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ENGLISH FOR AGRIBUSINESS

Навчальний посібник з дисципліни
«Ділова іноземна мова (англійська)»
для здобувачів вищої освіти
зі спеціальностей
галузі знань 20 «Аграрні науки та продовольство»
та магістерської програми «Агрокебети»

Мелітополь
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С 89

Рекомендовано до друку рішенням вченої ради
Таврійського державного агротехнологічного університету
імені Дмитра Моторного
як навчальний посібник для здобувачів ступеня вищої освіти
«Магістр» зі спеціальностей галузі знань 20 «Аграрні науки та
продовольство» та магістерської програми «Агрокебети» в
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Навчальний посібник призначено для вивчення курсу «Ділова іноземна мова (англійська)» здобувачами вищої освіти зі спеціальностей галузі знань 20 «Аграрні науки та продовольство» та магістерської програми «Агрокебети». Посібник створено з метою розвитку лексичних, граматичних та письмових навичок, практичних умінь та навичок розуміння професійно спрямованої та академічної автентичної літератури, а також розвитку навичок ділової комунікації англійською мовою. Рекомендовано для проведення аудиторної та позааудиторної роботи у закладах вищої освіти.

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ПЕРЕДМОВА

Навчальний посібник «English for Agribusiness» призначено для вивчення курсу «Ділова іноземна мова (англійська)» здобувачами вищої освіти зі спеціальностей галузі знань 20 «Аграрні науки та продовольство», а також магістерської програми «Агрокебети».

Посібник створено з метою удосконалення набутих на попередньому етапі вивчення англійської мови граматичних, лексичних та письмових навичок студентів, розвитку практичних умінь та навичок іншомовного ділового спілкування та розуміння професійно спрямованої та наукової автентичної літератури англійською мовою.

Посібником передбачено вирішення наступних завдань у процесі вивчення дисципліни «Ділова іноземна мова»:

- формування у здобувачів професійних мовних компетенцій, що сприятиме ефективній комунікації у культурному розмаїтті навчального та професійного середовища;

- вивчення методики пошуку нової інформації в іншомовних джерелах, лінгвістичних методів аналітичного опрацювання іншомовних джерел;

- дослідження друкованої іншомовної оригінальної літератури та розширення лексико-граматичних навичок;

- вивчення методів та лінгвістичних особливостей анотування та реферування професійно-орієнтованих іншомовних джерел.

Навчальний посібник складається з п'яти розділів (Units 1-5), завдань для самостійного опрацювання (Practice File), граматичного довідника (Grammar Reference), списків лексичних одиниць для обов'язкового опрацювання та вивчення (Wordlists), словника (Vocabulary).

Кожен розділ містить три уроки, що фокусуються на формуванні певних навичок:

Урок 1 – читання та обговорення автентичних текстів на професійну тематику, фокус на ключових словах та словосполученнях, відпрацювання активного словника в завданнях на говоріння та письмо.

Урок 2 – аудіювання через перегляд автентичних відео, ознайомлення із граматичним матеріалом (Language Focus) в контексті професійної тематики, о презентований у в стислій формі в Language point, опрацювання матеріалу у завданнях дискусійного характеру.

Урок 3 – вивчення академічного мовлення, необхідного для проведення досліджень в галузі (спеціалізований словниковий запас, текстові структури в галузі науки); окрема увага приділяється поняттям академічної доброчесності та плагіату.

Перевагою видання є фокус на актуальних темах аграрної сфери в Україні та світі, серед яких сталий розвиток, подолання продовольчої кризи, новітні технологічні та ІТ розробки в агросфері, економічний бік агробізнесу та аграрного менеджменту, розумне природокористування та споживання ресурсів.

Джерелом інформації стали сучасні матеріали, запропоновані провідними фахівцями з агрономії, агроменеджменту, основ наукових досліджень тощо, у тому числі матеріали онлайн-видань та державних установ країн світу.

Вміст видання відповідає рівню B2+ (просунутий) згідно з Загальноєвропейськими рекомендаціями з мовної освіти (CEFR level Upper-Intermediate). На цьому рівні здобувачі можуть:

- розуміти основні ідеї складних текстів на абстрактні і конкретні теми, в тому числі теми, що стосуються їх спеціалізації;

- можуть спілкуватись з певною мірою безпосередньості, що робить можливою регулярну взаємодію з носіями мови;

- вміють формулювати чіткі, детальні висловлення з багатьох питань і можуть викласти власний погляд на проблему, показати переваги та недоліки різних варіантів.

Навчальний посібник «English for Agribusiness» можна використовувати для проведення як аудиторної, так і для позааудиторної роботи, у тому числі під час дистанційного навчання, у закладах вищої освіти.

CONTENTS

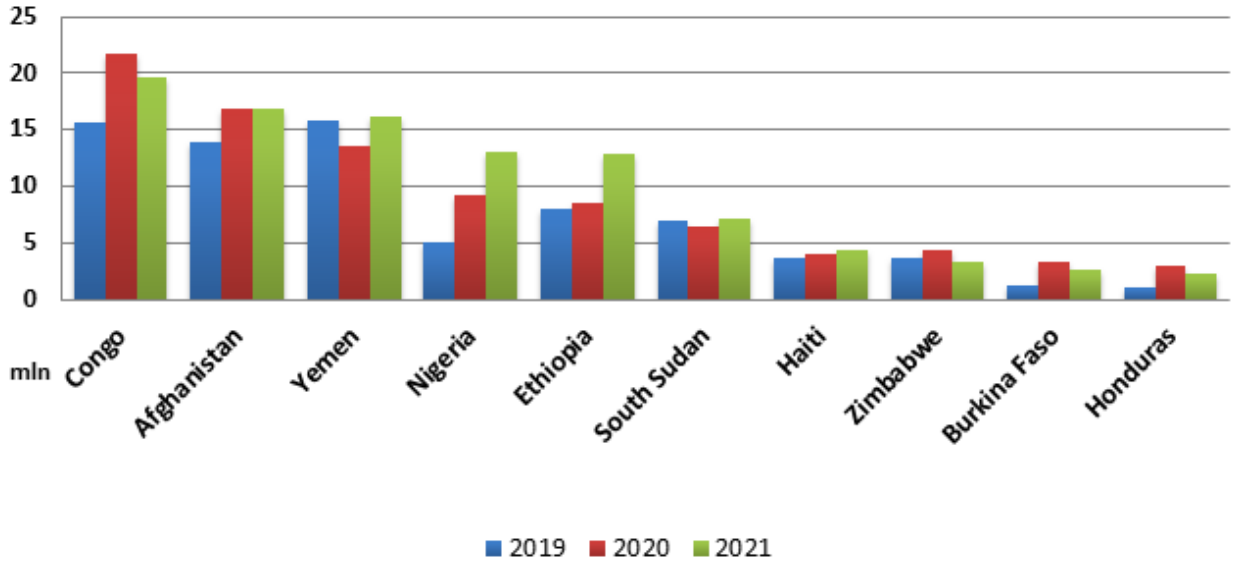
UNIT 1 SUSTAINABLE DEVELOPMENT

1.1. TRANSFORMING THE WORLD: LIVING SUSTAINABLY

1 Look at the statistics of world hunger and undernourishment. Think of the reasons of uneven distribution of food globally.

526 million	227 million	37 million	15 million
Asia and the Pacific	*Africa*	*Latin America / Caribbean*	*Developed countries*
(65% of total)	(28% of total)	(5% of total)	(2% of total)

2 According to research, over 65% of people suffering from hunger live in just ten countries. Analyse the chart below representing food insecurity trends in three years of pandemic. Why do you think famine is growing?



3 Here is a list of possible solutions of food crisis. Rate them 1-8 starting with the most important one. Can you think of any others?

- Produce more food
- Improve business management
- Invest in agriculture
- Use clean energy
- Create more jobs
- Improve technology
- Protect ecosystems
- Save resources

4 Read the article to see if your ideas were correct. Match paragraphs 1-7 to headings A-I. There are two headings that you don't need.

A	Energy use	**E**	Ecosystem management
B	Sustainable consumption and production	**F**	Water use
		G	Education
C	Gender equality	**H**	Climate change
D	Poverty alleviation	**I**	Economic growth and employment

Living Sustainably. If Not Now, When?

Food and agriculture are facing some difficult challenges nowadays. In recent years, scientific and technological breakthroughs have led to major improvements in agricultural productivity to meet the demand for food and reduce hunger and malnutrition around the world.

However, progress often comes with social and environmental costs as our planet's resources are reaching their limits. Land and freshwater resources are becoming scarce, climate change causes biodiversity loss. As a result, ecosystems are being destroyed at an unprecedented scale putting at risk the future fertility of the planet.

Global food system is out of balance. Nowadays, 815 million people worldwide suffer from hunger, and every third person is undernourished, which means that they have a caloric intake below minimum energy requirements.

To overcome the complex challenges, in 2015 the Member States of the United Nations adopted the 2030 Agenda for Sustainable Development which offers a vision for food and agriculture. The

document includes 17 Goals to tackle hunger and poverty, protect and enhance the environment and use the resources wisely.

Strong and sustainable agricultural sector (which means it causes no damage to the environment and continues for a long time) can help reach some of the Goals:

1 _____. More than 70% of the world's population live in rural areas and depend on farming for their income. Unlocking the potential of the private sector and growth in agriculture can help increase their earnings, improve livelihoods and foster economic growth.

2 _____. Agriculture needs fresh water to provide more food. Sustainable water management means wise use of resources to find balance between the present demand and the future needs.

3 _____. Experts predict that up to 12% of crops will be used to produce biofuel, so in the near future it might replace traditional sources.

4 _____. Agricultural business and food sectors can provide an increase in productivity and add value to food systems. This will create new jobs and provide economic growth in rural areas.

5 _____. Around one third of food produced globally is wasted. People need to start using resources responsibly. Improving nutrition and promoting balanced diets requires taking action at all stages of the food chain.

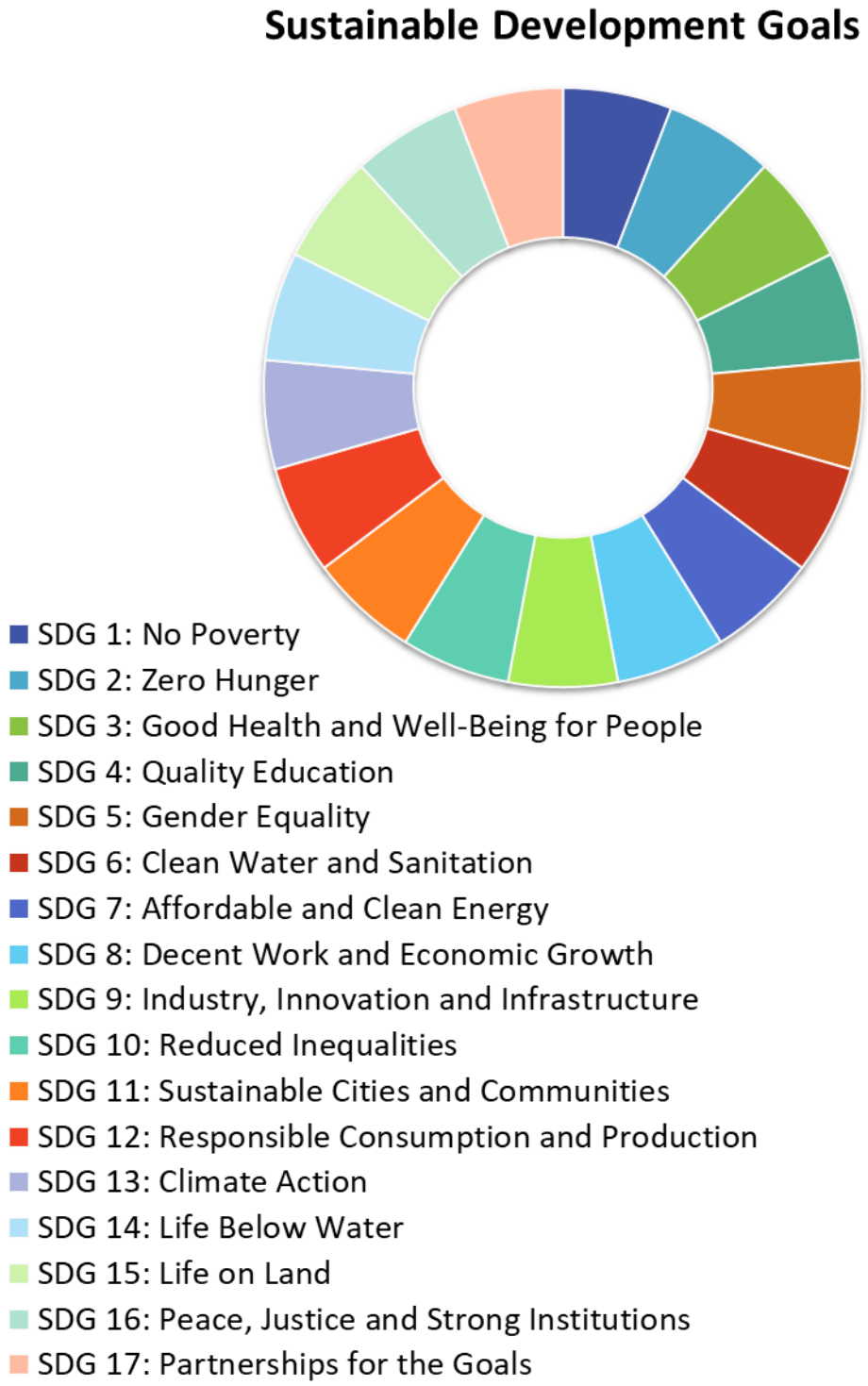
6 _____. Reducing carbon emission is a primary goal to stop global warming which affects agriculture, reduces access to food and affects its quality. There is an urgent need to mainstream biodiversity conservation and protect ecosystem functions.

7 _____. By improving farmland efficiency we can feed the world in a sustainable way and prevent soil depletion, loss of natural habitats and forests. Climate-smart agriculture and food systems can enhance the resilience of people, communities and ecosystems.

It is necessary to adapt governance to new global challenges that the world is facing. The transition to sustainable agriculture requires building political alliances and coalitions beyond food and agriculture. Society must put a lot of effort into building a world where food is accessible for everyone and the use of natural resources maintains ecosystems to support the needs of the growing global population.

5 Look at the full list of Sustainable Development Goals and answer the following questions.

- Which of the SDGs were mentioned in the article in ex.4?
- What other SDGs concern agricultural sector? In what way?
- Do you think it is possible to reach all of the SDGs by 2030? Why? Why not?



6 Combine phrases from Box A with words from Box B to make word partnerships. Use the definitions (1-10) below to help you.

A

technological	biodiversity	caloric	water	sustainable
economic	farmland	poverty	carbon	soil

B

alleviation	depletion	emission	intake
breakthrough	efficiency	management	development
	loss	growth	

1. improving the quality of life for people not having a lot of money

_____

2. a decline in soil condition caused by its improper use or poor management

_____

3. a way of organizing society so that it can exist in the long time

_____

4. a significant development or discovery in technology

_____

5. an increase in the production of goods and services

_____

6. the amount of energy consumed via food and beverage

_____

7. the activity of planning, developing and distributing of water resources

_____

8. extinction of species within an ecosystem, a given area or Earth

_____

9. increasing the output of agricultural land use

_____

10. the release of CO_2 into the atmosphere

_____

7 Match the words with similar meaning.

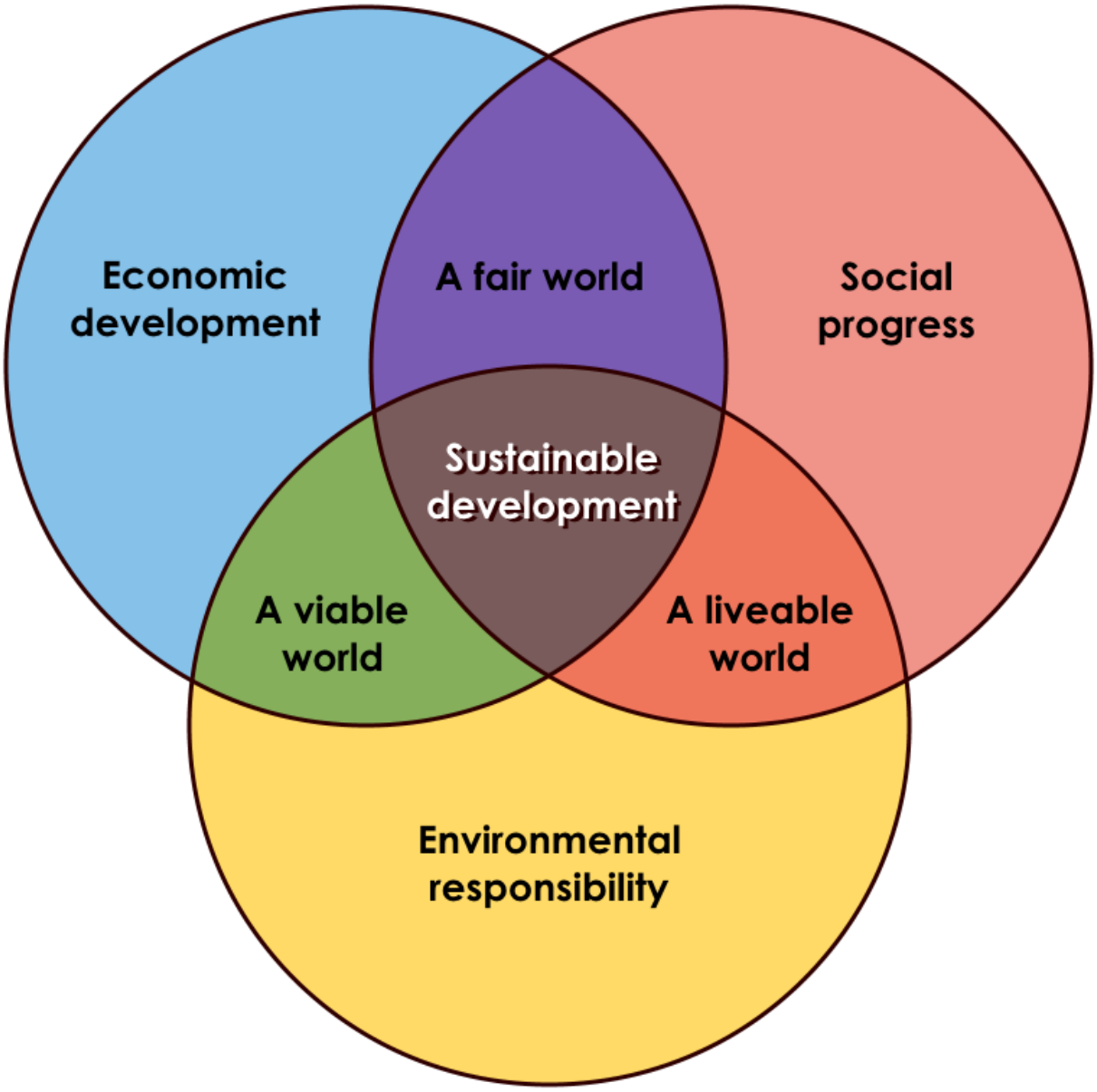
1. demand	___	a overcome	6. consumption	___	f available
2. fertility	___	b productivity	7. resilience	___	g limited
3. to enhance	___	c earnings	8. accessible	___	h resistance
4. tackle	___	d requirement	9. maintain	___	i usage
5. income	___	e to increase	10. scarce	___	j preserve

8 Fill in the gaps with words from the box.

demand	fertility	enhance	tackle	income
consumption	resilience	accessible	maintain	scarce

1. Nearly 3.5 million Angolans living in _____ areas are currently receiving humanitarian assistance.
2. Ecosystem based approaches develop _____ under climate scenario uncertainty.
3. Sustainable agriculture can lead to increased soil _____ and higher yields.
4. The _____ for low-cost housing is increasing as the economy gets worse.
5. Fuel economy measures resulted in lower vehicle fuel _____ .
6. We have gained sufficient experience to _____ this problem.
7. Fresh food is so _____ that prices have rocketed.
8. People on a high _____ should pay more tax.
9. Only by keeping down costs can we _____ our competitive advantage.
10. Getting the right qualifications will _____ your employment prospects.

9 **Work in pairs. Look at the diagram and think of possible outcomes of sustainable development. Present your ideas to the class.**



10 **What are the main challenges in achieving sustainable development in Ukraine and how can they be tackled? Do you think it will be possible to maintain economic development in harmony with ecology in the future? Why or why not?**

1.2. HOW SUSTAINABLE FARMING WORKS

1 What are the primary aims of farming as a business? Discuss your ideas.

2 Agree or disagree with the following statements. Explain your answers.

1. It's important to plant the crops which consumers want to buy to provide income for as long as possible. _____
2. Monoculture farming is an example of sustainable agriculture. _____
3. Farming is seasonal, so farmers only need to provide workplaces for employees during the season. _____
4. Organic farming guarantees sustainability and biodiversity. _____
5. Organic farming produces the same volume and quality of food with the same amount of resources as sustainable agriculture. _____

3 You are going to watch an interview with Thaddeus Barsotti, one of the owners of *Farm Fresh to You*. Before watching, match the following phrases with their meaning. Use a dictionary to check your understanding.

1. albeit	___	a in the long term
2. the odds	___	b the most important factor
3. bottom line	___	c the chances
4. on a bigger picture	___	d although

4 Watch the interview with Thaddeus Barsotti explaining why sustainable farming practices are so important. Tick the two pillars of sustainable farming that Thaddeus mentions. Were your ideas in ex.2 correct? *(Go to p. 108 to scan the code)*

- ☐ social sustainability
- ☐ financial sustainability
- ☐ human sustainability
- ☐ environmental sustainability

5 Watch the interview again. Complete the table below with the main concepts for each of the key topics from ex.4 Thaddeus talks about.

