost of irrigation must be kept minimum and irrigation should be done without any wastage of water, which may cause adverse effect on the soil in the form of soil salinity and water logging problems. Almost all major crops are grown under irrigated condition. The most important one is rice in Tamil Nadu, which constitutes 67.5% of the total area under irrigation. The crops irrigated with flow irrigation from rivers and tanks are mostly rice and sugarcane and to a smaller extent banana and turmeric.

(b) Irrigation management - Regulating the activities based on the various resources for its efficient use and better out put i.e., allocation of all the resources for maximum benefit and to achieve the objectives, without eroding the environment is called management. Otherwise, it can be stated as planning, executing, monitoring, evaluating and re-organizing the whole activities to achieve the target.

Management of water based on the soil and crop environment to obtain better yield by efficient use of IRRIGATION AND WATER MANAGEMENT water without any damage to the environment. Management of water, soil, plants, irrigation structure, irrigation reservoirs, environment, social set up and it's inter liked relationship are studied in the irrigation management. Knowledge on the following aspects is necessary to device proper irrigation management.

- The soil physical and chemical properties,
- Biology of crop plants,
- Quantity of water available,
- Time of application of water,
- Method of application of water,
- Climatological or meteorological influence on irrigation, and
- Environment and its changes due to irrigation.

Management of all the above said factors constitute Irrigation Agronomy: Management of irrigation structures, conveyances, reservoirs constitute Irrigation Engineering; and social set up, activities, standard of living, irrigation policies, irrigation association and farmer's participation, cost of irrigation etc., constitute Socio-economic study. Irrigation management is a complex process of art and science involving application of water from source to crop field. The source may be a river or a well or a canal or a tank or a lake or a pond.

Maintaining the irrigation channels without leakage and weed infestation, applying water to field by putting some local check structure like field inlet and boundaries for the area to be irrigated etc., need some skill. These practices are the art involving practices in irrigation management. Time of irrigation and quantity of water to be applied (when to irrigate? and how much to irrigate?) based on soil types, climatic parameters, crop, varieties, growth stages, season, quality of water, uptake pattern of water by plants, etc., and method of application (How best to irrigate) includes conveyance of water without seepage and percolation losses and water movement in soil, are the process involving scientific irrigation management. Simply, it is a systematic approach of art and science involved in soil, plant and watery proper management of the resources (soil, plant and water) to achieve the goal of crop production.

(c) Importance - Irrigation management is very important

- To the development of nation through proper management of water resources for the purpose of crop production and other activities such as industrialization, power generation etc., which in turn provides employment opportunities and good living condition of the people.
- To store and regulate the water resources for further use or non-season use.

- To allocate the water with proper proportion based on area and crop under cultivation. (Balanced equity in distribution).
- To convey the water without much loss through percolation and seepage (Efficiency in use).
- To apply sufficient quantity to field crops (Optimization of use).
- To utilize the water considering cost-benefit (Economically viable management).
- To distribute the available water without any social problem (Judicial distribution).
- To meet the future requirement of agricultural and other sections (Resource conservation).
- To protect the environment from over use or misuse of water (Environment safe use).

TEKCT 3 ORGANIC MANURES

Organic manures include plant and animal by-products such as oil cakes fish manures and dried blood from slaughter houses. Before their organic nitrogen used by the crops it is converted through bacterial action into readily usable ammonical N and nitrate N. These manures are therefore, relatively slow acting, but they supply available N for a longer period.

Advantages - Organic manures supply plant nutrients including micronutrients. Organic manures improve physical properties of the soil, water holding capacity, hydraulic conductivity, infiltration capacity of the soil. CO₂ released during decomposition combines with water and forms carbonic acid and act as CO₂ fertilizer. Organic manures supply energy (food) for microbes and increase availability of nutrients and improve soil fertility. Green manures have the additional advantage of fixing atmospheric nitrogen leading to nitrogen economy in crop production and green manures draw nutrients from lower layers and concentrate them in the surface soil for the use of succeeding crop.