_____ **sustainability**	_____ **sustainability**
• _____ • _____ • _____ • _____ • _____ • _____	• _____ • _____ • _____ • _____ • _____ • _____

6 Paraphrase the words in *italics* with words and phrases from the box. Some of the phrases are used twice.

bottom line	the odds	albeit	bigger picture

1. Against ***all the obstacles***, they managed to raise yields without using dangerous chemicals. _____
2. The company's ***line at the lower part of the financial report*** shows its performance, which is net profit or loss. _____
3. To see the ***perspective***, farmers need to start thinking of the future generation who they are borrowing resources. _____
4. The ***essence*** of what is being said here is that farming should concentrate on both healthy economy and healthy environment. _____
5. What are ***the chances*** of high yields in a dry summer without irrigation? _____
6. Monoculture, ***although*** simple and more profitable, destroys soil nutrients and alters the ecosystem. _____

7 Imagine that you are about to take part in a Farming Forum. Prepare a short talk on the prospects of sustainable agriculture and food production in Ukraine. Write a list of the problems that Ukrainian farmers face and possible ways of their solution. Discuss in small groups.

Problem	Solution
_____ _____ _____ _____ _____	_____ _____ _____ _____ _____

LANGUAGE FOCUS

1 Read the article and answer the questions.

- Why is seaweed cultivation becoming the world's fastest-growing source of food?
- What effects might growing seaweed have on the coastal communities?

Seaweed Boom in India

The green fronds growing along the shoreline of India **have** large potential as a sustainable food source, while transforming the region's ecosystem, economy and even cuisine. Nowadays India **is turning** to seaweed cultivation which **is increasing** globally by 8% every year.

Seaweed, which **comprises** a large part of Indian folk medicine, **absorbs** carbon dioxide, **converts** the carbon to energy, and **releases**

oxygen into the water, in a way similar to plants. Nowadays, the demand for seaweed **is increasing** because of its use in the manufacture of agar.

On a bigger picture, seaweed cultivation ***could*** help women seaweed farmers enhance their economic independence. However, cultivation of seaweed ***may*** have ecological downsides. Measures ***must*** be taken to stop uncontrolled growth of seaweed and prevent damage to coral reefs of the Caribbean.

As algae ***can*** reduce the amount of carbon and save agricultural land, it ***will definitely*** have a remarkable impact on the coastal area of India which will have a lasting positive socio-economic effect.

2 Look at the phrases in bold in ex.1. Complete the rules in *Language Point 1.1* with the correct tense, Present Simple or Present Continuous.

Language Point 1.1

We use …	**to talk about…**
1 _____	habits and routines
2 _____	actions in progress at the moment of speaking
3 _____	general truths or statement of facts
4 _____	schedules
5 _____	processes and situations that are changing
6 _____	future arrangements
7 _____	permanent or long-term situations
8 _____	activities and situations that are temporary
9 _____	with stative verbs

For more information, go to ***Grammar Reference, Unit 1***

3 Complete the sentences with the correct corms of the verbs, Present Simple or Present Continuous.

1. We usually _____ (grow) leeks in winter, but this year we _____ (plant) cauliflower.

2. There has been a lot of rain this year, so we _____ (expect) high yields.
3. As a rule, an increase in agricultural production _____ (result) in economic growth.
4. Fresh water _____ (become) a scarce resource everywhere around the globe.
5. Most consumers _____ (believe) that buying brands with sustainability certification can help to tackle global warming.
6. The conference on new technologies in agriculture _____ (last) for 5 days.
7. Businesses _____ (experience) difficult times, they _____ (need) more support from the government.
8. We _____ (meet) our partners from Tokyo next week.

4 Look at the modal verbs in *italics* in ex.1. Match the verbs in *Language Point 1.2* with their meanings. Underline the correct answer in rule 5.

Language Point 1.2

We use …	**to talk about…**
1 **can**	a probability
2 **must**	b prediction
3 **may / could**	c obligation
4 **will** (definitely)	d ability

Most modal verbs are followed by an infinitive **5 with/without** to.

*For more information, go to **Grammar Reference, Unit 1***

5 Put sentences and questions a-h below into categories 1-6.

1. Talking about a prohibition: ____
2. Talking about necessities / obligations: ____, _____
3. Talking about an absence of obligation or necessity: ____, _____
4. Asking if there is a prohibition: ____
5. Asking if something is necessary: ____
6. Talking about a rule that is not very strict: ____

a Everyone **has to** wear a special overall when working with toxic substances.
b Do we **have to** get a medical check-up?
c You **don't need to** worry, we create employment for our crew year round.
d You **don't have to** use insecticides and herbicides unless the balance is broken.
e You **mustn't** monoculture if you want your business to be sustainable.
f You**'re not supposed to** grow leeks in summer.
g We **need to** follow a very strict procedure.
h Are we **allowed to** go inside?

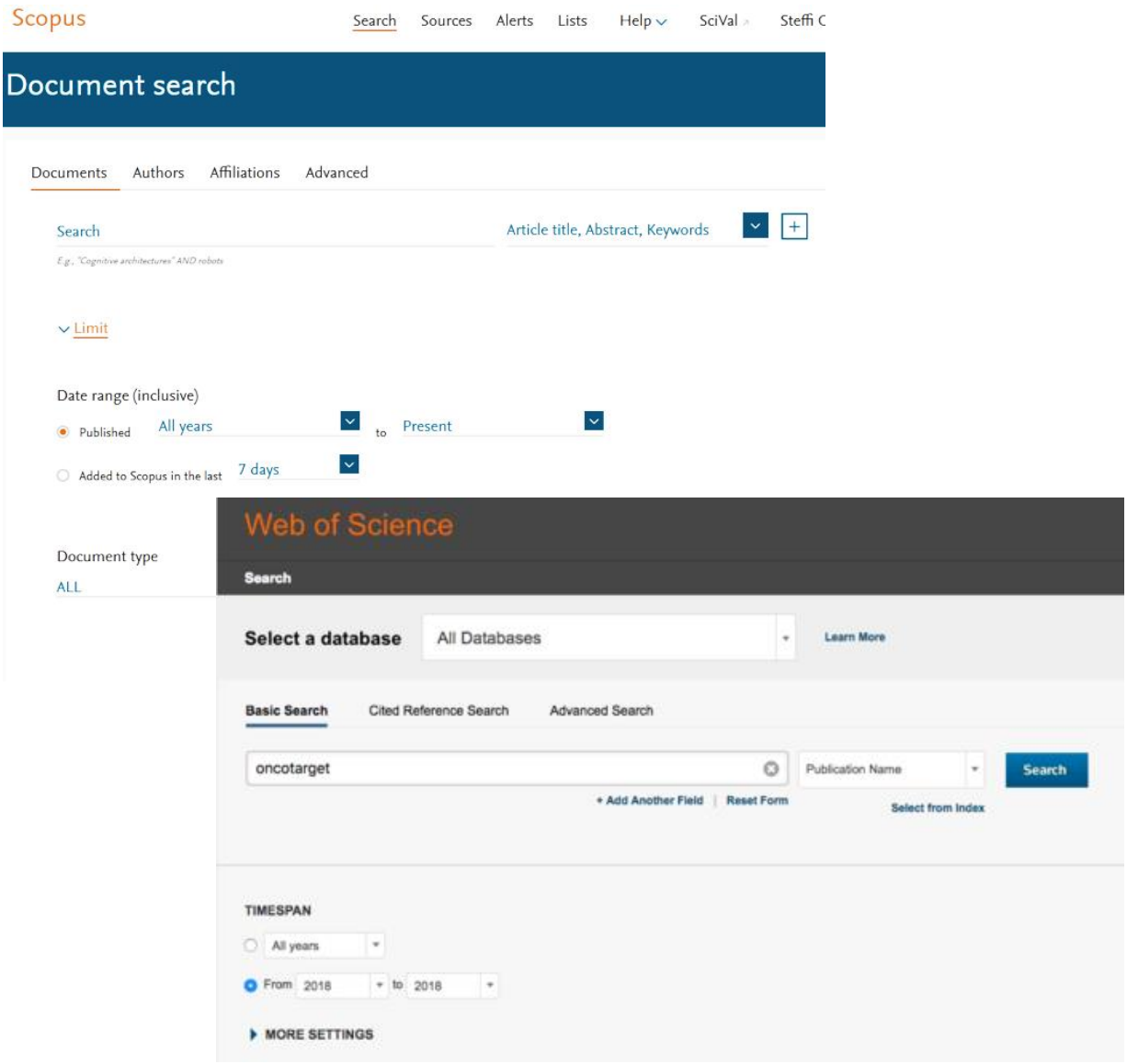
6 Underline the most suitable modal verb.

1. We have a wide range of products, so investors **must/can** always choose a fund that suits them.
2. Although I was at the back of the hall, I **could/might** hear very clearly.
3. **Must/May** I see some identification, please?
4. I'm afraid this is a non-smoking office, so you **don't have to/mustn't** smoke in here.
5. A significant increase in investment **could/has to** have a dramatic effect upon business confidence.
6. If we negotiate, they **have to/might** give us the discount we want.
7. This information **will/should** have been given to the tax authorities two years ago.
8. I'm afraid that I **won't be able/can't** to make that meeting on Friday.
9. We **needn't/didn't need to** have invested in irrigation system, this region has a lot of precipitation.
10. **Could/shall** you be more specific? What do you mean by "sustainability"?

1.3. DATABASES AND SEARCH STRATEGIES

1 Look at the photos and discuss the questions.

- What do the photos show?
- Why do you think researchers use them?



2 Read the article and check your ideas.

Writing a research paper is a really challenging task which depends not only on your writing skills, but also on the topic you choose and amount of the relevant and accurate sources of information.

Before beginning the research, there is always a need to do a preliminary search to determine whether there is enough information on the chosen topic. In order to do this, students and young scientists usually use different search engines like *Google*, *Yahoo*, etc., and face all sorts of information, ranging from personal blogs to newspaper and academic articles, social media posts, commercial and company websites. With thousands of results it is really difficult to find something actually relevant. A search engine is a good place to start a research, but it is not the only one available. If you want to get acquainted with up-to-date data and really valuable sources, you need to use an academic database.

Academic databases are a reliable tool to support education and students' coursework, provide researchers with materials to do their investigations, etc. They help to find articles with higher relevancy, published both in less-known journals and in well-known international editions. In other words, they are searchable collections of information.

Some databases are general or multidisciplinary and provide broad coverage of many topics, while others focus on one subject and cover one field in depth. They include thousands of scholarly peer-reviewed articles, dissertations, theses, book reviews, conference proceedings, book chapters, trade publications, technical reports etc., so you search through tons of information at once. Most databases contain only abstracts and citations, but some of them have full-text articles, so you can read the entire source online.

3 Read the second part of the article. Do you use these search methods while doing research?

Although databases are highly developed systems, you need to know some methods that make the search process easier. In order to do this, you should follow next basic steps:

Step 1: Identify the key words and phrases

If you type the whole title of your research work into the search engine, you will get thousands of results less or more related to your topic, but only few really relevant ones. Therefore, you need to transform the search statement into a set of key words and phrases

that represent the main concepts of your work.

Step 2: Use truncation and wildcard symbols

To take control of your search you should think about word variations and alternate spelling of some words (e.g. British and American English) or irregular plurals etc. which can widen your search and cover all relevant information.

A wildcard character (?) is a symbol that replaces a single letter. For example, if you type **analy?e** you get results for both **analyse** and **analyze**.

A truncation symbol (*) is a symbol that retrieves any number of letters. In such a way, cutting the word to its root and adding a truncation symbol gives you an opportunity to search for any form of the word. It means that **agronom*** will search for **agronomy, agronomical, agronomic, agronomist**.

Remember: Some databases can use other symbols instead of (?) and (*), so check this on the Help page before searching.

Step 3: Use double quotation marks

If you need to search for an exact phrase, use **double quotation marks** (i.e. "**sustainable agriculture**") and your search will show you all the results that contain it.

Step 4: Use Search (Boolean) operators

When you need to combine multiple words and phrases, you can use **Search or Boolean operators** – AND, OR and NOT.

AND – to combine words from different topics or ideas (i.e. **"sustainable agriculture" AND Covid-19**).

OR – to combine alternative words or similar concepts (i.e. **agronomy OR agriculture**).

NOT – to exclude terms you do not need (i.e. **South Ukraine NOT South-east**).

Step 5: Limit your search

A lot of databases provide a set of **filters** or **limiting criteria** to refine your search results. They can include:

- Publication date.
- Publication type.
- Subject area and specific fields.
- Keywords.
- Author and country.

This list can be much longer and every filter can give your another list of available subfilters, the only thing you should do is just choose the needed one and tick a checkbox.

All databases are made to help you find the relevant data, so make the most of them and get as much as you need for your research.

4 Test your knowledge. Complete these sentences without looking at the text.

1. Each database contains thousands of _____.
2. Some databases can focus on one subject or be _____.
3. Databases vary in content and may include _____.
4. To search for a phrase, use _____ around the words.
5. _____ is used to add synonyms or similar concepts to the search.
6. Most databases provide _____ which enable you to refine your search results.
7. When you cut the word to its root you need to add _____.
8. Use _____ to carry out a search on the internet or on a database.
9. When you use _____ your search will only bring back items containing these exact phrases.
10. _____ allow you to include multiple words and concepts in your searches.

5 Match the methods on the left with the examples on the right.

1 wildcard character	a “ozone layer”
2 truncation symbol	b effect OR impact
3 quotation marks	c organi?ation
4 Boolean operators	d pollut*

6 Complete the table using the information from the text and your own ideas.

Types of databases	Search methods
_____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____

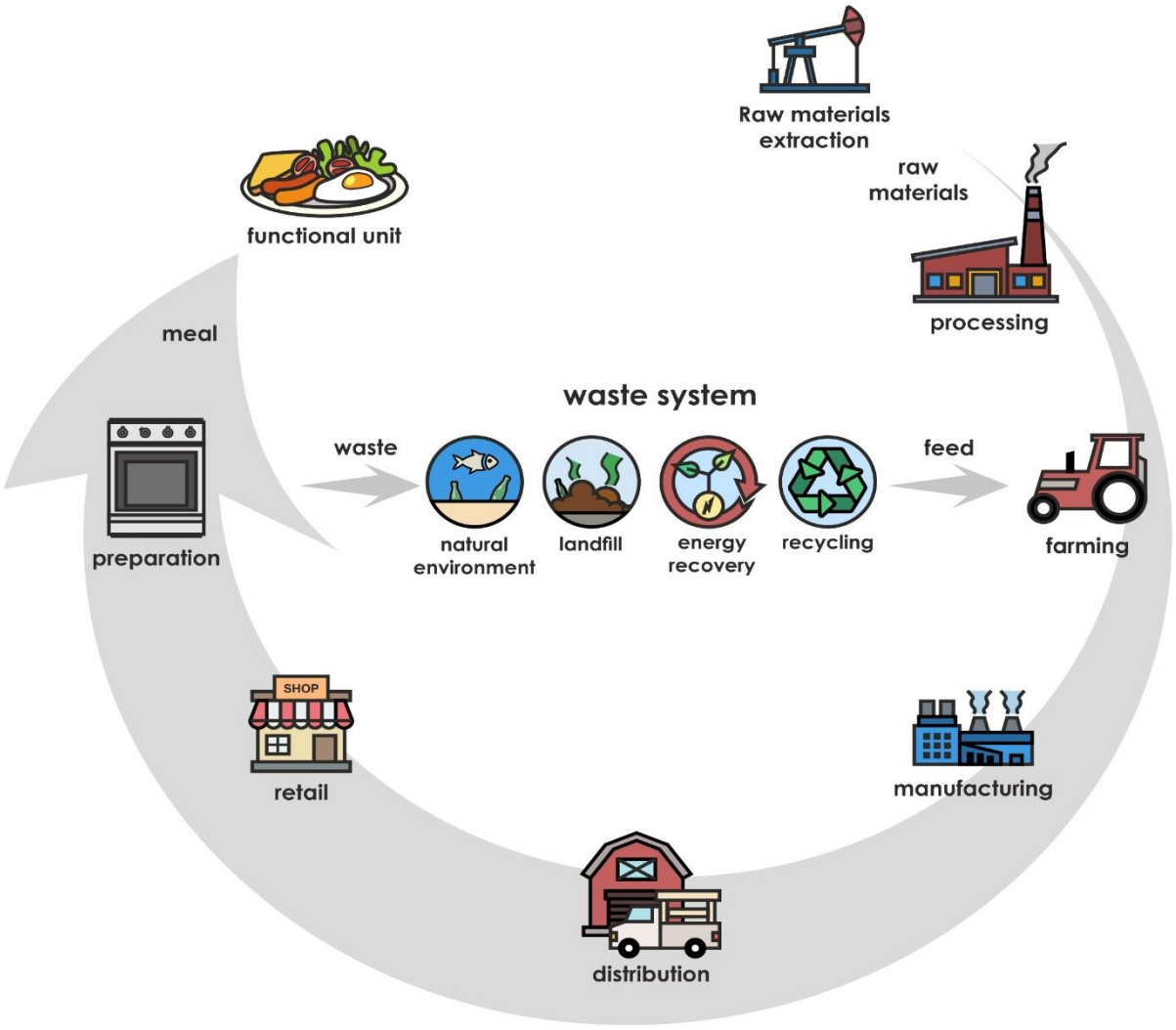
7 Use any database of your choice and find the information on one of the provided topics. Then, make a list of references.

- Sustainable agriculture in the European Union
- Effective energy use: benefits and opportunities
- Gender equality in the Islamic countries
- Poverty alleviation strategies in developing countries
- Economic growth: beyond the pandemic (Covid-19)

UNIT 2 FOOD PRODUCTION AND FOOD SECURITY

2.1. FIGHTING THE GLOBAL FOOD CRISIS

1 Look at the diagram showing the lifecycle of a plate of food. Sustainable choices can be made at each stage. Can you think of any? Discuss in pairs.



2 Discuss the following questions.

- What role does agriculture play in food production?
- How important is agricultural production to the overall economy

of the country?

- What factors affect food production?
- What are the possible reasons of food shortages and insecurity?

3 Look at the list of methods for increasing production of food. Put them into the corresponding category.

aeroponics	*foods from bio cultures*	*mechanization*
aquaculture	*hydroponics*	*seaweed and algae cultivation*
control of weeds and pests	*irrigation*	*soil conservation*
double cropping	*lab-grown meat*	*use of fertilizers*
	land reclamation	

Traditional methods	Innovative methods
• _____ • _____ • _____ • _____ • _____ • _____ • _____	• _____ • _____ • _____ • _____ • _____ • _____ • _____

4 Read the article and fill in the gaps (1-6) with the most suitable option (A-I). There are two choices that you don't need.

A it takes 150 litres of water
B to learn that behaviour and constantly **adjust** to conditions
C by climate change, poor infrastructure, unstable markets, war and conflict
D with less inputs, less fertilizer, less pesticides as water needs to be sustainable
E that would require all the **habitable** land
F to link up with other people
G and 600 million of those people are obese
H and they started out of a common interest

Futuristic Farms Will Feed the World

If we want to feed the world in 2050, then we need to produce the same amount of food as we did over the last 8,000 years, and that indicates the pressure the food system is facing nowadays.

Let's take a look at some examples of our food systems limitations. While one out of every three people suffers from malnutrition, 1.9 billion people overeat **1** _____ . Consequently, more people suffer from illnesses such as type 2 diabetes. Our food is too rich in fat, sugar, salt and meat. This type of diet has an impact on health and the environment. In addition, our food is less diverse: 75% of our food now comes from only 12 plants including rice, corn and wheat, and from 5 animal species including cows, chickens and pigs. Out of all the food we produce one third is not consumed but thrown away. Our natural resources are under pressure. Sources of fresh water are running dry and existing water resources are becoming polluted, 33% of soils are degraded, our biodiversity is threatened. These problems are intensified **2** _____.

The security of the food system is one of the world's most pressing challenges, but the story of how a small country became an unexpected food superpower might just have some answers for how we tackle it.

Consider this: if everyone on Earth ate the diet of the average American, **3** _____ to be used for agriculture and we'd still be 38% **short**. Now, what do we do if there are 2 billion more people? Basically, how do we produce a lot more on the land we're already using and do it using a lot fewer resources? Well, the key is efficiency.

When it comes to sustainable agriculture, one country has seemed to crack that code: the Netherlands has become the world's number two food exporter. There was a very close collaboration between government, science organizations and the industry, **4** _____.

For example, if you produce tomatoes in an open field in Spain, you will end up with four kilograms per square meter at the end of the growing season. If you do this in a **high-tech** greenhouse in the Netherlands, you will end up with 80 kilograms per square meter, which is 20 times more. But the best part of the story is that they do it with four times less resources. **5** _____ to produce a single cup of coffee. The Dutch lead the world in tomato yield while using a **fraction** of the

water that other countries use.

They perfected the greenhouse as the ideal environment to continuously test and implement all kinds of ways to optimize growth from things as simple as testing how the use of LED lights can increase pest resistance and improve nutritional value to things as crazy as moth killing drones. They've even started taking the **human touch** completely out of it. Some of the latest tech relies on **AI 6** _____ without any input from a farmer. For example what they're testing a climate computer which is able to **replicate** any climate on Earth to figure out what modifications need to be made to realize the same yields they're getting in the Netherlands in any other country on Earth.