TEKCT 4 FERTILIZERS

Fertilizers are synthetic (commercially manufactured) or naturally occurring chemical compounds either dry solid or liquid that added to the soil to supply one or more plant nutrients for crop growth.

Classification

The fertilizers are classified based on whether the fertilizer supplies a single or more than one nutrient, their chemical nature and

commercial mode of supply as straight, compound, complex and mixed

Straight Fertilizers

When a fertilizer contains and is used for supplying a single nutrient, it is called a straight fertilizer. This is further classified as nitrogenous, phosphatic and potassic fertilizers depending on the specific macro nutrient present in the fertilizer.

Nitrogenous fertilizers

N fertilizers are those fertilizers containing N as major nutrient. It may be either a nitrate or ammonium or amide fertilizer depending on the form of nitrogen present.

Phosphatic fertilizers

They are classified into three groups, based on the solubility of phosphate contained in the fertilizer.

Compound Fertilizers

Compound fertilizers are the commercial fertilizers in which two or more primary nutrients are chemically combined. For example: DAP. DAP contains 18% N and 46% P₂O₅.

Mixed Fertilizers/Fertilizers Mixtures

They are physical mixtures of two or more straight fertilizers. Sometimes a complex fertilizer is also used as one of the ingredients. The mixing is done mechanically. The fertilizer mixtures are usually in powder form but techniques have been developed for granulation of mixtures so that each grain will contain all the nutrients mixed in the mixture.

BIO FERTILIZERS

Bio fertilizers are the living organisms capable of fixing atmospheric nitrogen or making native soil nutrients available to crops. Atmospheric nitrogen is fixed effectively by the microorganisms either in symbiotic association with plant system (Rhizobium, Azolla) or in associative symbiosis (Azospirillum) or in free living system (Azotobacter, phosphobacterium, blue green algae) or in micorhizal symbiosis (VAM fungi).

TEKCT 5 DRAINAGE

For optimum growth and yield of field crops, proper balance between soil air and soil moisture is quite essential. Except rice many of the cultivated plants cannot withstand excess water in the soil. The ideal condition is that moisture and air occupy the pore spaces in equal

proportions. When soil contains excess water than that can be accommodated in the pore spaces, it is said the field is water logged.

In general, soil is defined as the more or less loose and crumbly part of the outer earth crust. It is a natural dynamic body of mineral and organic constituents, differentiated into horizons, which differs among themselves as well as from the underlying parent material in morphology, physical make-up, chemical composition and biological characteristics. It is made up of small particles of different sizes.

A. Causes of Water Logging

- Excessive use of water when the water is available in abundance or cheaply due to the belief that more water contributes better yield.
- Improper selection of irrigation methods.
- Percolation and seepage from lands, canals and reservoir located at nearby elevated places.
- Improper lay out, lack of outlets.
- Presence of impervious layer with profile impeding percolation.
- Upward rise of water from shallow ground water table or aquifer.

B. Effects of Water Logging

(i) Direct effects - Replacement of soil air, which is the main source of oxygen for the roots as well as soil microbes. Due to high amount of CO₂ in soil air, high CO₂ concentration under waterlogged conditions will kill plant roots. Sometimes superficial root system or air space in root system

will develop. Due to poor aeration, intake of water and nutrient will be reduced.

(ii) Indirect effects - Nutrients are made unavailable due to leaching. Toxic elements will be formed under anaerobic conditions. Decomposition of organic matter under anaerobic condition results in production of organic acids like butyric acid, which is toxic to plants.

- Reduce the availability of N, Mn, Fe, Cu, Zn, Mo
- Reduces soil temperature
- Reduces the activity of beneficial microbes
- Destruct soil structure
- Difficult for cultural operation, and
- Incidence of pest, disease and weeds.

TEKCT 6 SOIL

Soil is a three-dimensional body, which supports plant establishment and growth and it is a natural and dynamic medium. For a farmer, soil refers to the cultivated top layer (surface soil) only, that is, up to 15–18 cm of the plough depth. Soils widely vary in their characteristics and properties. Understanding the properties of soils is important (1) for optimum use they can be put to and (2) for best management requirements for their efficient and productive use.