It's obvious that our food system must be transformed. Each step of the food system – production, processing, distribution, consumption – needs to be adjusted to ensure healthier food to our growing population and to reduce its environmental impact. But above all, it is necessary to bring all the **stakeholders** together: government and health authorities, producers, consumers, business people – to break down the **silo thinking**, examine all the points of view and work together to define the actions necessary to produce and eat food differently and decrease levels of overconsumption.

5 Explain what the following numbers from the article refer to.

33%	1/3	38%	12	5
1.9 billion	150	80	600 mln	4

6 Look at the words in bold in the text. Find a word or phrase that has a similar meaning.

1. using people's work _____
2. reluctance to share information within the same company _____
3. machines programmed to mimic human thoughts and actions _____
4. lacking _____
5. reproduce, make an exact copy of something _____
6. suitable for living _____
7. alter slightly in order to achieve the desired result _____
8. sophisticated, involving technology _____

9. people with an interest or concern in something _____
10. very small amount _____

7 Use the words and phrases from the box to complete the sentences. There are two words and phrases that you don't need.

pest resistance	collaboration	nutritional value	consume
overconsumption	threaten	implement	efficiency

1. We _____ calories in the form of food and use them up in maintaining the body's functions.
2. Cooking vegetables reduces their _____ .
3. The new technology was a triumph of European industrial and technical _____ .
4. Climate changes _____ the continued existence of the species.
5. Our _____ is fuelling the economic boom, but at a heavy cost to the environment.
6. Over time many pesticides have gradually lost their effectiveness due to _____ .
7. The authorities failed to _____ the plan.
8. The production _____ is decreased by the old machines.

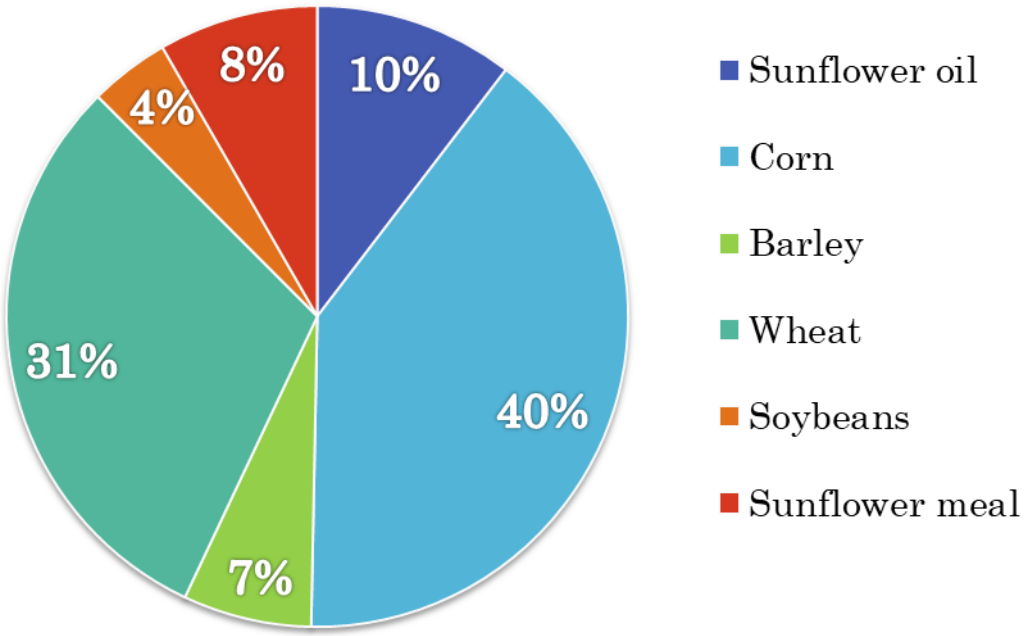
8 Complete the sentences with prepositions *in, on, under, from, out, up, down*. You can use the prepositions more than once.

1. What started _____ as fun quickly became hard work.
2. He suffers _____ diabetes.
3. Technology has had an irreversible impact _____ society.
4. If you fail to adjust to new conditions, you will end _____ broke and out of business.
5. We must figure _____ how to solve the problem.
6. The task won't feel so overwhelming if you break it _____ into small, easy-to-accomplish steps.

7. All success comes _____ tireless effort and pursuit
8. Liver and kidney are particularly rich _____ vitamin A.
9. The industry relies _____ the price of raw materials remaining low.
10. The government is _____ pressure from the European Commission.

9 Around 70% (42 million hectares) of Ukraine's area is agricultural land, with more than 55% of it used for arable production. Today, Ukraine is among the top three exporters of organic products to the EU and is the 3rd largest grain exporter worldwide. Look at the chart below and discuss Ukraine's potential in maintaining global food security.

Food export from Ukraine



2.2. FARMS OF THE FUTURE

1 Discuss the questions.

- What do plants need for growing?
- What is urban farming? How much food is it possible to grow in urban areas?
- Is it possible to grow plants without soil? Without sun? Rain?

2 You are going to watch a documentary about *Plenty*, a farm near San Francisco using a revolutionary agricultural technology. Paraphrase the words in italics with words from the box.

ditch	from scratch	big-box retail store	plummeting
LED	grid	awesome	vapourware
	gross	untethered	

1. We can condense about 700 acres of farmland into the size of ***supermarket***, and we harvest 365 days a year. _____
2. Humans and machines are partnering together to make farming ***amazing***. _____
3. With vertical farming you can ***get rid of*** the pesticides, recycle the water and you can go pretty much anywhere anytime. _____
4. But the surprising technology that's helped make this possible is ***energy-efficient light bulbs*** to replicate the sun. _____
5. Humanity is fully ***free*** from the environment in terms of how our population grows. _____
6. The cost of each component is ***dropping*** as industries like solar and robotics are flourishing. _____
7. Faster, unhealthy food dominates people's diets, but alternative produce for most is kind of ***disgusting***. _____
8. This is Hard Reset, a series about rebuilding our world ***starting from zero***. _____
9. Plenty is not ***unavailable to buy***, it's already on the market. _____
10. LEDs efficiency comes down to how little loss there is between the ***network*** electricity and the amount of light it puts out. _____

3 Watch Part 1 of the documentary. Say if the statements below are True or False. *(Go to p. 108 to scan the code)*

1. Vertical farms need a lot of land. ___
2. In an indoor farm, plants grow faster. ___
3. The price of building a vertical farm is rising. ___
4. LED light can influence the taste of the plants. ___
5. Vertical farms use less water to produce a bigger amount of food. ___

4 Watch Part 2 of the documentary. Complete the gaps with the information from the video.

Plenty is **1** _____ their produce being better and more flavourful than produce from traditional farms. And because farms like *Plenty* use a tremendous amount of **2** _____ , these plants have actually never even been touched by human hands. If you grow indoors, you can control a lot of those factors in ways that aren't **3** _____ to outdoor growers.

Globally we eat about **4** _____ of the fresh fruits and vegetables that we should be **5** _____ . Humanity is trapped in our **6** _____ to those calories, and we don't have the land, or the resources, or the ability to compensate with **7** _____ food. Many products like tomatoes are designed for **8** _____ because they got to be shipped across the country in these massive trucks, and not for **9** _____ . We're able to concentrate on **10** _____ over the ability to ship.

5 Watch Part 3 of the documentary. Find the answers to the questions below.

1. How can *Plenty* help communities in areas not suitable for farming?
2. Is vertical farming possible for all kinds of plants? Why or why not?
3. If vertical farms replaced traditional ones, would the consequences for farming communities be positive or negative?
4. How can urban farming help the environment globally?

6 In pairs, discuss the pros and cons of vertical farming. Do you think that potential benefits outweigh the negative effects?

LANGUAGE FOCUS

1 Look at the sentences from the video. Underline the correct option to complete the rules in *Language point 2*.

1. All of that **used to be** nature.
2. We literally **changed** ecosystem of the entire planet in order to meet our dietary needs.
3. We**'ve just managed** to pack more of them into a field and there is a limit to that type of yield gain.
4. Historically vertical farming **has been** too expensive and too inefficient to make it a better option than traditional farming, but that's all changing now.
5. Most produce **has been packed** up and **shipped** off to another country or **transported** across state lines via trucks and trains.

Language Point 2

- We use **1 Past Simple / Present Perfect** to talk about a finished action in the past.
- We use **2 Past Simple / Present Perfect** to talk about an action that happened in the past and has result in the present.
- We use **3 Past Simple / Present Perfect** to talk about an action that started in the past and continues in the present.
- We use **4 Past Simple / Present Perfect** to talk about experiences.
- We use **5 Past Simple / used to** to talk about a past habit or state.
- Most adverbs like *already*, *just, ever, never* etc. are used **6 before / after** the auxiliary verb, but *yet* and *so far* come at the end.
- With more than one predicate, we use auxiliary verbs with **7 the first / every** predicate.

*For more information, go to **Grammar Reference, Unit 2***

2 Rewrite the sentences with *used to + infinitive*.

1. We don't spray a lot of pesticides now.
2. Did you once work on a traditional farm?
3. The facility was originally in San Francisco.
4. Traditional farming wasted a lot of water.
5. In the past all the farmland belonged to nature.
6. Did people once eat more fresh fruit and vegetables?
7. In the past, farmers depended on the seasons to grow vegetables.
8. In the past, factories were very dangerous.
9. Twenty years ago, it took a long time to grow kale.
10. In the past, we didn't need AI to grow vegetables.

3 Put the verbs in brackets into the correct form, using *Past Simple* or *Present Perfect*.

1. Sales _____ (fall) this year, but we hope they will recover before December.
2. You _____ (be) late three times this month, and it's only the 15,h.
3. The company _____ (get) into financial trouble last year.
4. Jenna needs to talk to you – she _____ (phone) twice this week.
5. The new computers _____ (arrive) last week.
6. I _____ (not/see) Harry today, but I may see him this afternoon.
7. I _____ (not/see) Harry this morning, so I phoned him after lunch.
8. I'm calling about the units we _____ (order) last month.

4 Rewrite the sentences, put the adverbs in brackets into the correct place.

1. I've sent you an email. (**just**)
2. Have you been to the USA? (**ever**)
3. They've put up their home page. (**already**)
4. They haven't done any of the product pages. (**yet**)
5. We have thought about growing plants indoors. (**never**)
6. They have harvested 50 tons of produce. (**so far**)

2.3. PROCESSING INFORMATION

1 Look at the title of the article. What do you think this article is about? Explain the terms "academic integrity" and "plagiarism" in your own words.

2 Read the text and check your ideas.

Academic Integrity and Plagiarism

At present science is developing at a very high rate. Nearly every day we learn about new discoveries from scientists all over the world. All of this is possible due to the access to the unlimited scientific researches that were made previously or are in progress now. In such a way scientists have an opportunity to become familiar with already obtained results and get their own. That's why all the members of the academic community should maintain the academic integrity rules.

Academic integrity means representing your work and others' work honestly, using results by other authors only in legitimately accepted ways. Academic integrity violations can have serious educational and professional consequences. Students who are found guilty of academic integrity violations may fail a grade or be expelled. Employees may be fired for plagiarism and do great damage to their professional reputation. In short, it is never worth the risk.

Plagiarism is a serious academic offence. Under this term we consider a direct or indirect representation of someone else's ideas as if they are your own. A writer can plagiarize someone's work on purpose by copying or pasting text and images without saying a word about the original source or changing some words in the passage of the text without acknowledging its author. Sometimes plagiarism can be accidental. Being short of time a writer can accidentally not show when a quote is a quote or forget to put the original author's name next to the summary or quote. Any of these actions can create the appearance of plagiarism and lead to negative consequences.

To avoid accidental plagiarism, you should always cite any type of information which was taken from others, keep source materials and notes carefully organized and strictly follow guidelines for referencing and citing sources.

3 For statements (1-5) choose T if the statement is true according to the text, F if it is false.

1. Academic integrity means representing your work and others' work as your own. ___
2. Academic integrity violations can have serious educational and professional outcomes. ___
3. Plagiarism doesn't have any effect on the further career. ___
4. A writer always plagiarizes on purpose. ___
5. You should always cite any results that were taken from other researchers' articles. ___

4 Complete these sentences with the words from the box.

sources quote cite professional reputation obtained plagiarism academic community academic integrity

1. His _____ was ruined after he was caught plagiarizing.
2. A _____ means that you take a word, phrase, sentence directly from the person who created that word, phrase or sentence.
3. All the teaching staff is working closely with students to create an outstanding _____.
4. _____ means that you have taken information or ideas, from a source and then used them in your own text without mentioning anything about the author.
5. To make a really valuable research you need to look through lots of _____.

6. After the survey was completed they presented the _____ data.
7. When your professors or instructors say you need to _____, it means that you should indicate where you got the work or information from.
8. This week we are holding a set of lectures about respect and responsibility in learning, teaching and research. Therefore, we hope to promote _____ among the students and young researchers.

5 When do you need to cite sources? Which citation style can you use? Read the article and find out.

Reference & Citation in Academic Writing

When writing any academic paper or assignment, you need to give reference to all of the materials that you used in your research. In such a way you are giving the original author credit for his own ideas, enable the reader to see how dated the information is and validate your own arguments.

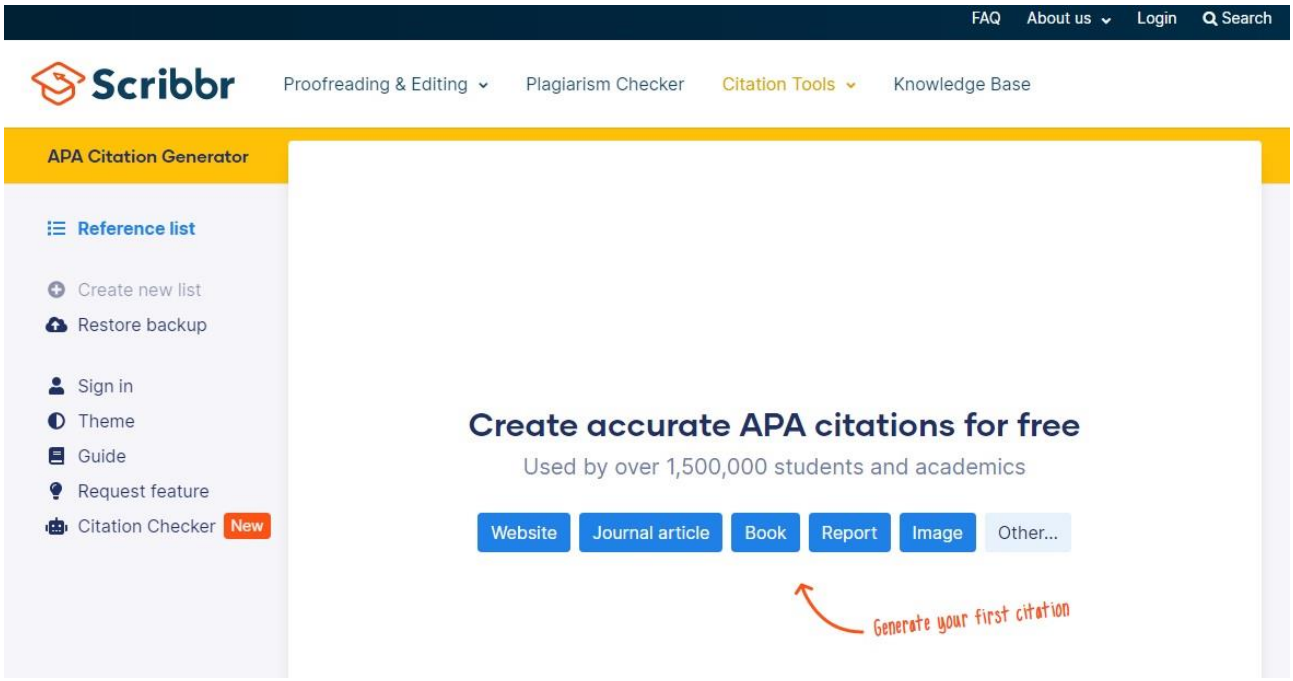
Citing sources is an important part of academic writing. Whenever you use information or research results from a source (such as a book, journal, or web page), you have to include a citation. By this we mean giving the readers information about what kind of sources you used, by whom and when they were created.

Usually the in-text citation consists of author surname, followed by the year of publication and page (Suprun, 2021, 167). If the source was written by two authors - (Suprun & Zaitseva, 2020, 129); if there are more than three authors – (Suprun et al., 2021, 493). Be attentive, the in-text citations may differ according to the citation style.

There are many different citation styles. Among the most common citation styles are MLA, APA (from the American Psychological Association), Chicago etc. APA is the most common style in the social sciences, while MLA is the most common style in the humanities. In Ukraine ДСТУ 2015 is commonly used for citing and referencing in the scientific journals and books.

APA
Bilousova, Z., Klipakova, Y., Keneva, V., & Priss, O. (2020). Forecasting of winter wheat (Triticum aestivum L.) yield for the Southern Steppe of Ukraine using meteorological indices. *Ukrainian Journal of Ecology*, 10(3). 36-43. doi: 10.15421/2020_130.
Chicago
Bilousova, Z., Klipakova, Y., Keneva, V., & Priss, O. "Forecasting of winter wheat (Triticum aestivum L.) yield for the Southern Steppe of Ukraine using meteorological indices." *Ukrainian Journal of Ecology*, no.10(3) (2020). 36-43. doi: 10.15421/2020_130.
MLA
Bilousova, Zoia V., Klipakova, Yulia O., Keneva, Viktoriia A., & Priss, Olesia P. "Forecasting of winter wheat (Triticum aestivum L.) yield for the Southern Steppe of Ukraine using meteorological indices." Ukrainian Journal of Ecology, 10(3), 2020. pp. 36-43. doi: 10.15421/2020_130.
ДСТУ 2015
Bilousova, Z., Klipakova, Y., Keneva, V., & Priss, O. Forecasting of winter wheat (Triticum aestivum L.) yield for the Southern Steppe of Ukraine using meteorological indices. *Ukrainian Journal of Ecology*, 2020. 10(3). P.36-43. doi: 10.15421/2020_130.

References are usually listed at the end of the paper in a part called References or Bibliography. Full references always include the author, title, and publication date of the source and can include some other information. The exact format of a reference depends on the type of the source.



Scribbr – APA Citation Generator (https://www.scribbr.com/apa-citation-generator/)

If you have any difficulties or doubts while writing references, you can use citation generators. The vast majority of citation generators are made for different styles and operate online. Usually they are free of charge. All you need to do is put in a URL or DOI or type the source details, then the generators will show you an in-text citation and a reference entry in the correct style.

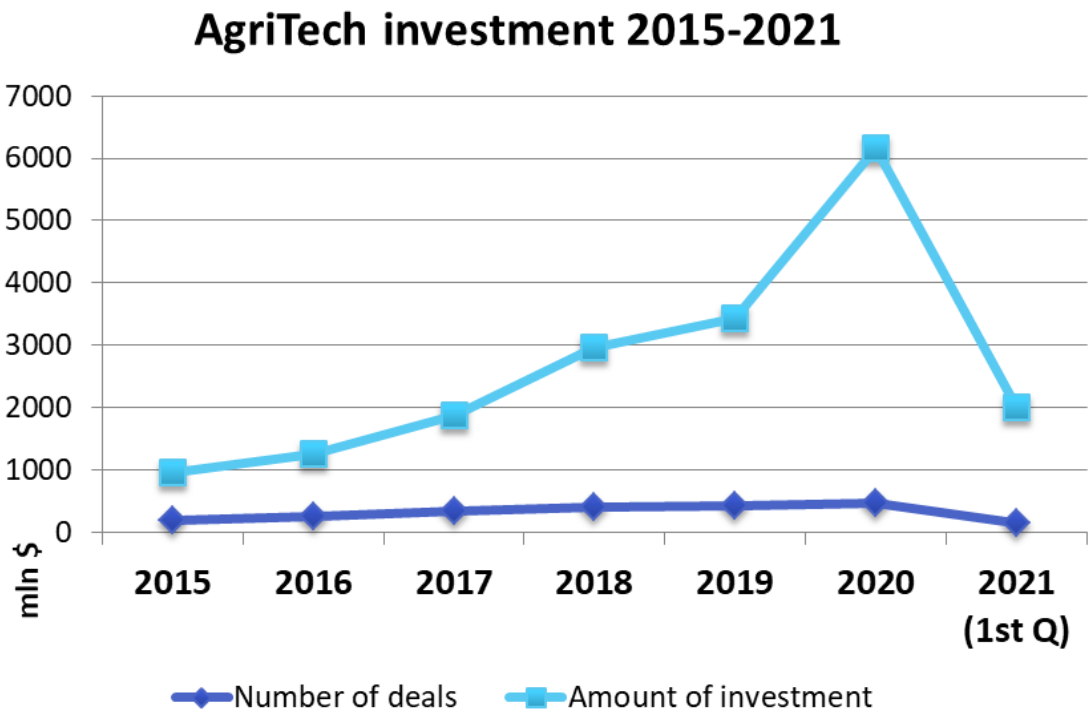
6 Make a list of references (at least 5) on the one of the provided topics using different citation styles.

- The Global Food Crisis
- Food Security and COVID-19
- Agriculture and Food Security
- Farming in the future

UNIT 3 INNOVATION IN AGRICULTURE

3.1. DATA-DRIVEN AGRICULTURE

1 What do you think of when you hear about innovation in agriculture? Look at the graph and discuss the global investment trends in AgriTech (agricultural technology).



2 Which of these technologies do you think can be used in agriculture? In what ways? Which of them have already been implemented?

- Drones
- Chatbots
- Nanotechnology
- Blockchain
- Robotics
- 3D printing
- GPS
- Telematics
- IoT (Internet of things)
- RFID

3 Read the article about the use of IoT in agriculture and check your ideas.

IoT: Powering Digital Agriculture

Farming has long been considered a risky investment with tight profit margins and often unpredictable yields, but it's a sector with enormous potential. According to the World Bank, it accounts for about a third of global GDP. That's a challenge, and we're going to need all sorts of technology.

We've seen these types of changes in technology before, whether it was the mechanization of the farm in the late 1800s or the Green Revolution, where breeding and understanding about fertility helped improve yields. Digital agriculture is going to be this next wave of innovation that will be able to apply to these problems helping farmers.

Technology in agriculture is thriving and attracting investment like never before. Food producers are now turning to digital innovations to increase their yield and farming efficiency. Digitalization along the entire value chain makes tech companies forge new relationships with agricultural business with even digital heavyweights like *Google* and *Amazon* starting to participate. So how is farming changing its face in the digital revolution and what business opportunities and challenges lie ahead in this program?

It started with a seed. The seed of an idea that we could help the world's food production, keep pace with population growth and do this sustainably in a climate that is changing rapidly. That every farmer should have access to the breakthroughs in data-driven agriculture, low-cost sensors that take the pulse of the soil in real time, communicating at broadband speeds across unused TV white space, affordable drones that create detailed visual heat maps identifying areas of the farm that need attention, and monitor livestock health, movements, and food supplies.

Digital technology, such as the Internet of Things, or IoT, is driving change in agriculture. IoT refers to devices from pumps, sheds and tractors to weather stations that are embedded with a sensor so they can measure and transmit data via the Internet.

IoT allows devices across a farm to measure all kinds of data remotely and provide this information to the farmer in real time. IoT devices can gather information like soil moisture, chemical application, dam levels, and livestock health – as well as monitor fences, vehicles

and weather. Information generated by IoT devices allows farmers to make better informed decisions and respond more quickly to changing conditions while saving time and money. It's putting the data behind the all-important farmer instinct, whether it is knowing when to check on water supply to a trough, how much fertilizer to apply to a crop and which ewe two check during lambing.

IoT powered by machine learning and cloud storage technologies enables precision agriculture and empowers farmers at all levels. With precision agriculture farmers need to know precisely what inputs are needed, where, in what amount and when to plant and nurture their crops. This requires collecting a lot of information from different sources and in different parts of the field. Once collected, this information needs to be analysed to produce agronomic recommendations.

Big farmers use sophisticated machinery that collects georeferenced information on soil characteristics, yields and greenness of the plants. For instance, using robotic devices attached to GPS guided tractors or remote sensing through the use of satellite imagery.

However, solutions like these may be economically infeasible for medium and small-scale farmers. These farmers lack the scale to afford that sophisticated machinery, lack the knowledge to operate the non-automatic aspects of the machines and lack the resources to hire a person who knows how to do it.

All of these technological developments are pieces of a puzzle that needs to be put together to make precision agriculture a real option. IoT augments knowledge to help farmers create a brighter future for all mankind.

4 Choose the correct answer (A, B or C) according to the article in ex. 3.

1. Which is **NOT** a risk factor for farming according to the text?
   - A The amount of harvest is difficult to calculate.
   - B Unpredictable GDP growth rate.
   - C Limited earnings.
2. Digital revolution means …
   - A using *Google* and *Amazon* to purchase fertilizers.
   - B machine learning for the staff.

C using complex technologies to monitor the farm's operation.

3. With precision agriculture, it is possible to …

A use IT to ensure that crops and soil receive exactly what they need.

B use satellites to increase yields.

C grow different plants in different parts of the field.

4. Medium and small-scale farmers have difficulties using innovations because …

A they are not educated enough.

B the machines are too expensive.

C all of the above.

5. According to the text, IoT in farming …

A provides employment for small-scale farmers.

B allows farmers to make more profit in a sustainable way.

C helps to treat livestock remotely.

5 Match the words to make collocations.

1.	profit	a	space
2.	digital	b	learning
3.	value	c	health
4.	data-driven	d	margins
5.	white	e	chain
6.	heat	f	levels
7.	livestock	g	innovations
8.	food	h	maps
9.	dam	i	agriculture
10.	machine	j	supplies

6 Put the collocations from ex. 4 into three categories according to their meaning: *Farming*, *Technology* or *Finance*. Some of them can go to more than one category.

***Farming*:** _____, _____, _____, _____ .

***Technology*:** _____, _____, _____, _____, _____ .

***Finance*:** _____, _____ .

7 Match the words in the box with their meaning.

embedded	broadband	nurture	forge	infeasible
sophisticated	augment	empower	thrive	remotely

1. to increase the size or value of something _____
2. integrated into, fixed on the surface _____
3. from a distance _____
4. take care of, protect _____
5. complicated _____
6. increase and progress _____
7. impossible to use or perform _____
8. enable, make stronger and more confident _____
9. of wide bandwidth _____
10. build or establish _____

8 Discuss the following questions.

- How will the growing use of smart agricultural IoT solutions influence employment?
- Is digital agriculture a solution for declining arable farmlands in the 21st century?
- Can precision agriculture be answer to food insecurity in the future?

9 Modern technologies are already changing Ukrainian agriculture for better. Search the web to find out about the most promising AgriTech start-ups in Ukraine. Prepare a report about the problems they solve and the technology they use.

3.2. AGRICULTURE 4.0: ROBOTIC FARMING

1 Discuss the questions.

- What are the biggest problems for arable farming today?
- What are the possible ways to control weeds in the field?
- How can the problem of weeds and herbicide resistance be solved with ICT?

2 Watch the presentation of an AgriTech Company *Small Robot* (Part 1). Tick all the adjectives used to describe the new technology. *(Go to p. 108 to scan the code)*

- ☐ game-changing
- ☐ amazing
- ☐ incredible
- ☐ intelligent
- ☐ accurate
- ☐ robust
- ☐ viable
- ☐ farm-ready
- ☐ impressive
- ☐ end-to-end

3 Watch Part 1 again. Choose the correct answer, A or B, to complete the sentences.

1. Tom, Dick and Harry are…
   a founders of the *Small Robot* Company.
   b agricultural machines driven by AI.
2. Robots use plant-by-plant technology…
   a to recognise weeds more precisely.
   b to identify weaker plants and treat them with fertilizer.
3. The non-chemical weeding technology was developed by…
   a *Small Robot* Company.
   b another company.
4. The *Small Robot* Company …
   a is looking for investment to start the trials.
   b has already gone through several development stages.
5. According to the developers, … commercially ready to be marketed.
   a only Tom is
   b Tom and Dick are

4 Watch Part 2 of the video, where the technology is being described. Agree or disagree with the statements below. Correct the false statements. *(Go to p. 109 to scan the code)*

1. There has been more than one version of Tom. _____
2. Dick kills every weed that Tom has identified. _____
3. The farmer makes a decision about killing the weed or not. _____
4. The cost of herbicides has been rising. _____
5. The robots can be transformed to meet the current needs of the farmers. _____

5 Watch Part 2 again. Match the phrases with their meanings.

A	on the cusp of
B	the world's your oyster
C	to reinvent the wheel
D	to have an ear towards something
E	unanimously

1. with support from everyone in a group _____
2. to waste time trying to do something that has already been done ____
3. be well informed about up-to-date events and trends _____
4. at the time when a situation is going to change _____
5. you can do anything you want to _____

6 Complete the sentences with words and phrases from ex. 5. Use the correct form.

1. With your degrees from Harvard and MIT, _____ .
2. Nobody had any arguments against the decision of the Board, so it was accepted _____ .
3. The company was _____ a major technological breakthrough.
4. Farmers _____ digitalization so as to know as soon as possible about the newest trends and technologies.
5. You don't need _____, the way to solve this problem already exists.

7 What are the chances that in the future farms will become fully automated? Why or why not? What might be the possible outcomes?

LANGUAGE FOCUS

1 In pairs, discuss the questions.

- What skills are needed to be able to operate a robot?
- In what ways can farmers get the necessary skills and receive the necessary knowledge?

2 Look at the sentence and answer the questions.

*The data from Tom **is collected**, then it **is absorbed** into Wilma and **processed** through the AI to create the map of the field.*

- Which word is the subject in the sentence?
- Who performs the actions **in bold**?
- What is more important, the subject or the action?
- What is the overall style of the sentence: formal or informal?

3 Read the instructions for programming a robot and complete the rules in *Language point 3*.

How to Program a Robot

In order to work correctly, robots **need to be instructed** all the way through the process.

First of all, an algorithm **is written** with a set of specific instructions – robots do not know what to do or what information to collect. They **have to be programmed** to do each step, not even the smallest detail **can be omitted**.

Then, beta testing of the robot's performance **is carried out** using a programmable robot simulator. At this stage, the infrared sensors, with which the robot **has been equipped,** play a major role.

Next, if any mistakes **were identified** during the beta testing, the algorithm is debugged, which means that the mistakes are corrected.

After that, trials of the prototype **will be carried out** in conditions as close as possible to real life.

Finally, the viable product is commercially ready for the market.

Language Point 3

We use the Passive
- when we are interested in **1 the action / the performer**
- when we **2 know / don't know** who performs the activity
- in **3 formal / informal** speech.

To form the Passive, we use the corresponding form of the verb **4 be / have** and the **5 second / third** form of the verb:

- Present Simple **6** ____/____/____ + V_3
- Past Simple **7** ____/____ + V_3
- Present Perfect **8** ____/____ + _____ + V_3
- Future Simple **9** _____ + ____ + V_3
- Modal Verbs **10** _____/_____/ _____ + ____ + V_3

The performer of the action is usually **11 omitted / named** in the Passive.

*For more information, go to **Grammar Reference, Unit 3***

4 Rewrite the sentences using the Passive. Make all the necessary changes.

1. A famous engineer is developing our software.
   Our software _____
2. They make a lot of the world's IT research in the Silicon Valley.
   A lot of _____
3. My assistant will check the algorithm.
   The algorithm _____
4. He orders all the analytics from the local ICT company.
   All the analytics _____
5. The partners established the company in 1998.
   The company _____
6. Nobody has carried out the beta testing yet.
   The beta testing _____
7. They received $100,000 of investment last year.
   $100,000 of investment _____

8. We use modular construction in our robots.
Modular construction _____
9. Someone will collect you from the airport.
You _____
10. We can organize a presentation of our product at the fair.
A presentation _____

5 Complete the sentences using the correct form of the verb in brackets, Active or Passive.

1. Several groups of environmentalists _____ (encourage) members of the public to protest against the testing of genetically modified crops.
2. At the moment there are about 15 sites around the country where large-scale trials _____ (carry out).
3. A lot of calculations _____ (have to, make) before the robot is programmed to complete even the easiest operations.
4. The company _____ (produce) a viable product by the end of next year.
5. A mobile robot _____ (recently, develop) which _____ (can, program) to pick apples with the use of a robotic arm.
6. You don't need to reinvent the wheel, the existing software _____ (perform) all the necessary calculations.
7. The algorithm _____ (debug) by our specialists tomorrow.
8. GPS and satellite imagery _____ (use) to monitor the ongoing processes on the farm.
9. IoT devices and machinery _____ (provide) with the ability to transfer data over the network without human interaction.
10. The robot _____ (be able, cover) a territory of 1.4 acres per hour.

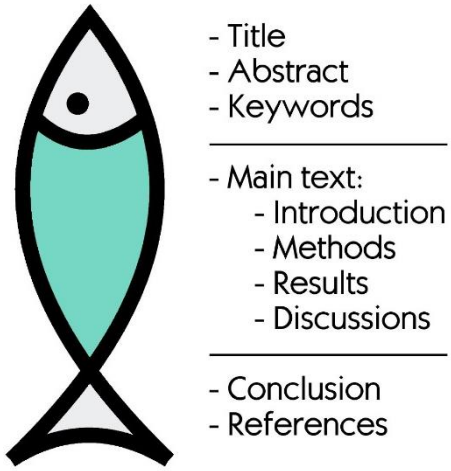
3.3. ARTICLE & ABSTRACT

1 What kinds of articles do you know? How often do you read research articles? Have you ever written your own research article? Do you want to write a research article? Why? Why not?

2 Read the article and answer the questions after the text.

Writing a research article

A research article usually reports the results of original research, new findings and discoveries in a particular area of study, and is published in a scholarly journal.



The structure of the article is just as important as the content itself. It helps to guide the readers through the written information in a clear and logical way. Although some scientific journals can have their own guidelines or be format-free, there are some general elements, which necessarily should be outlined in the article:

Title

The title is one of the first indicators that concisely describes the content of the article. It should be accurate and informative. Remember to include some most relevant keywords, but try to avoid abbreviations and formulae.

Abstract

The abstract is usually some kind of a short "preview" to the whole article. It helps readers to find out the main points and results discussed in the article.

Keywords

Keywords list out the main topics presented in your paper.

Introduction

Introduction is the first part of your article that should provide a

broad overview of the entire content, explain what problem it attempts to solve and describe the context around it. After the problem setting, the objective (aim) of the article is stated.

This part is usually written in the present or past tenses, but should never refer to the future, as the research is already complete.

Methods

In this part of the article the methods, which were used in the research, should be indicated. In other words, it is a brief description of what you did and how you did it. It is usually written in the past simple tense as it refers to completed actions.

Results

Results should give a clear overview on what was discovered or achieved during the research. This part of the article can be in the present or past tense.

Discussion

In the Discussion the implications of the findings should be described and interpreted, the relationship of new facts to the theory should be discussed. It is usually written in the present tense.

Conclusion

The main conclusions of your research should be listed in this part of the article. The reader should be left with a clear understanding of the central point that your research has proved or argued. Conclusions are usually written in the present tense.

References

References are usually listed in the end of the article. Be attentive and use the appropriate style of referencing.

1. What are the main parts of the article?
2. Which of the parts are usually smaller in size? Which of them are bigger? Why?
3. Which parts is the main content of the article stated in?
4. Which tense can be predominant while writing the article?
5. Which part gives an outlook on the scientific works used in the research?

3 Complete the table with the information from the article.

Part of the article	Purpose
Title	describes the content of the article
Abstract	…..
…..	

4 Do you know how to write a good abstract? What kind of information should be included in the abstract? Read the article and check your ideas.

How to write an abstract

Abstracts are typically 150–300 words and comprise one or two paragraphs. However, some of the scientific journals may require more complex ones, so you may firstly need to check the guidelines.

The main purpose of an abstract is to help readers decide whether to read the whole article. That's why a common misconception is to write your abstract like an introduction. It is not an introduction to the article, it is rather a summary of the problem background, main findings and results.

The abstract contains the main information and findings presented in the article, but in a brief form:

- the research background and its specific topic;
- the problems and aims of the research;
- the research methods;
- the main findings, discoveries and results;
- the significance of the obtained data.

In other words, abstract describes what has been studied, what has been found and what is argued in the article.

Although the abstract is stated just after the title of the article, it is better to write it after the whole article is ready, in order to know what should be certainly mentioned.

Yeremenko, O., & Onyshchenko, O. (2020). Dynamics of changes in biometric indicators of sunflower plants depending on basic tillage methods and growth regulator in the Southern Steppe of Ukraine. Bulletin of Poltava State Agrarian Academy, (4), 93–103. doi: 10.31210/visnyk2020.04.11

Abstract. Sunflower cultivation and sunflower oil production occupies a leading position and reaches about 95 % of the total volume of vegetable oils in Ukraine. The article presents the results of researching Colombi and Talento high oil-yielding hybrids of Syngenta company under different tillage and application of AKM-K1 and AKM-K2 plant growth regulators in different combinations in the conditions of insufficient moistening of the southern Steppe of Ukraine. The experiments were conducted in 2017–2019 in the fields of "Energy2000" LLC in Melitopol district of Zaporizhzhia region. The soils of the enterprise are clay loam southern black soils. AKM-K1 plant growth regulator (PGR) was used for pre-sowing treatment of sunflower seeds, and AKM-K2 PGR – for vegetating plants. Plants' sampling was conducted in accordance with the BBCH scale and generally accepted research methods. No significant difference was observed between the hybrids in the number of leaves per plant. In the variant AKM-K1 + AKM-K2 on the plants of Talento hybrid at deep loosening, the plants had the maximum height (172.9 cm) according to 2019 data. The same year, the plants of Colombi hybrid formed the maximum stem diameter (2.93 cm) in the variant of AKM-K1 + AKM-K2 with deep loosening. In 2018, which was the most arid among the studied years, the effect of AKM-K1 and AKM-K2 growth regulators was the maximum. This can be confirmed by the increase in linear size: the plants of Colombi hybrid at deep loosening had increased indices by 9.7 to 22.7 %, and at plowing – from 8.0 to 23.0 %. For sunflower plants of Talento hybrid, the results were recorded from 8.1 to 26.5 % increase at deep loosening, and from 6.7 to 26.2 % at plowing. It was established that hydrothermal conditions of the year had the greatest effect on the formation of biometric parameters of Colombi and Talento sunflower hybrids.

Key words: Sunflower, tillage, plant growth regulator, high oil-yielding hybrids, biometric indicators, yield.

5 Test your knowledge. Complete these sentences without looking at the texts.

1. _____ provides a broad overview of the entire project.
2. The section _____ summarizes the main findings and the outcomes.
3. The _____ section explains the ultimate conclusion and its ramifications.
4. Writing the _____ at the end is more effective since you have a better understanding of what is actually in your paper.
5. The abstract concisely reports the _____ and _____ of your research.
6. Finally, state the main _____of your research: what is your answer to the problem or question?

6 Find two articles on the provided topics. Write your abstracts to them. Use Task 4 as the guideline and example.

- GIS software and GPS agriculture
- IoT Application in Agriculture
- Smart Farming
- Robots in Agriculture and Farming

UNIT 4 AGRICULTURAL ECONOMICS

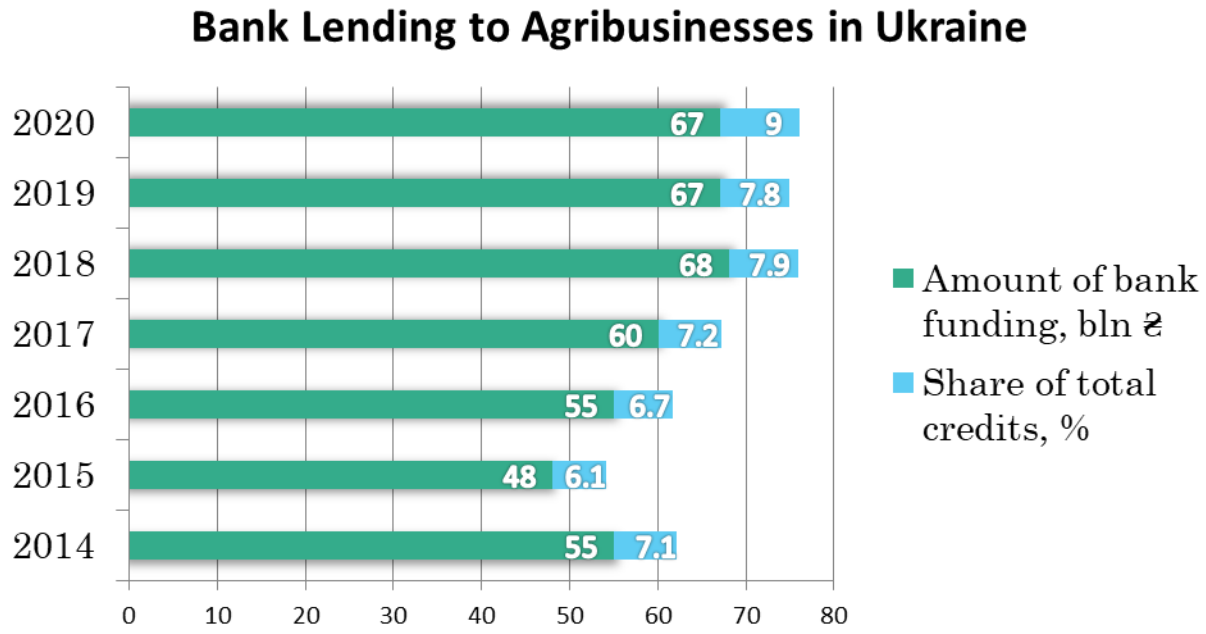
4.1. AGRICULTURAL FINANCE

1 How do you understand the quote "*Agriculture is not just about working in a field. It's actually about entrepreneurship as well*"? (Sherry Silver, Advocate for the Rural Youth International Fund for Agricultural Development).

2 Agricultural businesses can leverage three main sources of financing. What kind of financing would you choose if you started your own agricultural business? Why?

- Private equity funding
- Government funding
- Bank financing

3 Analyse the statistics of bank lending in agriculture in Ukraine. Do you think the dynamics are positive or negative? Discuss the possible factors influencing the dynamics.



4 Match the names of jobs in agribusiness with their activities. Use web search or consult a dictionary.

1. smallholder farmer	a	consolidates and distributes agricultural products
2. trader	b	owns a business in agriculture
3. agricultural entrepreneur	c	provides resource required for agricultural production
4. aggregator	d	is responsible for the supply side on the market for food products
5. input supplier	e	owns a farm where family provides the majority of labour
6. processor	f	buys and sells of products that have been produced through farming

5 Read the article. Match headings (A-H) to paragraphs (1-5). There are three headings that you don't need.

A Value chain financing
B Cash flow assessment
C Price risk management
D Capacity assessment
E Agricultural business
F Collateral management
G Client assessment
H Foreign investment

1. _____

Agripreneurship seeks to create sustainable development by creating jobs, empowering young people and protecting the environment. It combines agriculture and entrepreneurship to help tackle some of the world's pressing issues, from climate change to overpopulation and urbanization. With high youth unemployment many are looking outside the traditional job sector and becoming agripreneurs. But agripreneurs from low-income backgrounds often face a disadvantage because of the lack of resources and land they have access to. The answer to this is an agricultural loan.