Functions of soil

- It provides place and anchorage for plant growth and development.
- It serves as a medium for air and water circulation.
- It acts as a reservoir for water and nutrients.
- It provides space for beneficial microorganisms.

Pedology - The origin of the soil, its classification and its description are involved in pedology.

Pedologist considers soil as a natural body and does not focus primarily on the soil's immediate practical utilization. Pedologist studies, examines and classifies soil as they occur in their natural environment.

Edaphology - It is the study of soils from the standpoint of higher plants. It considers various properties of soil as they relate to plant production. The edaphologist is practical, having the production of food and fibre as an ultimate goal. Simultaneously, the edaphologist must be a scientist to determine the reasons for variations in the soil productivity, and to find means of conserving and improving soil productivity.

TEKCT 7

SOIL PHASES

Soil is a complex system, made of solid, liquid and gaseous materials. Soil is a three phase or polyphasic system comprising of (a) solid phase, (b) liquid phase, and (c) gaseous phase in some proportions.

Normally the proportion is 50:25:25, but this may vary from soil to soil. In some occasions, liquid or gaseous phase may be absent. For e.g., in water logged soil, air is not present; similarly in desert dry sandy soils, water is not present.

Components of Soil

Soil consists of four major components. They are: (i) Mineral matter, (ii) Organic matter, (iii) water, and (iv) air. Physically, soil consists of stones, large pebbles, dead plant twigs, roots, leaves and other parts of the plant, fine sand, silt, clay and humus derived from the

decomposition of organic matter. In the organic matter portion of the soil, about half of the organic matter comprised of the dead remains of the soil life in all stages of decomposition and the remaining half of the organic matter in the soil is alive.

The living part of the organic matter consists of plant roots, bacteria, earthworms, algae, fungi, nematodes actinomycetes and many other living organisms.

Soil contains about 50% solid space and 50% pore space. Mineral matter and organic matter

occupy the total solid space of the soil by about 45% and 5% respectively. The total pore space of the soil is occupied and shared by air and water on roughly equal basis. The proportion of air and water will vary depending upon the weather and environmental factors.

(a) **Soil mineral matter (SMM)** - Size and composition of mineral matter in soils are variable due to nature of parent rock from which it has been derived. The rock fragments are disintegrated and broken portion of the massive rocks, from which regolith through weathering, the soil has been formed.

These materials are usually very coarse and the minerals are extremely variable in size. The primary minerals viz., quartz, biotite, muscovite (dominates coarse fractions of the soil) and the secondary minerals viz., silicate clays and hydrous oxides clays of iron and aluminium (as very fine fraction) are present.

(b) **Soil organic matter (SOM)** - Soil organic matter exists as partly decayed and partially

resynthesized plant and animal residues. These are continuously being broken down as a result of microbial activity in soil. Due to constant change, it must be replenished to maintain soil productivity.

The organic matter content in a soil is very small and varies from only about 3–5% by weight in topsoil.

In addition to partly decayed plant and animal residues, soil organic matter contains living and dead microbial cells, microbiologically synthesized compounds and derivatives.

TEKCT 8

A TEXTBOOK OF AGRONOMY

- It is a main source of N, 5-6% of P, and 80% of S. It also supplies different trace elements like boron, molybdenum etc.

- It acts as a chelate, due to chelate formation between organic matter and various metals; the availability of these metallic elements will be increased.

- It contributes to cation exchange capacity in soils.

- It reduces soil erosion; shades the soil and keeps the soil cooler.

(c) Soil water - Soil water plays a very significant role in soil-plant growth relationship. Water is held within the soil pores with varying degree of forces depending upon the amount of water present.