2. _____

Lending to a farmer or to an agribusiness has some significant differences due to the nature of agriculture. The three main segments are farmers, agricultural entrepreneurs and agribusinesses. Farmers are people who grow and sell agricultural commodities. Banks can lend directly to farmers, but only if they are commercial which means producing and marketing surplus produce or income. Entrepreneurs and microbusinesses include collectors, smaller scale input suppliers, traders and those involved in agricultural supply chain logistics. Agribusinesses are larger enterprises including farmer-owned cooperatives and associations. These deal with a range of activities including collection, processing, distribution, retail and export.

3. _____

Lending to farmers and assessing their ability to repay presents a number of challenges as farmers will only receive an income from their crop once they have harvested and marketed it depending on the crop or crops in question, so a farmer only receives income from his crops once or twice a year. Smallholder incomes and expenses need to be considered in relation to the entire household finances. Household members may generate incomes from other economic activities, and have significant household expenses that are not related to agriculture. Essentially a bank will only lend to farmers if they can accurately assess the household's complete financial situation and project profit and loss throughout the loan period.

4. _____

Unpredictability and uncertainty affects businesses as much as individuals. Commodities experience price volatility over time and the level of volatility is prone to change unexpectedly. The risk faced by an agribusiness depends on its trading positions in terms of purchases and sales of agricultural commodities during the season. The order and level of exposure to risk depends on two factors: the length of time that the agribusiness is exposed to the risk and the total volume of the commodity. A loan officer discusses with an agribusiness their practices for managing and mitigating risks to ensure that exposure is kept within acceptable and manageable levels.

5. _____

Understanding the key players is essential in developing a

successful and profitable strategy for financing an agricultural group. Finance aligns incentives, insurance costs and risks with agribusiness partners operating in the same group. The model has proven to be a good way for banks to finance small producers to clients that typically would not finance individually. The chain begins with an aggregator, or off taker, who has a good relationship with a large number of small suppliers, for instance, a farmer cooperative, a processor or a trader. Normally, the off taker is already providing finance to its suppliers.

6 Match the words from the two columns to make collocations from the article in ex. 5.

1. surplus	___	a	flow
2. price	___	b	unemployment
3. trading	___	c	produce
4. insurance	___	d	risks
5. youth	___	e	costs
6. job	___	f	sector
7. cash	___	g	volatility
8. mitigate	___	h	positions

7 Choose the correct definitions for the collocations from ex. 6.

1. the amount of money transferred into and out of a business

_____

2. part of the produce created by direct producers in excess of the required product

_____

3. to reduce the exposure to potential dangers

_____

4. the price of contract that guarantees a compensation in case of damage, loss or illness

_____

5. the company's level of sales

_____

6. a situation when young people have no jobs

_____

7. price changes of goods and services

_____

8. a professional category

_____

8 Choose the correct word from the box to complete the sentences. Use the correct form of the words.

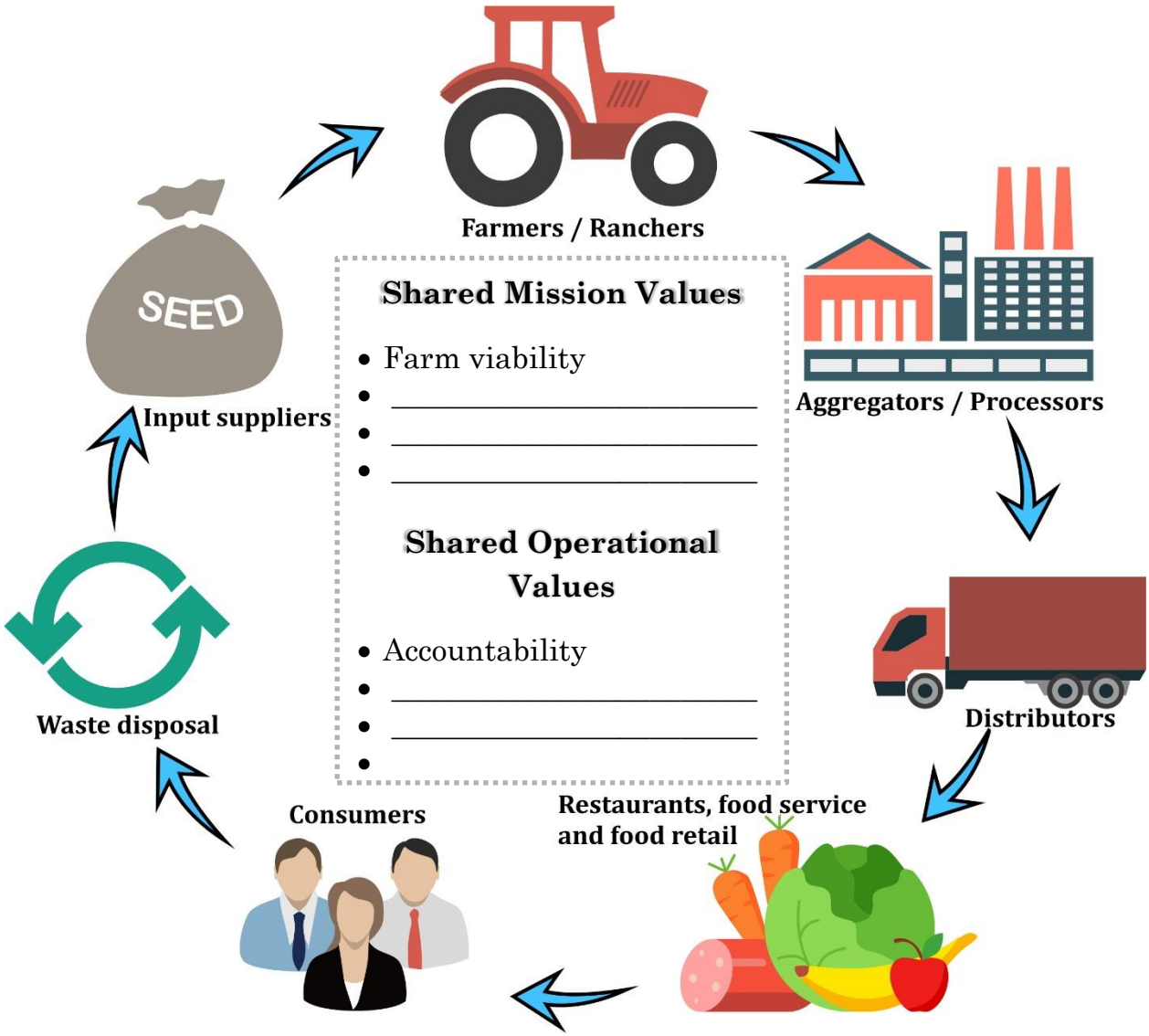
be prone	entrepreneur	commodity	logistics	incentives
retail	assess	purchase	exposure	loan

1. Before borrowing money, it is a good idea to _____your chances to return the money.
2. Prolonged _____to extreme weather conditions may decrease yields.
3. Governments can stimulate agricultural development by offering _____to help farmers increase their income.
4. In order to become an _____, one needs to raise a start-up capital.
5. Root vegetables _____to damage by splitting when heavy rains follow a drought.
6. _____prices for agricultural produce are determined by the level of demand and supply to the market.
7. Unstable economy and high interest rates could discourage farmers from long-term _____, which are essential for investment.
8. Farmers often have a need to finance specific _____of tools or machinery.
9. Crops and animals produced or raised on farms either in their original form or undergone primary processing are forms of agricultural _____.
10. The efficient, effective flow and storage of agricultural products is provided by _____.

9 In pairs, discuss the questions.

- What factors affect the supply, demand, and prices of agricultural products?
- Can value chain finance strengthen agricultural development? How?
- What can governmental agencies do to financially support agriculture?

10 Look at the diagram showing the key components of a local food value chain. Work in groups. Complete the diagram with your ideas.



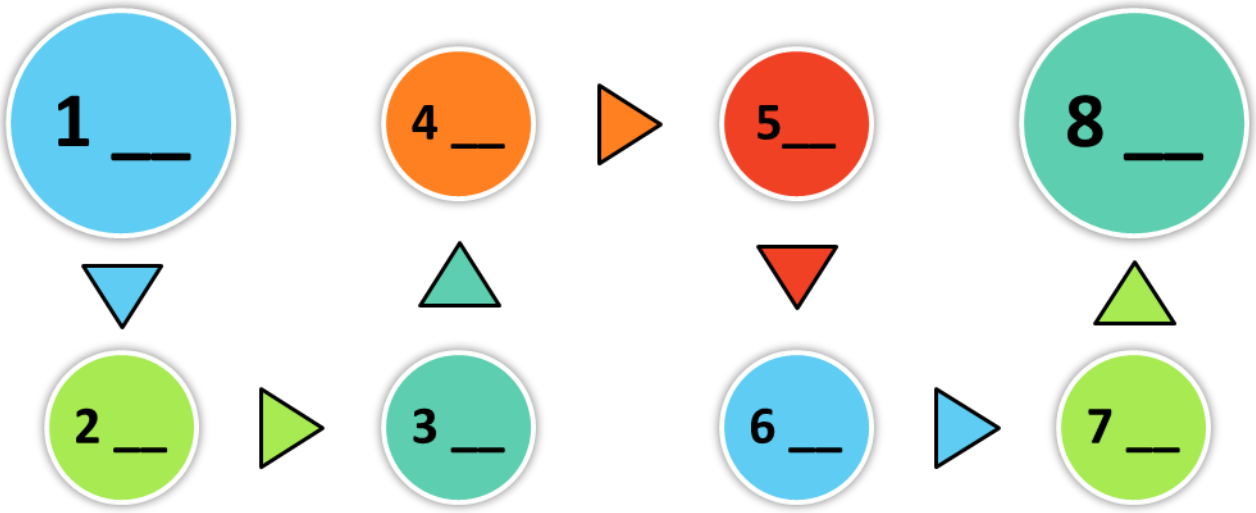
4.2. AGRIBUSINESS

1 Discuss the questions.

- Would you like to start a business in agriculture?
- What area of agriculture would you choose? Give reasons.
- What is farm management? Is it the same as agribusiness?

2 You are going to watch a video where Professor of Applied Economics James Sterns explains the meaning of agribusiness. How does agri-food system work? Put the elements (A-H) from the box onto the diagram (1-8). Then watch the video and check.
(Go to p. 109 to scan the code)

A	assembly	**D**	farm production	**G**	retailing
B	consumer	**E**	input supply	**H**	wholesaling
C	distribution	**F**	processing		



3 Watch the video again. Agree or disagree with the following statements. Explain your answers.

1. Agribusiness emerged because a farmer couldn't manage so many roles on his own. _____
2. Cooperation of specialists in various areas of economy is important for agribusiness to be successful. _____
3. According to Professor Sterns, the only aim of farming as a business is to produce more food. _____
4. Consumer's preferences influencing their choice of food products have changed. _____
5. Nowadays, agricultural business is an integral part of the country's economy. _____

4 How do you understand the following phrase from the video? Choose the correct meaning.

"*...the farmer wore all the hats...*"

a do all the work without anyone's help
b to fulfil many different duties at the same time
c get all the income without sharing

5 The phrase from ex. 4 is called an idiom. Look at the business idioms. Complete them with names of animals from the box.

cow	duck	beaver	bear
cat	bull	lion	monkey

1. a market where share prices are falling, encouraging selling:
   _____ **market**
2. a market where share prices are rising, encouraging buying:
   _____ **market**
3. person or activity that makes a lot of money for a business:
   cash _____
4. a person who is anxious to perform duties and volunteers for more:
   eager _____

5. a privileged and wealthy person:
   fat _____
6. a company that falls behind in achievements:
   lame _____
7. the largest portion of something:
   _____**'s share**
8. illegal or forbidden activity:
   _____ **business**

6 When starting a business, it is necessary to write a business plan. Match the essential parts of a business-plan (1-6) with the descriptions (A-F) below. In groups, discuss your company's plan, present it to the class.

Company name	_____
1. Executive summary ___	_____ _____ _____
2. Products and services ___	_____ _____ _____
3. Market analysis ___	_____ _____ _____
4. Marketing strategy ___	_____ _____ _____
5. Financial planning ___	_____ _____ _____
6. Budget ___	_____ _____ _____

A How the company will attract and keep its customer base and how it intends to reach the consumer.

B Outline of the products and services it will offer, pricing, and benefits to the consumer.

C Costs of staff, development, manufacturing, marketing, and other expenses.

D The company's mission statement, leadership, employees, operations, and location.

E Potential investors, targets and estimates for the first few years of business.

F Outline of the company's target market, consumer competition, its strengths and weaknesses and expected demand.

7 SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) is a powerful tool in developing a business strategy. Use the SWOT template below to analyse your business strategy.

LANGUAGE FOCUS

1 Read the article and discuss the questions.

- Who was the program intended for?
- Will the program be carried out? Why?

Debt Relief Program Put on Hold

The US Ministry of Agriculture offers debt forgiveness of up to $ 250,000 on loans provided by the US Department of Agriculture (USDA) or through banks with USDA loan guarantees for disadvantaged smallholder farmers.

According to the program, **if** the farmers **receive** assistance**,** they **will have to** stay in agriculture for the next two years.

However, the program was put on hold because of the lawsuit of a group of farmers ineligible for debt relief. **If** all of them **received** the maximum assistance in the amount of $ 250 thousand, the program **would cost** $ 10 billion. **Unless** the programme **had been stopped**, approximately 40,000 farmers **would have met** the criteria.

2 Look at the words in bold from ex. 1. Underline the correct option to complete the rules in *Language point 4.*

Language Point 4

- We use the first conditional when speaking of **1 likely / imaginary** situations in the **2 future / past**.
  If + Present Simple, ⟶ *will + infinitive*
- We use the second conditional when speaking of **3 likely / imaginary** situations in the **4 future / past**.
  If + Past Simple, ⟶ *would + infinitive*
- We use the third conditional when speaking of **5 likely / imaginary** situations in the **6 future / past**.
  If + Past Perfect, ⟶ *would + perfect infinitive*
- ***Unless*** has a **7 positive / negative** meaning.

For more information, go to ***Grammar Reference, Unit 4***

3 Read through the following sentences. Decide whether the events are likely or imaginary. Put the verbs in brackets into the correct form using first or second conditional.

1. If more people _____ (contribute) part of their earnings to charity, there _____ (be) no poverty.
2. I am sure that if we _____ (maintain) our current level of sales, we _____ (meet) this year's targets.
3. If I _____ (be) in your position, I _____ (cut) staffing costs in the company.
4. Mr. Brown is out at the moment. If you _____ (wait) a couple of minutes, he _____ (be) back in his office.
5. Are you expecting a call? If they _____ (call) today, I _____ (let) you know immediately.
6. I _____ (apply) for debt relief if I _____ (be) eligible for the program, but unfortunately I'm not.
7. I _____ (arrive) by 5.30 unless I _____ (get) stuck in the traffic.
8. What environmental laws _____ (you/support) if you _____ (be) the President?

4 Put the verbs in brackets into the correct form, past perfect or would + perfect infinitive.

1. We wouldn't have invested in this company if we _____ (know) it had such huge debts.
2. If we _____ (make) a better offer, we would have won the contract.
3. Unless our flight had been delayed, we _____ (arrive) at the conference on time.
4. Would the number of agricultural loans have been higher if the interest rates _____ (be) lower last year?
5. If we _____ (make) a deal with the IT company earlier, we'd have saved a great amount of money.
6. The investors _____ (get) the lion's share of profit if we hadn't used our own equity to finance the company.
7. _____ you _____ (agree) to finance that company if we hadn't got financial assessment?
8. If we hadn't invested in modern technology, we _____ (go) out of business 2 years ago.

4.3. WORKING WITH VISUALS

1 How often do you present your research results to the audience? Is data visualization important for a good presentation? What types of data visuals do you know?

2 Read the article and say which of the described graphs and charts you have used before.

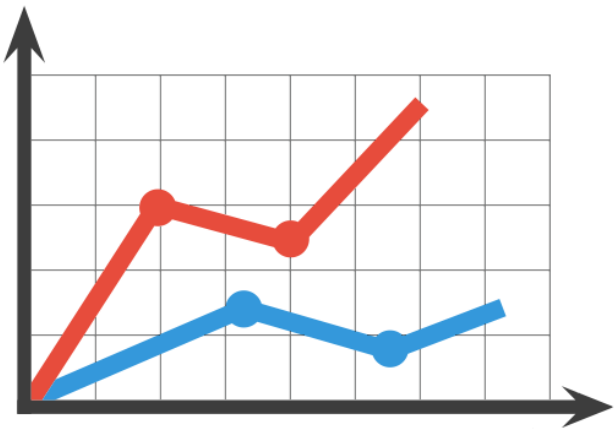
The most common types of data visualization

Before presenting the results of your research or survey it is important to design the right visualizations for your data to allow others to understand and interpret all your outcomes. It doesn't matter if it is a large or small dataset, visualizing data using graphs and charts will contribute largely to your audience understanding the message.

As the main aim of any graph or chart is the representation of the data they are widely used in science, statistics, business, etc.

There are a lot of different kinds of graphical charts and bars that are used in data visualization. Each of them has its own advantages and disadvantages and can be more effective in a particular field of study and investigation. The most common types of graphs and charts used in any science are:

1. Line Graphs



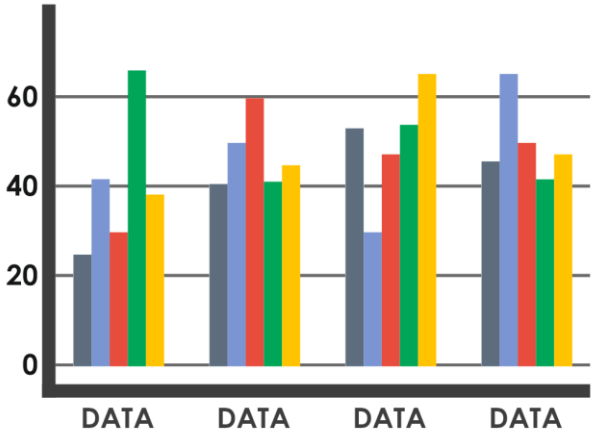
Line graphs are usually used when there is a need to compare two or more different variables, situations, and information over a given period of time. In other words, it displays data that changes continuously.

Line graphs have x and y-axis (in the most cases, time is shown on the x-axis). The proper use of colour in this graph is necessary because different coloured lines make it easier to understand and

analyse the data.

In order to avoid confusion, it is better not to compare more than 4 categories in one line graph.

2. Bar Charts



Bar charts are ideal for visualizing the distribution of data when there are more than three categories and there is a need to compare the data among the given categories. This kind of charts is widely used in economics, marketing and statistics.

Bar charts organize the data using rectangular bars. One axis of the bar chart usually presents the categories that are being compared, while the other shows a measured value.

The bars can be of two types: vertical and horizontal. Each rectangular bar has length and height proportional to the values that they represent. It is better to use consistent colours and labelling in order to identify relationships more easily.

3. Histograms

As a rule, histograms show the data distribution over a particular interval or period of time. It can be easily confused with a bar chart, that's why it is necessary to know the main difference between them – bar charts represent the data according to the categories while histograms show the data according to the time period.

A histogram presents the data using rectangular columns, usually without gaps between them. Remember, that wide bars can hide some valuable details.

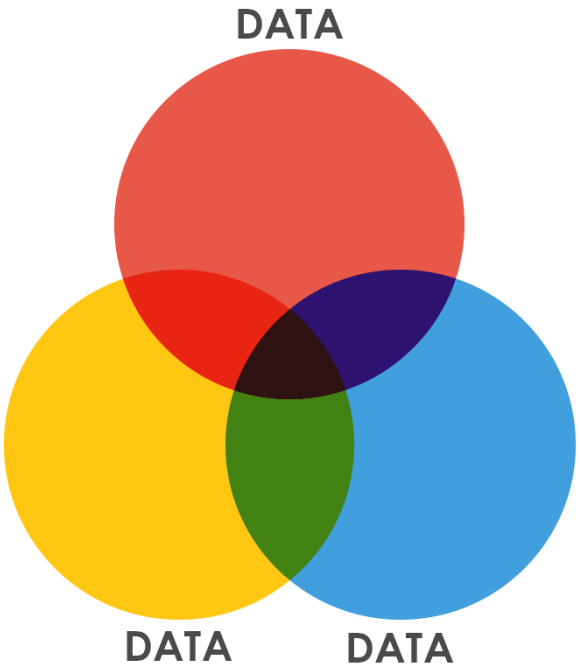
4. Pie charts

The pie chart is one of the commonly used visualizations. It displays the data as parts of a whole, which is easy to interpret and understand. Pie chart is often used to show the composition of something.

Each pie slice, the size of which is dependent on the value, represents a certain category in a given group. So, to make a pie chart you need a list of categories and their numerical variables.

The effective pie chart should not represent more than 7 categories because having more categories makes it hard to differentiate the data on the slices. It is necessary to add numerical values to the slices otherwise the percentage of each category won't be obvious.

5. Venn Charts

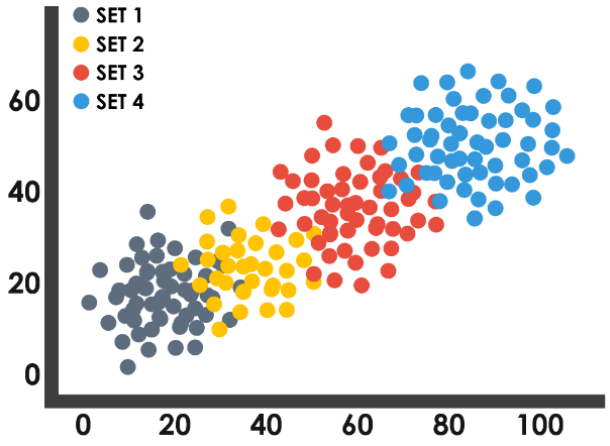


Venn charts serve to show the logical relationships, common traits between two or more categories or to identify all the possible relations between them.