With the increasing amount of water in soil, the forces of retention of water by the soil will be low and vice-versa. The movement and retention of water in the soil is primarily influenced by the characteristics of the soil viz., texture, nature of inorganic and organic colloids, type and amount of exchangeable cations, size and total amount of pore spaces etc. Water held by soil with high force of attraction is not available to the plants. Soil water along with dissolved salts makes up the soil solution. This soil solution acts as an important medium for supplying different nutrient elements through exchange phenomena between soil solid surface and soil solution and the plant roots.

(d) Soil air - Pore spaces in soil consist of that portion of the soil volume not occupied by soil solids, either mineral or organic. Under field condition, pore spaces are occupied by air and water; the more the water the less the room for air and vice-versa. The relative amounts of air and water in the pore space fluctuate continuously. During rainy season, water replaces air from the soil pore spaces, but as soon as water leaves by downward movement, surface evaporation, and transpiration etc., air gradually replaces the water, as it is lost from the pore spaces. Soil air contains various gases like CO₂, very small amounts of O₂ and N etc. Generally, soil air contains much more CO₂ and small amount of O₂ than that of atmospheric air due to microbial respiration when large amounts of CO₂ releases into the air and O₂ is taken up by soil microorganisms. Well-aggregated soil having large pore spaces offers less mechanical impedance to root developments and shoot emergence and do not form crusts easily. Good aeration occurs in well-drained soils, which have sufficient proportion of their volume occupied by pores. Cultural practices affect soil aeration and plant growth through modification of different soil physical properties like bulk density, porosity, aggregation etc. Soil air also influences beneficial microorganisms in soil.

TEKCT 9

SEED TREATMENT

Seed treatment is usages of specific products and specific techniques to improve the growth environment for the seed, seedlings and young plants. It ranges from a basic dressing to coating and pelleting.

Seed dressing: This is the most common method of seed treatment. The seed is dressed with either a dry formulation or wet treated with a slurry or liquid formulation. Dressings can be applied at both, the farm and industries. Low cost earthen pots can be used for mixing pesticides with seed or seed can be spread on a polythene sheet. The required quantity of chemical can be sprinkled on the seed lot and mixed mechanically by the farmers.

Seed coating: A special binder is used with a formulation to enhance adherence to the seed.

Seed pelleting: The most sophisticated Seed Treatment Technology changes the physical shape of a seed to enhance pelletability and handling. Pelleting requires specialized application machinery and techniques and is the most expensive application.

The farmer must take care of the following while buying the seeds

- When purchasing the seed farmer should obtain a bill/cash memo wherein the lot number and seed tag number is mentioned.
- After purchasing the seed, empty bag/packet (pouches) and receipt should be kept safely.
- Out of purchased seed, 100 seeds are taken from each purchased variety to test them for germination before sowing in the field. Knowing the germination percentage, the farmer can decide the seed rate when sowing in the field.

TEKCT 10

AGRICULTURE OF UKRAINE

Ukraine is an independent state. The total geographic area of Ukraine is about 603,700 square km. Ukraine is an agrarian country. Its agriculture is a basis of the national economy. Ukraine's land fund amounts 60.4 million hectares, including 41.9 million hectares for agriculture. The territory of the farmers' lands is 21,576 hectares with 38,428 farms. The top soils are mainly black. They are the biggest treasure of Ukraine. 25 % of the world's rich black soils are in Ukraine. Ukraine's climate is moderately continental. The sediments are 300-600 millimetres a year. There are favourable conditions for the development

of agriculture. Ukraine's farmers grow wheat, fruit, sunflowers, cereals, beetroots, potatoes, tomatoes, onions, carrots, cabbages and others for sale and their own use. They occupy an important place in Ukrainian diet and are grown everywhere.

Ukraine consists largely of a flat, fertile plain with no natural boundaries except the Carpathian Mountains in the southwest and the Black Sea in the south. Great areas are occupied by steppes and forest-steppe regions.

Lowlands occupy a considerable part of the country. In the north lies the Polissia Lowland. On the Left Bank, the Dnieper Lowland runs along the Dnieper River; The Black Sea Lowland skirts the Black Sea and the Sea of Azov. Between the Southern Buh and the middle reaches of the Dnieper lies the Dnieper Plateau. At its highest point it is 321 m. The Volhynia Plateau is 200-300 m in elevation. The Podillia Plateau lies between the Dnieper and Southern Buh. Its surface, is cut by valleys of 150-200 m. In the southeast of the country lies the Donets Ridge and the Azov Plateau.

Within the borders of Ukraine we find the Carpathian Mountains with the highest peak Hoverla (2061 m) which is located in the Chornohora massif.

Nowadays Ukraine is in the process of structural disintegration, what is characterized by a long-term decrease of production efficiency expressed in lowering of labor productivity and surplus of material production. The reforms initiated during the last years in Agro-Industrial complex (AIC) not only have helped to overcome the crisis but have also resulted in misbalance of interrelation between the AIC's spheres and branches of national economy. The main chains of production mechanisms have not been coordinated with each other. As a result the enterprises cannot fulfill their activities efficiently.

ТЕКСТ 11

AMERICAN FARMS

American farmers are famous all over the world for gathering big crops. On the one hand it is explained by the generosity of the nature. Little rainfalls are observed just in particular regions of the United States – especially in the West, where there are even deserts. On the rest of the territory there are big rainfalls, and rivers and underground waters perfectly water the soil. In the Middle West a considerable part of the most fertile soils of the world is situated. On the other hand the success of American farmers is caused by the considerable investments in the

agriculture and the rise of workers' qualification. Due to the constant selective-breeding, the increase of productiveness and stableness of cereals was achieved.

It is necessary to organize the production of self-propelled windrow harvesters and at the same time to expand the production of combined soil cultivating and sowing machines.

In the nearest future the agricultural machine building industry is to arrange the manufacture of new machines for application of hard and liquid fertilizers and chemical plant protection means. In the interests of successful realization of the food programme it is highly important to continue the retooling of agriculture on the basis of new technology, to complete the comprehensive mechanization of the production of sugar beet, raw cotton and fibre flax and of the application of organic and mineral fertilizers and crop protection agents, to raise the level of mechanization of the production of vegetables, including potatoes, fruit, fodder, and livestock products.

ТЕКСТ 12 GARDENING

The grass grows very quickly at this time of year, especially if we have a lot of rain. And we have had a lot of rain recently so I need to cut it at least once per week. This task takes about half a day.

As spring rushes towards summer, trees and shrubs come into flower. The pink and white blossom of the Japanese cherry trees is always eagerly awaited. However it is gone very quickly, removed by strong winds and heavy rain. The same goes for the blossom on the pear, plum, apple and cherry trees. Fortunately the blossom wasn't blown away before it was pollinated, so tiny fruits can be seen growing on the trees. Something to look forward to in the late summer and autumn. We supplement the flowering shrubs and perennials with a variety of annuals. Annuals are plants that grow, flower and die all in one season. We sowed seeds in trays of compost several weeks ago. They have been growing in the greenhouse and now that the risk of frost has passed we put them outside to harden off (to get used to being outside). They are now at the stage when they need to be planted into the flower beds. There are a lot of them. Earlier this week my wife and I planted 400 dahlias, 200 lavender, 40 sunflowers, 200 French marigolds and many more. There still a lot more awaiting their turn.

We try to arrange our bedding plants (the general term for plants grown inside and then planted outside) so that the different heights and

colours compliment each other. For instance we are filling the large bed nearest the conservatory with plants that will produce mainly white flowers but with a few lilac or lavender coloured specimens as well. We will see if this plan has worked in about 6 weeks. We also grow vegetables. Some like carrots, beetroot, spinach and parsnips are sown directly into the ground. The white net over the carrots is there to try and prevent the carrot root fly laying its eggs on the carrots. If they do then the hatched larvae tunnel into the carrot and can make the carrot inedible.