They are made with overlapping circles, where each circle represents one particular category. It is better to use light colours and labelling in order to show relationships more clearly.

This kind of visualization is used in scientific and engineering reports, in computer applications and statistics.

6. Scatterplots



Scatterplots present a compact data distribution when there are two different data points. They help to highlight similarities and common traits.

The dots on the scatterplot represent values for different numeric variables. The position of each dot on the x- and y-axis indicates values for an individual data point. Once multiple dots are plotted, trends can be spotted and categories can be compared.

3 For statements (1-5) choose T if the statement is true according to the text, F if it is false.

1. Data visualization is needed only for big datasets.
2. Bar charts are used to compare two or more different variables over a given period of time.
3. The size of each pie slice is dependent on the value.
4. There are no gaps between rectangular columns in the histogram.
5. Scatterplots present a data distribution when there are more than two data points.

4 Complete the table according to the article.

Types of data visualization	Purpose	Features	Where is used
Line graph	to compare two or more variables over a given period of time	has x and y-axis	in economics, marketing and statistics
…			
…			

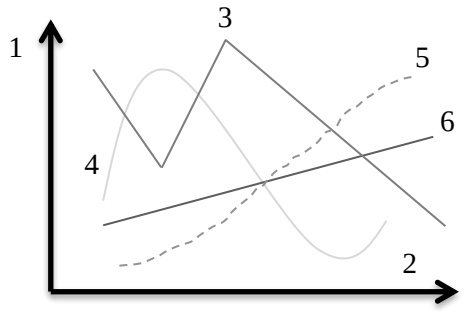
5 Read the article. Write numbers 1-6 next to the corresponding line types in bold. Write out useful phrases for describing a graph or chart.

Describing graphs and charts in English

Once you make a perfect graph or chart for presenting your research results, it is important to know how to describe it in the most efficient way. At the beginning, in order to catch your audience's attention, use the following phrases for introduction:

Let me show you this bar graph…
Let's turn to / let's have a look at this graph…
If you look at this chart, you will notice / understand…
To illustrate my point, let's look at some charts…
The graph from (source) presents data on (title)…
The graph from (source) shows/ illustrates (title)…

Before presenting the main data, name each visual component:



*The **vertical axis** __ (y-axis) represents …*
*The **horizontal axis** __ (x-axis) shows …*
*This **curve** __ illustrates…*
*The **solid line** __ shows…*
*The **broken line** __ shows…*
*The **dotted line** __ illustrates…*
The shaded area describes…

Next, present the obtained data shown on the graph or chart:

The key significant area is … / Two key significant areas are…
An important point is… / Two important points I'd like to illustrate are… The chart is divided into ... parts.
It highlights ...
... has the largest (number of) ...
... has the second largest (number of) ...
... is bigger than / as big as ...
more than ... per cent ... / less than half ...
The number ... increases/goes up/grows by ...
The number ... decreases/goes down/sinks by ...
The number ... does not change/remains stable

6 Complete the table with the words and phrases from the box. Put the words into the correct category.

drop	fall	lift	rise	change	decline
expand	go up	grow	jump	extend	decrease
stand at	go down	fluctuate	increase	level out/off	
reach a peak		keep stable		the highest/ lowest point	
stay at the same level			stop falling and start rising		
an upward/rising/increasing trend			reach/hit a low (point)		
remain stable/constant/steady at			stop rising and start falling		

Going up	_____ _____
Going down	_____ _____
No change	_____ _____
Change	_____ _____
Frequent change	_____ _____
At the top	_____ _____
At the bottom	_____ _____

7 Analyze the trends of import or export in Ukraine in the last 5 years. Make a graph or a chart based on the data, then write a description using the expressions from ex. 5 and 6. Present the results in class.

UNIT 5 AGRICULTURE AND THE ENVIRONMENT

5.1. ENVIRONMENTAL ISSUES AND AGRICULTURE

1 Discuss the questions.

- What is global warming?
- What are its effects on the climate of our planet?
- In what ways does agriculture influence the environment?

2 Match the environmental terms with their definitions.

water contamination	waste disposal	inadequate land use
excessive fishing	species extinction	deforestation
habitat destruction	greenhouse gases	

1. improper ploughing, inappropriate rotations, inadequate management of plant residues, overgrazing, land fragmentation, over-pumping of groundwater etc.

_____

2. an irreversible loss of part of the biological diversity of the Earth as a result of unpredictable catastrophe, chronic environmental stress or ecological interactions

_____

3. a process when natural areas are no longer able to support the species present, resulting in the displacement or destruction of its biodiversity

_____

4. destroying or storing damaged, used or other unwanted domestic, agricultural or industrial products and substances

_____

5. gases in the atmosphere that let sunlight pass through the atmosphere, but prevent the heat from leaving the atmosphere

_____

6. catching too many fish at once, so the breeding population becomes too depleted to recover

_____

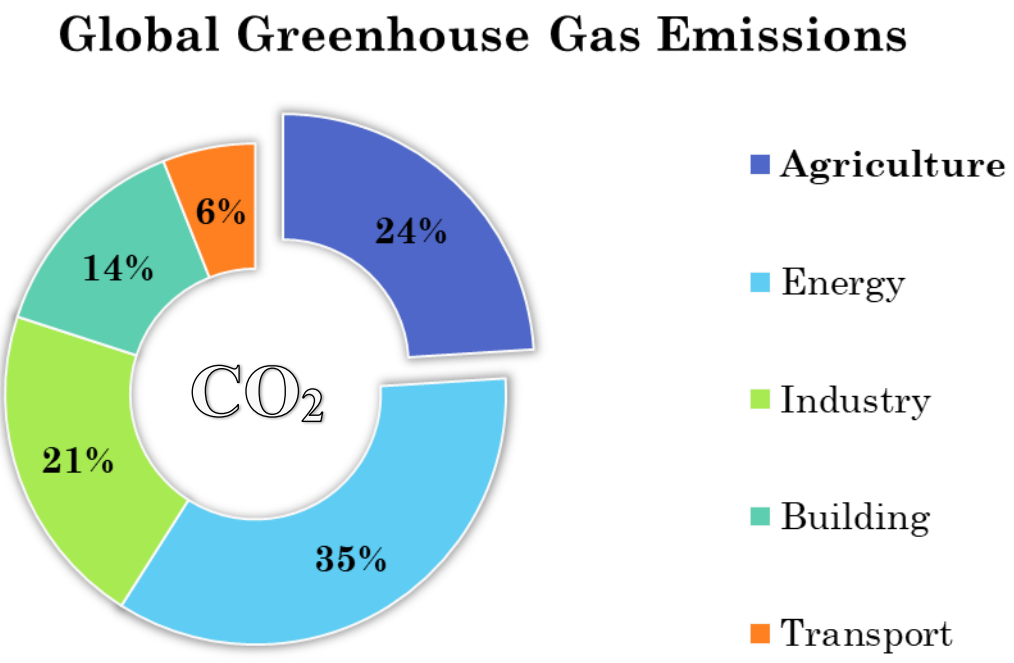
7. the loss of forest areas across the world for other uses such as agricultural croplands, urbanization, or mining activities

_____

8. pollution of water bodies, usually as a result of human activities, with substances that harm the environment

_____

3 Study the diagram of global greenhouse gas emissions. Think of the processes in agriculture that contribute to the carbon dioxide emissions. Are there any effective ways to reduce the negative impact?



4 Read the article ignoring the gaps and check your ideas.

Agriculture: Feeding the World without Destroying It?

Nowadays, agriculture is our dominant form of land management. This human influence on the land is accelerating because of the rapid population growth and increasing food requirements. Industrial agriculture model doesn't give sufficient consideration to the strain that food production puts on the environment, and this impact is huge. The agricultural sector is the second largest emitter of greenhouse gases after the energy sector and the largest consumer of water. To make crops more resilient and harvests bigger, farmers increasingly use **1** _____ . This causes pressure on land resource and the whole environment. That's why agriculture is our top priority in the environmental policy.

A big way in which we interact with the environment is through the food we eat and how we grow it. Food production is a huge cause of environmental change and habitat destruction. Agriculture, which is farms and pastures, takes up most of the land on Earth. Croplands alone take up as much land as the continent of South America, while pastures for grazing animals take up as much land as the continent of Africa.

Twenty-nine percent of the Earth's surface is land, of that, 71% is habitable, in which 50% is used for agriculture. Of that agricultural land, 77% is for livestock and 23% for crops excluding feeding crops. With that amount of land you will think **2** _____ , but the farming for dairy and meat is only 18%, while for plant-based foods it's 82%. With that small usage of plant for plant-based foods, you can get a lot more for protein than from meat and dairy. Given how much it takes to produce livestock, meat production is a leading cause of deforestation.

Agriculture is the most destructive industry facing the planet today. It compromises our world with climate change, water contamination, waste disposal, inadequate land use, excessive fishing, species extinction and deforestation. Climate change has consequences on many levels. It is caused by humans and nature itself, but the human part does greater damage **3** _____ that at some point it will be irreversible.

Another problem about agriculture is species extinction. The expansion of agriculture has been one of humanity's largest impacts on

the environment. It has transformed habitats and is one of the greatest pressures for biodiversity. Of the twenty-eight thousand species evaluated to be threatened with extinction of the Red List, agriculture is listed as a threat for 24,000 of them. Endangered species matter because all of them are connected through their interactions in a web of life. A balanced and biodiverse ecosystem **4** _____ and relies on the services provided by other species to survive. Healthy ecosystems are more productive and resistant to disruptions.

Deforestation and degradation of land is also a big impact that agriculture causes all over our planet. Clearing land to grow soybeans in the Amazon rainforest is responsible for cutting out over 100 million acres of forest releasing enough carbon into the atmosphere to exacerbate the rate of global warming by 50%. Together, agriculture, deforestation and other land use such as harvesting feed and managing grasslands and wetlands generate about a third of human greenhouse gas emissions, **5** _____ **.**

Industrial agriculture is one of the most unsustainable practices of modern civilizations. Factory farming is responsible for the abusive use of land, animals and natural resources because they want to provide cheap and healthy food to a large amount of people. Our current global food system is responsible **6** _____. The distribution of global greenhouse emissions is led by agriculture. Humans must drastically alter food production to prevent the most catastrophic effects on global warming.

5 Read the article again and fill in the gaps (1-6) with the most suitable option (A-I). There are two choices that you don't need.

A for one-third of global greenhouse emissions
B that the calorie supply would be huge
C is the one in which each species plays an important role
D pesticides and fertilizers rich in nitrogen, potassium and phosphates
F showing the share of land use for agriculture
G including more than 40% of methane
H because it is increasing the greenhouse effect in such a rate
I causing the sea level to increase

6 Match the words to make collocations from the article.

1.	food	a	agriculture
2.	greenhouse	b	species
3.	top	c	policy
4.	feeding	d	effects
5.	endangered	e	emissions
6.	environmental	f	priority
7.	clearing	g	use
8.	industrial	h	requirements
9.	abusive	i	crops
10.	catastrophic	j	land

7 Paraphrase the sentences changing the words in *italics* with one of the words from the box.

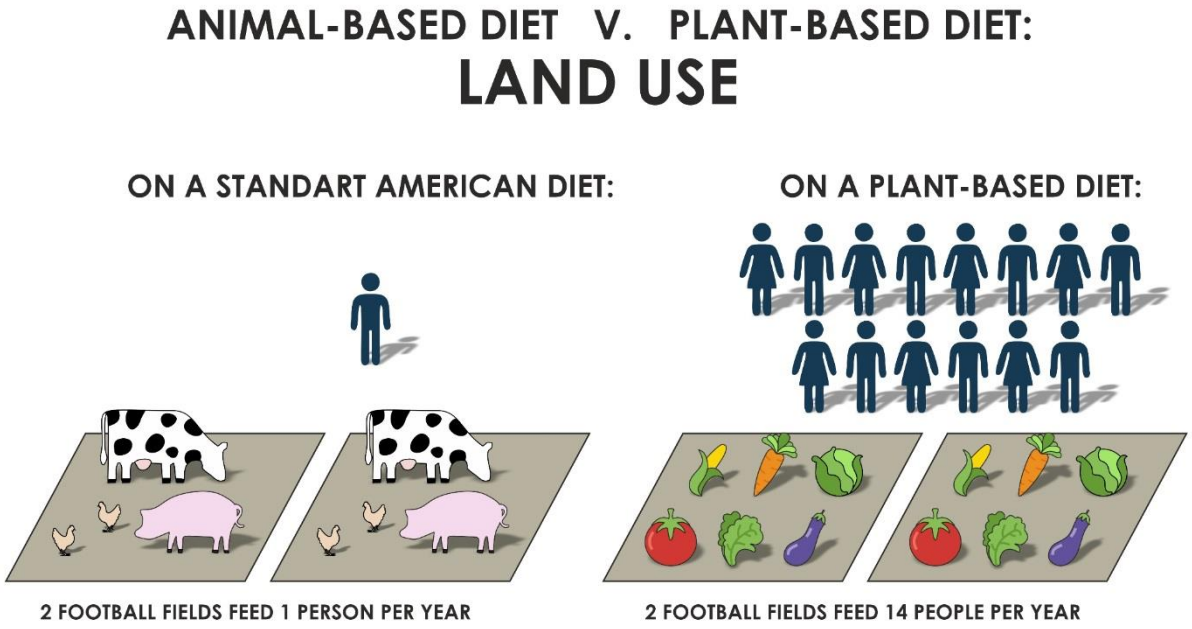
accelerate	destructive	disruption	grassland
graze	irreversible	pasture	strain
dominant	wetland	drastically	exacerbate

1. Technology brought about ***impossible to undo*** changes. _____
2. Fragile ecosystems were put under further ***pressure*** by the existence of uranium deposits. _____
3. Nature can certainly be a ***damaging*** force. _____
4. Bacteria were the ***superior*** life form for most of Earth's biological history. _____
5. Existing ***steppe*** resources must be protected. _____
6. Special chemicals are used to ***speed up*** plant growth. _____
7. This ***feeding meadow*** carries 200 heads of cattle. _____
8. Interfering now would only ***worsen*** the situation. _____
9. This ***marshy area*** can easily be converted for agricultural use. _____
10. Thoughtless interference into nature might lead to a complete ***destruction*** of the ecosystem. _____
11. Next year's budget will have to be ***radically*** reduced. _____
12. Most animals tend to ***feed*** in herds. _____

8 In pairs, discuss the questions.

- Do you think agriculture must change?
- Do you think going vegan is the solution?
- Would you change your eating habits to help the environment?

9 Work in groups. Analyse the information below. Think of the pros and cons of an animal-based and plant-based diet. Discuss in class.



	Pros	Cons
Animal-based diet		
Plant-based diet		

5.2. CLIMATE-SMART AGRICULTURE

1 Compare industrial agriculture with small-scale farming practices. Explain your ideas.

- Do they use the same farming methods?
- Do they have the same impact on the environment?
- Which of farming practices is more sustainable?

2 Unlike livestock, which is a massive producer of carbon dioxide, plants use it to grow and release oxygen. How can trees save our planet? Complete the diagram with your ideas.

- _____
- _____
- _____
- _____
- _____

- _____
- _____
- _____
- _____
- _____

3 Watch a video about climate-smart agriculture in Costa Rica. Tick the items listed below that were mentioned in the video. *(Go to p. 109 to scan the code)*

- ☐ fix nitrogen
- ☐ reduce evaporation rates
- ☐ give frost protection
- ☐ provide shade
- ☐ have aesthetic value
- ☐ stop erosion
- ☐ prevent leachates from entering waterways
- ☐ use carbon dioxide
- ☐ provide habitat for birds and insects
- ☐ act as windbreakers
- ☐ provide timber
- ☐ provide food for bees, birds and animals
- ☐ release oxygen
- ☐ provide firewood

4 Watch the video again. Complete the choices 1-8 with the names of farmers: *LV* - Leon Vargas, *JH* - Julio Hernandez, *CG* – Carlos Gomez.

Which farmer … ?

1 saves on fertilizer by using natural compost _____ _____
2 uses a natural water filtration system without using energy _____
3 contributes to saving the planet's fauna _____
4 fights land degradation by growing plants _____ _____
5 can earn money by growing or selling wood _____
6 feeds domestic animals with feed grown on his own land _____ _____
7 uses dung in the production of a dairy product _____
8 creates barriers from plants _____

5 Complete the sentences with words and collocations in the box.

lush	trough	saplings	mitigate
fodder	corral	mindset	carbon footprint
commitment	windfall profit		

1. We approach our business with a _____of excellence.
2. Investment in farming is a big financial _____.
3. Humanity must take action to _____the effects of global warming.
4. This variety of grass can be used as _____for sheep or goats.
5. People need to look for ways to reduce our _____.
6. The water _____was empty so the thirsty cattle headed for the river in search of water.
7. The sheep were grazing on the _____green pastures.
8. Climate change laws should not provide _____ corporations

that have produced the problem.
9. Cowboys use whips to _____the cattle.
10. We collect the seeds and germinate_____ out of them.

6 In pairs, discuss which climate-smart practices could be used in Ukraine. What are the challenges and benefits of a climate-smart mindset?

LANGUAGE FOCUS

1 Read the article and discuss the questions.

- Which trends will influence the future of agriculture most of all?
- What are the challenges for the future of agriculture?

What Will Farming Be Like in 100 Years?

Farmers probably know more than anyone else that change is inevitable. Climate change **is going to continue** to have consequences which **will affect** agriculture the most.

Farmers of the future will be more like scientists empowered with technology to make well-informed decisions. Precision agriculture technology **will have grown** to such rates that the way we do things now is nothing compared to farming 100 years from now.

Trends toward more plant-based diets **will strengthen** over the next decade. In 100 years' time, our food **won't be grown** in soil. To save space, people **will be growing** vegetables on rooftop urban farms.

It seems like fiction today, but every year brings this future closer: a sustainable, zero waste agricultural system powered with clean renewable energy and feeding the world.

2 Look at the words in bold from ex. 1. Complete the rules in *Language point 5* with *will, won't, be going to, Future Continuous* or *Future Perfect.*

Language Point 5

We use …	**to talk about…**
1 _____	things that we expect to happen based on the present facts
2 _____	predictions for the future based on our thoughts or convictions
3 _____	an action that will be in progress at a definite time in the future
4 _____	a completed action or event in the future
5 _____	with negative predictions

For more information, go to ***Grammar Reference, Unit 5***

3 Complete the sentences with the correct forms of the verbs in brackets using *will*, *won't* or *going to*.

1. I hope the weather _____ (be) nice tomorrow.
2. We _____ (take up) a climate-smart approach towards farming under the terms of the World Bank credit.
3. I think the new IT system _____ (cost) a lot of money.
4. There is a possibility that the farming practices of the future _____ (meet) the demand of the growing population.
5. Fifty years from now, we _____ (not need) to cut down tropical forests to have more land for agricultural use.
6. Judging by the present trends, more and more farmers _____ (utilize) local resources in their farming business.
7. By planting trees, we _____ (be able) to prevent the soil from erosion.
8. I believe that climate-smart agricultural processes _____ (make) economic sense over time.
9. Because of differences in climate, the farming methods used in Costa Rica _____ (not work) for every country.
10. When the trees reach maturity, we _____ (sell) the timber and reap a windfall.

4 Choose the correct option, A or B, to complete the sentences.

1. By next spring we _____ all of our farming machinery.
   a will be upgrading b will have upgraded
2. In a few years farmers _____ plants vertically in urban areas.
   a will be growing b will have grown
3. If the present rates of consumption stay the same, we _____ most of the resources by 2050.
   a will be using up b will have used up
4. By adopting sustainable farming methods, farmers _____ world hunger.
   a will be stopping b will have stopped
5. Unless measures are taken, the planet's temperatures _____ to even higher levels.
   A will be rising B will have risen
6. In 50 years' time industrial farming using non-sustainable methods _____ gradually.
   a will be declining b will have declined
7. Some species _____ their habitats due to the global warming and deforestation.
   a will be losing b will have lost
8. A lot of consumers _____ plant-based diets in the near future.
   a will be eating b will have eaten
9. By using genetic engineering the nourishing values of some foods _____ .
   a will be changing b will have been changed
10. Some farmers _____ methane from the manure to provide fuel for cooking and heating water for their households.
   a will be using b will have used

5.3. PRESENTING A PROJECT

1 Have you ever given a presentation? Is it easy to keep the audience interested? What should you do to make a presentation more effective?

2 Read the article. Match headings (A-H) to paragraphs (1-5). There are three headings that you don't need.

A Tell Stories
B Focus on your Audience's Needs
C Relax, Breathe and Enjoy
D Keep it Simple: Concentrate on your Core Message
E Remember the 10-20-30 Rule for Slideshows
F Show your Passion and Connect with your Audience
G Use your Voice Effectively
H Start Strongly

5 Tips for Effective Presentations

Whether you are an experienced presenter, or just starting out, you need always work on yourself in order to improve your presentation skills and hold the presentation more effectively.

1. _____

It is really hard to be relaxed and be yourself when you are standing in front of the big audience and gradually getting nervous. If you want your audience to respond you should be enthusiastic and honest and let your passion for the subject shine through.

2. _____

Building your presentation think about what your audience is going to get out of it, keep in mind their needs, try to respond to them. You should find a right balance between what you can tell them and what really they want to learn about.

3. _____

Think about the key points and key message. It should be very clear and simple so that you can present it for no more than 30 seconds. If what you are planning to say doesn't correspond to the key message, don't say it.