Other vegetables are sown inside the greenhouse and then planted out after the risk of frost has passed. We have so far planted runner beans, broad beans, cauliflower, sprouts, corn, onions and leeks outside. The net over the cauliflower is there to try and prevent the cabbage white butterfly laying eggs on them. Their eggs hatch and caterpillars eat and destroy the plants.

Some vegetables are not really suited to growing outside in England. So the greenhouse is gradually filling up with tomato plants. The Polytunnel now has cucumbers and butternut squash plants as well as some early potatoes.

The majority of the potatoes are planted directly into the soil, but as they sprout, the tops have to be covered up with soil to keep them safe from frost.

VII. ГОВОРІННЯ (SPEAKING) ПИТАННЯ ДЛЯ ОБГОВОРЕННЯ СПЕЦІАЛЬНІСТЬ 201 «АГРОНОМІЯ»

Factors influencing decisions on the selection of crops and cropping system

Climatic factors

Is the crop/cropping system suitable for local weather parameters such as temperature, rainfall, sun shine hours, relative humidity, wind velocity, wind direction, seasons and agro-ecological situations?

Soil conditions

Is the crop/cropping system suitable for local soil type, pH and soil fertility?

Water

- Do you have adequate water source like a tanks, wells, dams, etc.?
- Do you receive adequate rainfall?
- Is the distribution of rainfall suitable to grow identified crops?

- Is the water quality suitable?
- Is electricity available for lifting the water?
- Do you have pump sets, micro irrigation systems?

Cropping system options

- Do you have the opportunity to go for intercropping, mixed cropping, multi-storeyed cropping, relay cropping, crop rotation, etc.?
- Do you have the knowledge on cropping systems management?

Past and present experiences of farmers

- What were your previous experiences with regard to the crop/cropping systems that you are planning to choose?
- What is the opinion of your friends, relatives and neighbours on proposed crop/cropping systems?

Expected profit and risk

- How much profit are you expecting from the proposed crop/cropping system?
- Whether this profit is better than the existing crop/cropping system?
- What are the risks you are anticipating in the proposed crop/cropping system?
- Do you have the solution? Can you manage the risks?
- Is it worth to take the risks for anticipated profits?

Economic conditions of farmers including land holding

- Are the proposed crop/cropping systems suitable for your size of land holding?
- Are your financial resources adequate to manage the proposed crop/cropping system?
- If not, can you mobilize financial resources through alternative routes?

Labour availability and mechanization potential

- Can you manage the proposed crop/cropping system through your family labour?
- If not, do you have adequate labours to manage the same?
- Is family/hired labour equipped to handle the proposed crop/cropping system?
- Are there any mechanization options to substitute the labour?
- Is machinery available? Affordable? Cost effective?
- Is family/hired labour equipped to handle the machinery?

Technology availability and suitability

- Is the proposed crop/cropping system suitable?
- Do you have technologies for the proposed crop/cropping system?
- Do you have extension access to get the technologies?

- Are technologies economically feasible and technically viable?
- Are technologies complex or user-friendly?

Market demand and availability of market infrastructure

- Are the crops proposed in market demand?
- Do you have market infrastructure to sell your produce?
- Do you have organized marketing system to reduce the intermediaries?

General conditions for cultivation of crops farmer's handbook on basic agriculture

where to sell? When to sell? Whom to sell to? What form to sell in? What price to sell for?

- Do you get real time market information and market intelligence on proposed crops?

Policies and schemes

- Do Government policies favour your crops?
- Is there any existing scheme which incentivises your crop?
- Are you eligible to avail those benefits?

Availability of required agricultural inputs including agricultural credit

- Do you get adequate agricultural inputs such as seeds, fertilizers, pesticides, and implements in time?
- Do you have access to institutional credit?

Post harvest storage and processing technologies

- Do you have your own storage facility?
- If not, do you have access to such facility?
- Do you have access to primary processing facility?
- Do you know technologies for value addition of your crop?
- Do you have market linkage for value added products?
- Are you aware about required quality standards of value added products of proposed crops?

ЛІТЕРАТУРА

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