4. _____

The beginning of your presentation is extremely important. You need to grab your audience's attention and hold it. They will give you at least few minutes to interest them, if you fail, they just won't listen to you. So don't waste time introducing yourself and giving a wide overview on who you are, start by entertaining them – tell them a story or give an attention-grabbing (but useful) image on a slide.

5. _____

Guy Kawasaki from Apple suggests that slideshows should contain no more than 10 slides, and the whole presentation should last no more than 20 minutes. The font size for the texts on slides should be no less than 30 point.

3 Think about other things that contribute to a good presentation. Make your list of Dos and Don'ts.

Do	Don't do
• _____ • _____ • _____ • _____ • _____	• _____ • _____ • _____ • _____ • _____

4 Read the list of advice on how to organize the slides of presentation. Which of them are the most useful for you? Why?

Making a presentation

Slideshows are quick to produce and easy to update, but you should always follow some simple rules in order to make it a real visual aid and not a visual distraction:

Choose a consistent and simple design of the template. You can vary the content presentation (i.e., bulleted list, 2-column text, text & image), but be consistent with fonts, colors and background.

Limit the number of words on each slide. Use key phrases and include only essential information.

Slides should have short titles. A long title shows something is wrong.

All the text on one slide should have the same structure (e.g. complete phrases, idea only, etc.).

Put no more than one idea per slide (i.e. all bullets should refer to the same thing). If you have lots of text, people will read it faster than you talk, and will not pay attention to what you say.

Limit punctuation and avoid putting words in all capital letters.

Use contrasting colors for text and background. Light text on a dark background is best.

Use strong colors for important stuff, pastel colors for the unimportant.

Don't overuse the special effects such as animation and sounds. A great amount of them could negatively impact your credibility.

Do not put useless graphics on each slide: logos, grids, affiliations, etc.

Spell-check. A spelling mistake is an attention magnet.

Use good quality images that reinforce and complement your message. Ensure that your image maintains its impact and resolution when projected on a larger screen.

If you use builds (lines of text appearing each time you click the mouse), have content appear on the screen in a consistent, simple manner; from the top or left is best.

Limit the number of slides. Presenters who constantly “flip” to the next slide are likely to lose their audience. A good rule of thumb is one slide per minute.

Learn to navigate your presentation before holding it. Know how to and practice moving forward AND backward within your presentation. You may need this, if audiences ask to see the previous slide again.

If possible, view your slides on the screen you’ll be using for your presentation. Make sure slides are readable from the back row seats.

Text and graphical images should be large enough to read.

Don't put useless information in result graphs (e.g. the 100% bar for each application).

Label very clearly the axes of the graphs. Explain the un-obvious ones. Use large fonts for labels; the default fonts in Excel are too small.

Discuss the results numbers in detail.

Have a Plan B in the case of technical difficulties. Remember that transparencies and handouts will not show animation or other special effects.

Practice with someone who has never seen your presentation. Ask them for honest feedback about colors, content, and any effects or graphical images you’ve included.

Useful phrases for effective presentation

Greetings

Good morning / afternoon ladies and gentlemen

Subject

I'm going to present the results of my research on …

The purpose of my presentation today is to … (analyse …, review…, identify the causes of …, consider the reasons for … , to present a series of ...)

Structure

Let me quickly put you in the picture about today's
presentation. I've divided it into … parts.
Firstly, we're going to discuss…
Secondly, I'm going to analyze...
Finally, I'll finish with our recommendations

Problem setting

I'm going to give you a brief outline of the problem of …
Let me remind you that …
Having analyzed the previous studies, I can say that …
Now I'd like to define the main problem: …
Let me explain …

Solutions

Let's see what the possibilities are…
Our findings suggest there would be little prospect of..
The prime drawback of this alternative is…
The survey suggests that all (none) of the options is ….
Thus, what I'm suggesting is... I strongly recommend …
The following solution could promote …
I hope you'll agree that this proposal is the right one … for …

Conclusions

This brings me to the final part of my presentation.
So, in conclusion, I'd like to emphasize …
Finally, let me summarize our findings...

Ending

Let me finish here. Thank you for your attention. If there are any questions, I'd be glad to answer them.

5 Put the sentences into the correct order.

a) I would like to take this opportunity to talk to you about…
b) Let me introduce myself. My name is …. and I am delighted to be here today.
c) Let me start with some general information on…
d) Let me use a graphic to explain this.
e) Let's summarize briefly what we have looked at.
f) That brings me to the end of my presentation. Thank you for listening/your attention.
g) The purpose of this presentation is…
h) This leads me to my next point, which is…

6 Reorder the words to make sentences.

1. a handout have does my everybody of report?

_____

2. handing I'll be talk the out copies slides of the my at end of.

_____

3. can presentation anyone the like I PowerPoint email would to who it.

_____

4. questions happy if have answer am any them I you to.

_____

5. if questions don't end I'd until to leave you mind the of my like talk.

_____

6. like you this to significance I'd figure think about the of her.

_____

7 Make your own presentation on one of the given topics. Follow the instructions listed above.

- Sustainable development of agriculture
- Food production and food security
- Innovation in agriculture
- Agricultural economics
- Agriculture and the environment

PRACTICE FILES

PRACTICE FILE 1

1.1. Vocabulary practice

1 Match the sentence halves.

1. The rates of **biodiversity** …
2. The lack of nutrients results in **soil …**
3. Scientific research often leads to **technological** …
4. People need to decrease their **caloric** …
5. Rural development and agricultural productivity growth are crucial for **poverty** …
6. The largest source of **carbon …**
7. The program for **water …**
8. Forecast of **economic …**
9. Integral elements for a **sustainable** …
10. Irrigation increases **farmland …**

a **breakthrough** and innovation.
b **efficiency** in dry areas.
c **intake** if they want to lose weight
d **loss** are alarming.
e **alleviation** in developing countries.
f **development** are research and innovation activities.
g **depletion** and its low fertility.
h **emission** is from burning fossil fuels.
i **growth** marks a recent positive development.
j **management** works with communities to collect rainwater for direct use.

2 Choose the correct answer, A, B or C, to complete the sentences.

1. It's important to _____ our planet's biodiversity.
a demand b maintain c tackle

2. Responsible _____ means doing more and better while using fewer resources.

a fertility b income c consumption

3. To achieve long-term productivity, we need to increase crop _____ to climate variabilities.

a resilience b sustainability c nutrition

4. Food must be nutritious and _____ to everyone.

a accessible b reachable c sustainable

5. We need to increase production of food to meet the _____ of the growing population.

a need b demand c standard

6. Conservation helps to _____ biodiversity.

a tackle b improve c enhance

7. Fresh water is _____ due to growing use and depletion of usable resources.

a scary b scarce c rare

8. By putting in various nutrients, farmers increase soil _____ so that it could produce higher yields.

a fertility b diversity c sustainability

9. There is more than one way to _____ the problem of world hunger.

a enhance b increase c tackle

10. Money earned from farming land, buildings and commercial produce from a horticultural land is called agricultural _____ .

a earnings b income c benefit

1.2. Grammar practice

1 Check the sentences. Rewrite the incorrect ones. Use Present Simple or Present Continuous.

1. We work with a new seed supplier this year.
2. Production of seaweed grows steadily with a yearly increase of 8%.
3. Organic food provides a significantly lower risk of pesticide contamination compared to conventional ones.
4. Harvesting vegetables at the right stage of maturity is ensuring the best taste and quality.

5. The United States are producing about 71.8 tons of waste paper a year.
6. China is emitting 10,357 metric tons of carbon dioxide which makes it the world's top polluter.
7. Over a quarter of the world's undernourished people are living in Sub-Saharan Africa.
8. A number of global trends are influencing food security, poverty and the overall sustainability of food and agricultural systems.
9. Nowadays, agriculture requires an energy input at all stages of agricultural production.
10. While hunger is existing worldwide, 526 million hungry people live in Asia.

2 Complete the sentences with the correct modal verb. Sometimes more than one answer is possible.

can	could	had to	might	must
need to	needn't	should	mustn't	will be able

1. You _____ choose a planting program with good rotation in order to keep the soil healthy.
2. The files aren't here – I _____ have left them back at the office.
3. If the meeting goes well, they _____ award us the contract, so let's hope for the best.
4. We _____ have used organic fertilizer instead of chemical ones.
5. Food insecurity _____ worsen diet quality and increase the risk of various forms of malnutrition.
6. If we start harvesting now, we _____ to complete by October.
7. We _____ get an interpreter in Japan because none of us could speak Japanese.
8. We _____ have sent them the reminder on Monday morning because the cheque arrived in the post that afternoon.
9. You _____ park here. If you do, they'll tow your car away.
10. He _____ go to university but decided not to.

1.3. Academic English

1 Match words in the box with their definitions.

abstract	accurate	research paper	citation
relevant	reliable	search engine	database
valuable	investigation	quotation marks	

1. _____ an act of quoting
2. _____ punctuation marks used in pairs in various writing systems to set off direct speech, a quotation, or a phrase
3. _____ something directly related, connected or pertinent to a topic
4. _____ a software system that is designed to carry out web searches
5. _____ having desirable or esteemed characteristics or qualities
6. _____ a short summary of your completed research
7. _____ an essay in which you explain what you have learned after exploring your topic in depth
8. _____ formal or systematic examination or research
9. _____ free from error especially as the result of care
10. _____ giving the same result on successive trials
11. _____ a usually large collection of data organized especially for rapid search (as by a computer)

PRACTICE FILE 2

2.1. Vocabulary practice

1 Match the words (1-7) to (a-g) make collocations.

1 high	a thinking
2 human	b value
3 stake	c consumption
4 silo	d holders
5 pest	e tech
6 nutritional	f touch
7 over	g resistance

2 Choose the correct meaning (a or b) of the words (1-8).

1. habitable
   a liveable b unacceptable
2. fraction
   a total amount b part
3. replicate
   a reject b imitate
4. collaboration
   a joining forces b working independently
5. consume
   a neglect b eat up
6. threaten
   a endanger b alleviate
7. implement
   a carry out b prevent
8. efficiency
   a relevancy b productivity

3 Underline the correct preposition.

1. Research helps to figure **in/out** what the plants need.
2. With LED technology, we don't rely **on/for** sunlight.

3. Many enterprises start **out/from** as a means of supplementing family income.
4. Financial resources for agricultural development are **in/under** pressure.
5. Microorganisms break **up/down** waste into organic fertilizer.
6. The new approach will have a tremendous impact **on/in** food production.
7. In arid areas, plants suffer **from/under** the lack of precipitation.
8. After a severe thunderstorm the farm ended **in/up** losing all the harvest.
9. A diet rich **in/with** all the necessary nutrients is inaccessible to a lot of people worldwide.
10. Funds to finance innovation in food production development mainly come **from/out** investment.

2.2. Grammar practice

1 Read the text about Compton. Write sentences about the changes in Compton with *used to* and *now*.

Compton is a city in southern Los Angeles County, California, United States, where *Plenty* have built a futuristic, 95,000-square-foot vertical farm in 2021. Ever since, the area's redevelopment began, and it is now an important food production centre.

Compton before	Compton now
• was a food desert with high unemployment • was difficult to travel to • had social problems • had poor housing • had no facilities	• lots of job opportunities • good transport links • a popular area • luxury flats • a museum, an airport, a casino

1. Compton _____, but now _____
_____ .
2. _____
_____ .
3. _____
_____ .
4. _____
_____ .
5. _____
_____ .

2 Complete the dialogue. Put the verbs in brackets into the Present Perfect or Past Simple.

A: How is the new indoor facility going?
B: Very well – they **1** _____ (make) a lot of progress.
A: **2** _____ (they/finish) it yet?
B: No, but they **3** _____ (complete) all of the warehouses, and they **4** _____ (build) the laboratory. So they are doing well. In fact, I **5** _____ (speak) to the contractor yesterday, and he **6** _____ (say) they were very happy with the work so far.
A: That's very good news. I **7** _____ (never/be) happy with a builder, but there's always a first time. How is the lighting getting on?
B: Not so good, I'm afraid. They **8** _____ (not start/yet). Anyway, I **9** _____ (call) their Managing Director last week, and I **10** _____ (complain), so I think we'll see some action soon.

2.3. Academic English

1 Match the words with their definitions.

academic integrity	assignment	citation style	reference
in-text citation	offence	plagiarize	violation

1. _____ is a set of rules on how to cite sources in academic writing.
2. _____ take the work or an idea of (someone) and present it as your own.
3. _____ is the act of doing something that is not allowed by a law or rule
4. _____ provide with citations of sources of information.
5. _____ is the demonstration of honest and moral behavior in an academic setting.
6. _____ a breach of a law or rule; an illegal act.
7. _____ is the brief form of the reference that you made within the body of your research paper.
8. _____ is a task or piece of work allocated to someone as part of a job or course of study.

PRACTICE FILE 3

3.1. Vocabulary practice

1 Complete the sentences with the appropriate collocations. The first letters have been given.

1. After the heavy rainfall, the **d**_____ **l**_____ have risen significantly which increases the danger of flooding.
2. The unused spectrum between TV stations called **w**_____ **s**_____ represents a valuable opportunity for wireless mobile networks.
3. Using technology helps to improve **p**_____ **m**_____ and stimulate higher income.
4. **L**_____ **h**_____ is affected as the grazing resources are becoming scarce.
5. **D**_____**-d**_____ **a**_____ enables farmers to make smart decisions for better profitability and sustainability.
6. The **v**_____ **c**_____ includes all the agents that operate within an industry, from input suppliers to end users.
7. Through **m**_____ **l**_____ and AI computers are able to improve their own performance.
8. The **h**_____ **m**_____ of the field helps to identify the dry areas that need the farmer's attention.
9. Smart technologies help in tracking **f**_____ **s**_____ for livestock.
10. Technology including wearable devices, chatbots, IoT, AI are all examples of **d**_____ **i**_____.

2 Choose the correct option to complete the sentences.

1. In many developing countries innovations slow down due to the lack of ***broadband / sophisticated*** Internet connection.
2. It's important to ***thrive / forge*** productive relationship between farmers and scientists in order to achieve success.
3. By using innovations it is possible to ***nurture / empower*** women

farmers as digital farming needs ICT skills instead of physical strength.
4. Without investment, most great ideas remain ***infeasible / embedded***.
5. You can operate farming machinery ***sophisticated / remotely*** by using a smartphone application.
6. AI ***augments / nurtures*** human knowledge to help farmers increase yields and profits in a sustainable way.

3.2. Grammar practice

1 Check the sentences below. Correct the ones that have mistakes in them.

1. Farming robots **can be transplanted** rice seedlings without human interaction.

_____

2. The robot's steering and accelerator systems **are controlling** by an on-board computer.

_____

3. The robot **equipped** with multiple modules including fertilizer hopper and herbicide applicator.

_____

4. The sensors **have embedded** into a robotic tractor and combine harvester.

_____

5. A new generation of autonomous robots **will be helped** plant breeders to create new the crop varieties.

_____

6. The robot **is navigated** around the field by sending out laser pulses to scan the environment.

_____

7. The robot **was designed** to generate as detailed heat map of a field as possible.

_____

8. Previously, plant breeders **have been measured** the plant's phenotypes by hand.

_____

9. Automation **was always played** a big part of agriculture, and with the use of modern IST tools farms might become fully autonomous.

_____

10. Using robots, the best-yielding plants **can identify** which will cut the time needed to breed a new variety.

_____

2 Choose the correct form of the verb, A, B or C, to complete the text.

The local telecoms provider **1** _____ figures showing that broadband **2** _____ rapidly by British households and businesses. The statistics, which **3** _____ yesterday, **4** _____ that over 30,000 subscribers a week **5** _____ to high-speed Internet services. The main advantage of broadband is that files **6** _____ by users at speeds up to 40 times faster than with a dial-up modem, and the connection **7** _____ open all the time. Broadband services **8** _____ most major towns and cities, but customers in more remote areas **9** _____ whether the phone lines in their areas **10** _____.

1.	A was released	B has been released	C has released
2.	A is taking up	B is being taken up	C took up
3.	A published	B is published	C were published
4.	A show	B are shown	C shows
5.	A are turning	B turns	C are being turned
6.	A downloaded	B can download	C can be downloaded
7.	A can leave	B can be left	C left
8.	A are reached	B have reached	C have been reached
9.	A are not known	B known	C do not know
10.	A will be upgraded	B will upgrade	C will be upgrade

3.3. Academic English

1 Match the words with their definitions.

Introduction	Abstract	Keyword	Title
Results	Discussion	Conclusion	References

1. _____ the name of a book, composition, or other work.
2. _____ a list of the sources used in the research paper.
3. _____ a word or concept of great significance.
4. _____ a detailed treatment of a topic in speech or writing.
5. _____ is a beginning section which states the purpose and goals of the following writing.
6. _____ a brief summary of a research article.
7. _____ a judgement or decision reached by reasoning.
8. _____ something obtained by calculation or investigation.

PRACTICE FILE 4

4.1. Vocabulary practice

1 Match the sentence halves.

1. Measures are taken to **mitigate …**
2. With remote working, the levels of **youth …**
3. The company managed to maintain its **trading …**
4. I wouldn't cot **insurance …**
5. Government subsidies for **smallholder …**
6. The company was able to generate **cash …**
7. IT is a growing **job …**
8. Around a third of **surplus …**
9. In agriculture, **price …**
10. Farmers can access the market through **input …**

a **suppliers** which shortens the supply chain.
b **sector** offering great opportunities for young people.
c **farmers** have increased.
d **volatility** is a major risk factor.
e **flow** in the first year of business.
f **produce** is sent to animal feed.
g **risks** in a timely manner.
h **positions** for a long period of time.
i **unemployment** have decreased.
j **costs** in these unstable times.

2 Choose the correct word (a or b) to complete the sentences. Use one of the words in each sentence.

1. ***assess / judge***
   a We need to _____ the impact on climate change.
   b It's early to _____ about the success of our start-up.
2. ***incentives / loans***
   a The scheme offers seed corn finance with _____ at only 4% interest.

b The government has created tax _____ to encourage investment.

3. ***prone / involved***

a 400 workers were _____ in the value chain.

b Smallholder farmers are _____ to vulnerability.

4. ***retail / wholesale***

a A customer who shops regularly at one _____ outlet knows where the items are displayed.

b It's much cheaper to buy _____ directly from the producer.

5. ***commodity / entrepreneur***

a To be a successful _____ , one needs to be a visionary.

b Crude oil is the world's most important _____ .

6. ***logistics / purchases***

a Please charge these _____ to my account.

b Our _____ and distribution network covers the US.

7. ***exposure / exposition***

a The purpose of the _____ is to create an environment in which buyers and sellers can do business.

b _____ of the body to strong sunlight can be harmful.

4.2. Grammar practice

1 Complete the sentences with *if*, *when*, *unless* or *in case*.

1. Please don't disturb me when I'm in the meeting _____ something really important comes up.
2. The new investors are coming in today – please give me a call _____ they get here.
3. _____ everything goes well, we will meet our sales targets easily this year.
4. We are ready to sign a contract with this company _____ there is some monkey business happening.
5. I need to check my emails, just _____ there are any important messages.

2 Choose the correct options to complete the sentences.

1. If you **will tell/told** them the truth, they **wouldn't/won't** believe it.
2. If we **will be/are** eligible for a government subsidy, we **will/would** definitely do that next year.
3. I'm concerned that unless sales **improve/will improve**, they **will/ would** go out of business.
4. If you **are/were** an agripreneur, what area of agribusiness **will/would** you choose?
5. It **will/would** be a successful year for business unless something **will go/goes** wrong.
6. We **will/would** meet at the conference on Saturday if we **didn't/don't** meet before then.
7. If a company **is having/will have** problems in business, it **will/is** called a "lame duck".
8. We **would make/made** a deal with the IT company if we **couldn't/could** afford it.

3 Rewrite the sentences using a conditional form so that they have the same meaning.

1. You checked the invoice. We didn't lose the money.
If you _____ .
2. Peter didn't come to the meeting. He was in New York.
Unless Peter _____ .
3. We didn't know the summer would be so dry. We invested in arable farming.
If we _____ .
4. I didn't realize the interest rates were going to rise. I took out a huge loan.
If I _____ .
5. They didn't give a good presentation. They didn't get the contract.
If they _____ .

4.3. Academic English

1 Match the words with their definitions.

decline	decrease	drop	fluctuate
increase	level out /off	grow	remain stable

1. _____ to move rapidly to a lower level, or cause something to move to a lower level.
2. _____ to increase in size or amount, or to become more advanced or developed.
3. _____ start to move horizontally rather than going up or down.
4. _____ become smaller, fewer, or less.
5. _____ be firmly fixed or not likely to move or change.
6. _____ make or become smaller or fewer in size, amount, intensity, or degree.
7. _____ to change, especially continuously and between one level or thing and another.
8. _____ to (make something) become larger in amount or size.

PRACTICE FILE 5

5.1. Vocabulary practice

1 Choose the correct answer, A, B or C, to complete the sentences.

1. Fossil fuels have caused _____ damage to the environment.
a dominant b irreversible c destructive

2. _____ provides food and habitat for fish and other aquatic wildlife, including threatened species.
a wetland b pasture c grassland

3. Conflicts and adverse climate _____ food crises in Africa and elsewhere.
a accelerate b exacerbate c improve

4. Water depletion and _____ can damage groundwater resources.
a disruption b strain c contamination

5. The activities of charcoal-burners have resulted in the almost complete _____ of the island.
a deforestation b extinction c disposal

6. Heavy rain and _____ land use have impoverished the soil.
a incomplete b inadequate c greenhouse

7. For the past years, the rate of species _____ has been drastically accelerating.
a water b habitat c extinction

8. Nuclear _____ disposal on land presents a hazard for the environment.
a fishing b waste c land use

9. Sustainable agriculture approaches allow farmers to stop the _____ use of chemicals.
a destructive b excessive c drastically

10. Reef herbivores, including parrotfish and surgeonfish, _____ on the algae growing on the coral.
a graze b pasture c eat

2 In sentences 1-10 the words in bold are in the wrong places. Correct the sentences.

1. Developed countries should take urgent action to reduce greenhouse **effects** in accordance with the Kyoto Protocol. _____
2. Environmental taxes are among the most cost-effective and efficient tools of the environmental **priority**. _____
3. Feeding **requirements** are produced primarily for consumption by animals. _____
4. The abusive **crops** of natural resources worsens climate breakdown and increases pollution. _____
5. With declined investment in agriculture, many countries became dependent on imports to meet their food **species**. _____
6. The catastrophic **land** produced by agriculture cannot be ignored today. _____
7. This nature reserve is maintained as a sanctuary for endangered **emissions**. _____
8. There must be a balance between human-induced climate change and industrial **policy** to reach poverty alleviation. _____
9. Bulldozers continued clearing **agriculture** to create a potential for agricultural purposes. _____
10. Adoption of sustainable agricultural principles must be a top **use** of the international community. _____

5.2. Grammar practice

1 Put the verbs in brackets into the correct future form. Use positive or negative forms of *will* or *going to*.

1. There has been a lot of rain this season so the yields _____ (be) higher than last year.
2. Unless we take action, next generations _____ (have) enough food to meet their requirements.
3. In 100 years' time most food people consume _____ (grow) on high-tech indoor farms.
4. I _____ (sell) the timber as I don't want to destroy the habitat of

local wild animals.
5. In theory, these specially bred plants _____ (contain) more protein and other nutrients for cattle.
6. I'm filling the trough as I _____ (water) the cattle.
7. Reducing our carbon footprint _____ (mitigate) the catastrophic effects on the environment over time.
8. Tomorrow I _____ (corral) the cows to a new plot of the pasture so that the grass had time to recover.
9. Maybe these saplings _____ (turn) into a lush forest one day.
10. Changes _____ (happen) overnight, so climate-smart agriculture must become a global mindset.

2 Study the calendar of agricultural works below. Complete the sentences using Future Continuous or Future Perfect and the verb in brackets.

Months	Activities
January-February	seed bed and land preparation (rice)
March	transplanting winter paddy
April	land preparation (maize)
May	planting maize
June-July	weeding winter paddy
August	harvesting winter paddy
September	weeding maize
October	preparation for maize storage
November	harvesting spring paddy
December	selling maize

1. In January, we _____
_____ . (prepare)
2. By April, we _____
_____ . (transplant)
3. By the end of April, we _____
_____ . (prepare)
4. In May, we _____
_____ . (plant)

5. In June, we _____
_____ . (weed)
6. By the end of summer, we _____
_____ . (harvest)
7. By October, we _____
_____ . (weed)
8. In October, we _____
_____ . (prepare)
9. In November, we _____
_____ . (harvest)
10. By the end of the year, we _____
_____ . (sell)

5.3. Academic English

1 Match the words with their definitions.

audience	background	bullet	font
presenter	slideshow	template	presentation

1. _____ a set of letters and symbols in a particular design and size.
2. _____ the things that can be seen behind the main things or people in a picture.
3. _____ a system that helps you arrange information on a computer screen.
4. _____ person who gives a speech.
5. _____ a small symbol used to introduce each item in a list, for emphasis.
6. _____ a presentation of a series of still images on a projection screen or electronic display device, typically in a prearranged sequence.
7. _____ the group of people together in one place to watch or listen to a play, film, someone speaking, etc.
8. _____ a talk giving information about something.

VIDEOS

UNIT 1

1.2. HOW SUSTAINABLE FARMING WORKS *(p. 14-15, ex. 4-5)*

UNIT 2

2.2. FARMS OF THE FUTURE (*p. 32, ex. 3-5)*

UNIT 3

3.2. AGRICULTURE 4.0: ROBOTIC FARMING (*p. 45-46, ex. 2-5)*

Part 1 *(p. 45, ex. 2-3)*

Part 2 *(p. 46, ex. 4-5)*

UNIT 4

4.2. AGRIBUSINESS (*p. 61-62, ex. 2-3)*

UNIT 5

5.2. CLIMATE-SMART AGRICULTURE (*p. 79-80, ex. 3-4)*

GRAMMAR REFERENCE

UNIT 1 SUSTAINABLE DEVELOPMENT

Language Point 1.1

PRESENT CONTINUOUS TENSE

Present Continuous Tense – теперішній тривалий час, який переважно вказує на процес, що триває у момент мовлення **(now, at the moment, at present, today, these days**).

⊕	I he, she, it we, you, they		+ am ('m) + is ('s) + are ('re)	+ Ving*
?	(Wh-)	Am Is Are	+ I + he, she, it + we, you, they	+ Ving*?
⊖	I he, she, it we, you, they		+ am not ('m not) + is not (isn't) + are not (aren't)	+ Ving*

Утворення –ing- форми основного дієслова

1) Кінцева **-e** основи дієслова випадає перед **-ing**:

take – taking

drive – driving

Проте дві **-e** залишаються перед закінченням **-ing**:

see – seeing

2) Якщо основа дієслова закінчується на **-ie**, відбувається чергування з **-y**:
lie – lying
tie – tying

3) Відбувається подвоєння, якщо кінцевому приголосному передує короткий наголошений голосний:
win – winning

<u>Present Continuous Tense</u> використовується:

1) Для опису дії, що відбувається у момент мовлення:
They are working in the field right now.

2) Для опису тривалих дій в сьогоденні (навіть якщо вони не відбуваються в момент мовлення).
They are working hard these days.

3) Для опису змін, що відбуваються в якійсь ситуації, і процесу розвитку.
The climate is constantly changing.

4) Для опису запланованої дії у найближчому майбутньому:
We are landing in Heathrow in 20 minutes.

STATIVE VERBS

Дієслова стану (**Stative verbs**) – це ті дієслова, які описують якийсь стан, почуття чи сприйняття. Дієслова стану зазвичай не вживаються у Present Continuous Tense, адже вони не позначають процес дії.

Випадки	Дієслова стану
Вподобання або антипатія:	to like to love to dislike to hate to enjoy to prefer to adore
Все, що ми сприймаємо органами чуття:	to feel to see to look to hear to sound to smell to taste
Все, що ми сприймаємо в принципі:	to know to believe to understand to realize to remember to forget to notice to think to seem
Дієслова, які виражають інші стани:	to want to contain to include to belong to need to matter to cost to mean to own to have (to possess)

Коли вказані вище дієслова виражають дію, а не стан, то вони мають зовсім інше значення і вживаються в тривалому часі:

*I **think** she is beautiful.* (я так постійно вважаю)
*I'**m thinking** about her.* (я зараз про неї думаю)

*This meat **tastes** awful.* (характеристика смаку)
*I'**m tasting** the meat.* (дія без характеристики смакових якостей)

*I **see** some trees far away.* (я дивлюся і бачу)
*I'**m seeing** my lawyer tomorrow.* (запланована зустріч)

*It **looks** perfect.* (характеристика)
*The dog **is looking** at the door.* (дія)

*These flowers **smell** nice.* (характеристика)
*Cat **is smelling** the milk.* (дія)

*He **is** a rude person.* (характеристика)
*He **is being** rude.* (поведінка)

*Mike **has** his own car.* (характеристика)
*Mike **is having** a shower now.* (дія)

Пам'ятайте, що багато дієслів можуть виступати дієсловами стану і звичайними дієсловами.

Language Point 1.2

MODAL VERBS

Модальні дієслова (Modal verbs) складають окрему групу дієслів в англійській мові. Вони не вживаються самостійно, тільки разом з інфінітивами основних дієслів, не виражають дії або стану.

⊕	⊖	?
can + V	can't + V	Can + V?
could + V	couldn't + V	Could + V?
am / is / are able to + V	'm not / isn't / aren't able to V	Am / Is / Are able to + V?
may + V	may not + V	May + V?
might + V	might not + V	Might + V?
should + V	shouldn't + V	Should + V?
must + V	mustn't + V	Must + V?
have to (has to) + V	don't (doesn't) have to + V	Have to (Has to) + V?

МОДАЛЬНІ ДІЄСЛОВА, ЩО ВИРАЖАЮТЬ ЗДАТНІСТЬ (ABILITY)

1) Can використовується, щоб вказати на фізичну і розумову здатність людини:

We can help you to do this.

They can draw very well.

2) Could використовується для зазначення того, що вмів або міг робити у минулому:

I could speak French when I was at the university.

МОДАЛЬНІ ДІЄСЛОВА, ЩО ВИРАЖАЮТЬ ДОЗВІЛ (PERMISSION)

Can, Could та May використовуються, щоб спитати або дати дозвіл:

You can go out after 8 pm.

May I take your pen?

Could I open the door, please?

МОДАЛЬНІ ДІЄСЛОВА, ЩО ВИРАЖАЮТЬ ПОРАДУ (ADVICE)

1) Should використовується при порадах та в інструкціях:

You should save more money.

2) Could використовується, щоб висловити пропозицію, запропонувати щось (теперішньої форми не існує, є лише минула та майбутня):

You could spend your vacation abroad.

МОДАЛЬНІ ДІЄСЛОВА, ЩО ВИРАЖАЮТЬ ПОВИННІСТЬ АБО ЗАБОРОНУ (OBLIGATION AND PROHIBITION)

1) Must використовується, щоб висловити повинність, зобов'язаність (власне рішення):

I must take this course.

2) Must використовується, щоб висловити заборону:

They mustn't use their mobiles at the exam.

Модальне дієслово must вживається тільки у теперішньому часі! У майбутньому та минулому замість нього вживається have to.

3) Have to використовується, щоб висловити зобов'язаність, потребу (цього вимагає ситуація або обставини):

I have to complete my project before deadline.

4) Have to використовується, щоб висловити відсутність необхідності щось робити:

I don't have to go there today.

Модальне дієслово have to має форми минулого та майбутнього часів:

I have to work every day.
I had to work yesterday.
I will have to work tomorrow.

МОДАЛЬНІ ДІЄСЛОВА, ЩО ВИРАЖАЮТЬ ВІРОГІДНІСТЬ (POSSIBILITY)

1) Позитивне та негативне припущення щодо справжньої ситуації

Ви можете бути впевнені в тому, що що-небудь є правдою (**must**), або в тому, що що-небудь ніяк не може бути правдою (**can not**).

He must remember us. We met two weeks ago.
She can not know him. They have never met.

2) Імовірність.

Якщо ж ви не впевнені на 100%, але вважаєте, що це ймовірно (швидше за все), то використовуйте **should / ought to**:

They should / ought to be at the office now. It's 9 o'clock.

3) Можливість.

Якщо ви вважаєте, що що-небудь можливо в майбутньому і сьогоденні (може бути), то для вираження цієї думки можна використовувати модальні дієслова **can, could, may, might**.

Але будьте уважні, так як **can** позначає можливість взагалі- те, що теоретично можливо, а **could, may, might** показують, що можливо в конкретній ситуації, при певних умовах.

Milk can go off very quickly. (Взагалі)

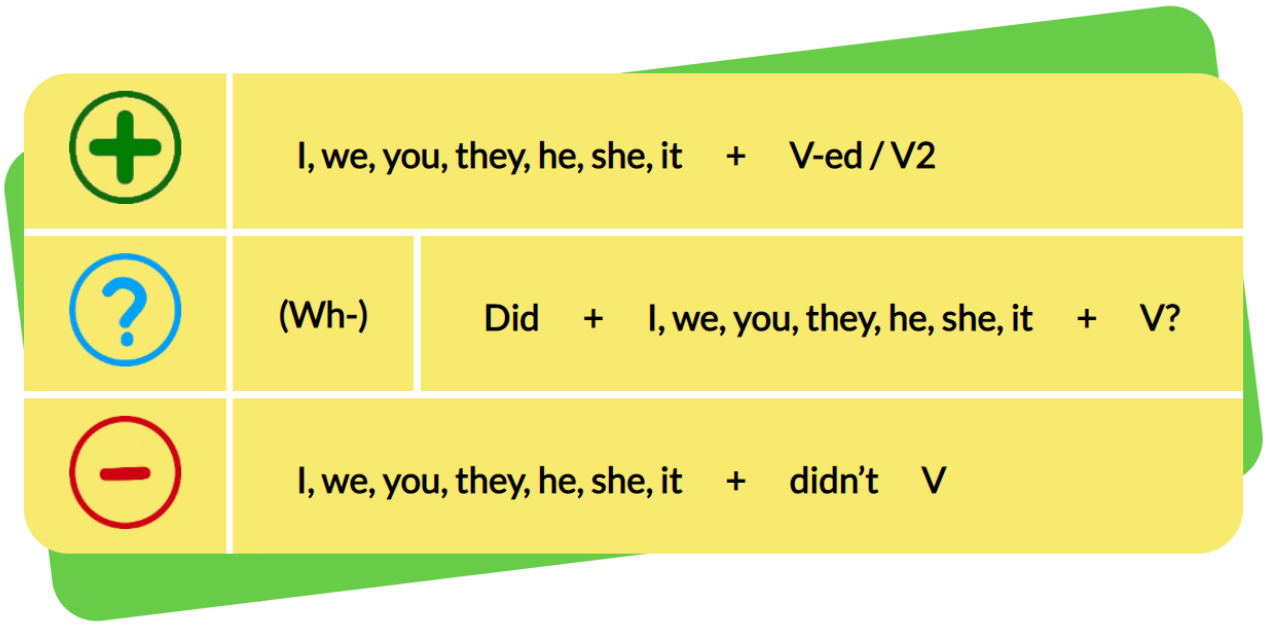
This milk could / may / might go off if you do not put it into the fridge. (Конкретна ситуація)

UNIT 2 FOOD PRODUCTION AND FOOD SECURITY

Language Point 2

PAST SIMPLE TENSE

Past Simple Tense – простий минулий час, що використовується для позначення подій, що відбулись у минулому.



Утворення форми минулого часу правильних дієслів

1) Якщо інфінітив або початкова форма дієслова закінчується на **-e** або **-ee**, то додаємо **-d**:

to type – typed

to agree – agreed

2) Якщо дієслово закінчується на одиничний приголосний, перед яким в слові стоїть короткий наголошений голосний, то відбувається подвоєння **+ -ed**:

to stop – stopped

to permit – permitted

Виняток: кінцева -x ніколи не подвоюється: to relax – relaxed

3) Якщо дієслово закінчується на **-r**, останній склад наголошений і не містить дифтонгу, то кінцева **-r** подвоюється **+ -ed**:
to occur – occurred *to prefer – preferred*

4) Якщо інфінітив закінчується на **-l**, перед яким у слові стоїть короткий голосний, то **-l** подвоюється **+ -ed**:
to signal – signalled *to travel – travelled*
Пам'ятаємо, що після довгого голосного або двох голосних **-l** не подвоюється:
to cool – cooled

5) Якщо в кінці слова стоїть **-y**, перед яким приголосний, то **-y** змінюється на **-i + -ed**:
to study – studied *to dry – dried*

6) в усіх інших випадках до інфінітива просто додаємо закінчення -**ed**:
to answer – answered

<u>Past Simple Tense</u> використовується:

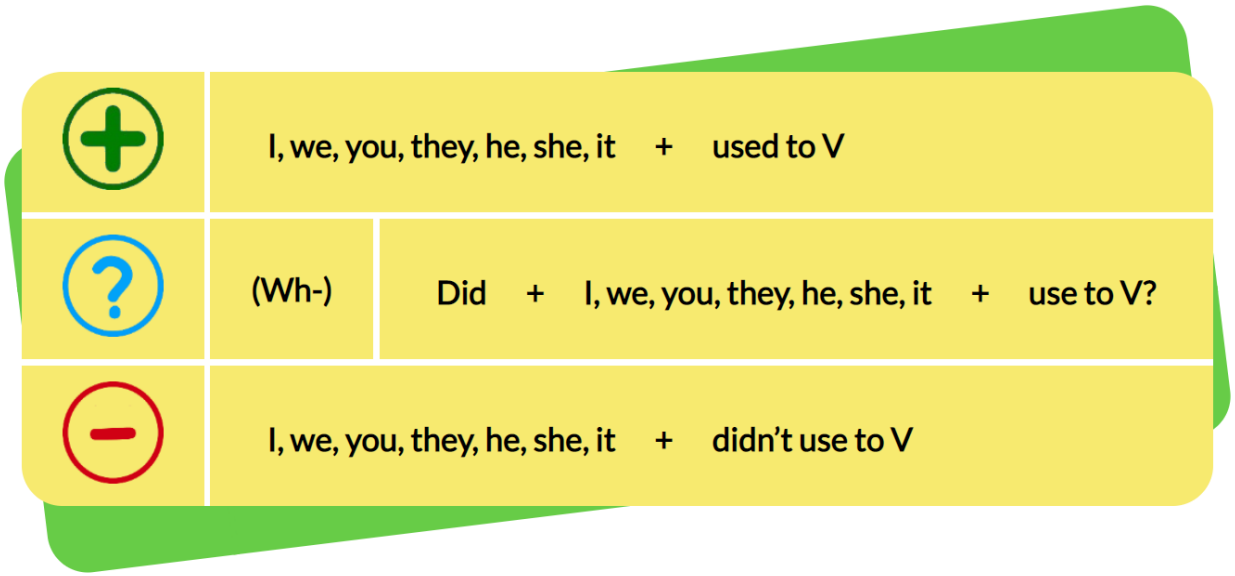
1) підкреслити, що дія розпочалась і завершилась у минулому
Last year I travelled to Boston.

2) для позначення дій у минулому, що відбувались одна за одною
He arrived to the office at 8:00, checked his e-mail at 9:00, and met the others at 10:00.

3) для позначення регулярних, повторюваних дій у минулому
We often purchased equipment there.

USED TO

Конструкція **used to** використовується для вираження дій, що повторювались або відбувались тільки у минулому. **Used to** має тільки форму минулого часу і не використовується в інших часах. Значення конструкції **used to** можна передати словами «раніше», «колись».



Конструкція used to використовується:

1) Used to виражає дію, що постійно повторювалася в минулому і набула характеру звички, проте на даний момент вона вже не відбувається або не є актуальною.

He used to work hard, but now he is retired.

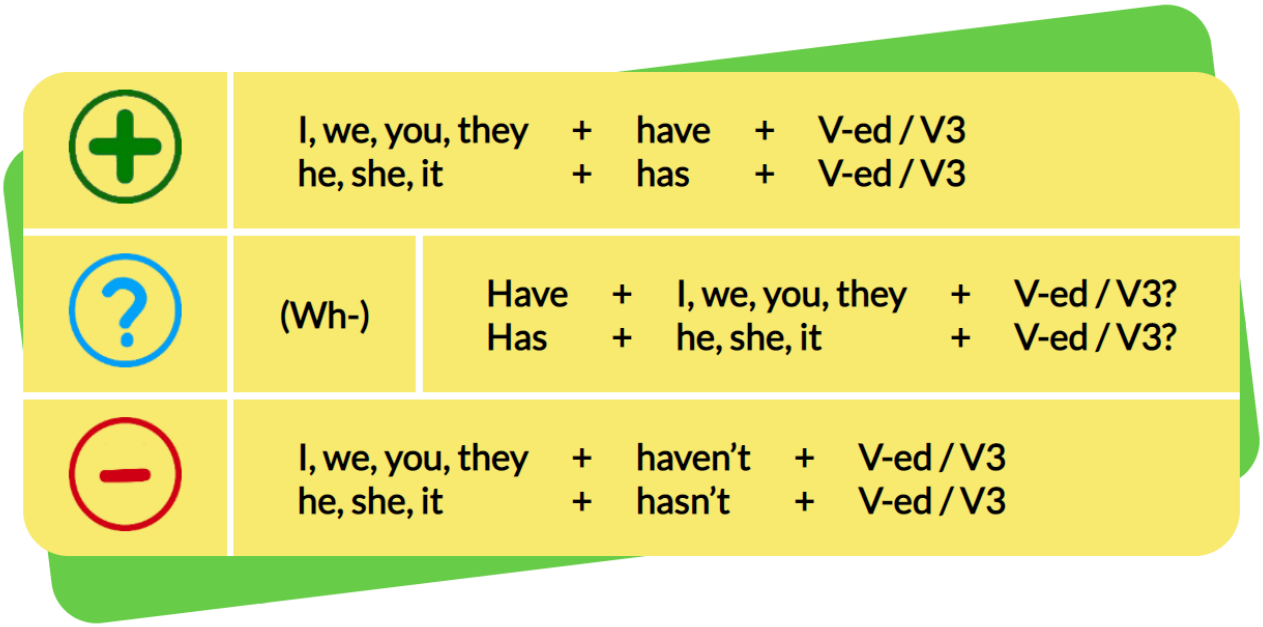
2) Used to також може використовуватися для передачі явищ та подій, що були актуальними для минулого (відбувалися в минулому), але вже не відбуваються зараз.

We did not use to think of telephone as a common thing when I was a child.

I used to live in Paris.

PRESENT PERFECT TENSE

Present Perfect Tense – теперішній доконаний (перфектний) час англійської мови, вживається для позначення подій, що завершилися до теперішнього моменту часу, або тих, що було завершено в період теперішнього часу.



Present Perfect Tense використовується:

1) Для позначення дій, які щойно (не) завершилися:

The train has just arrived.

She hasn't written the test yet.

2) Для позначення дій, які відбувалися в минулому, але результат ми бачимо зараз:

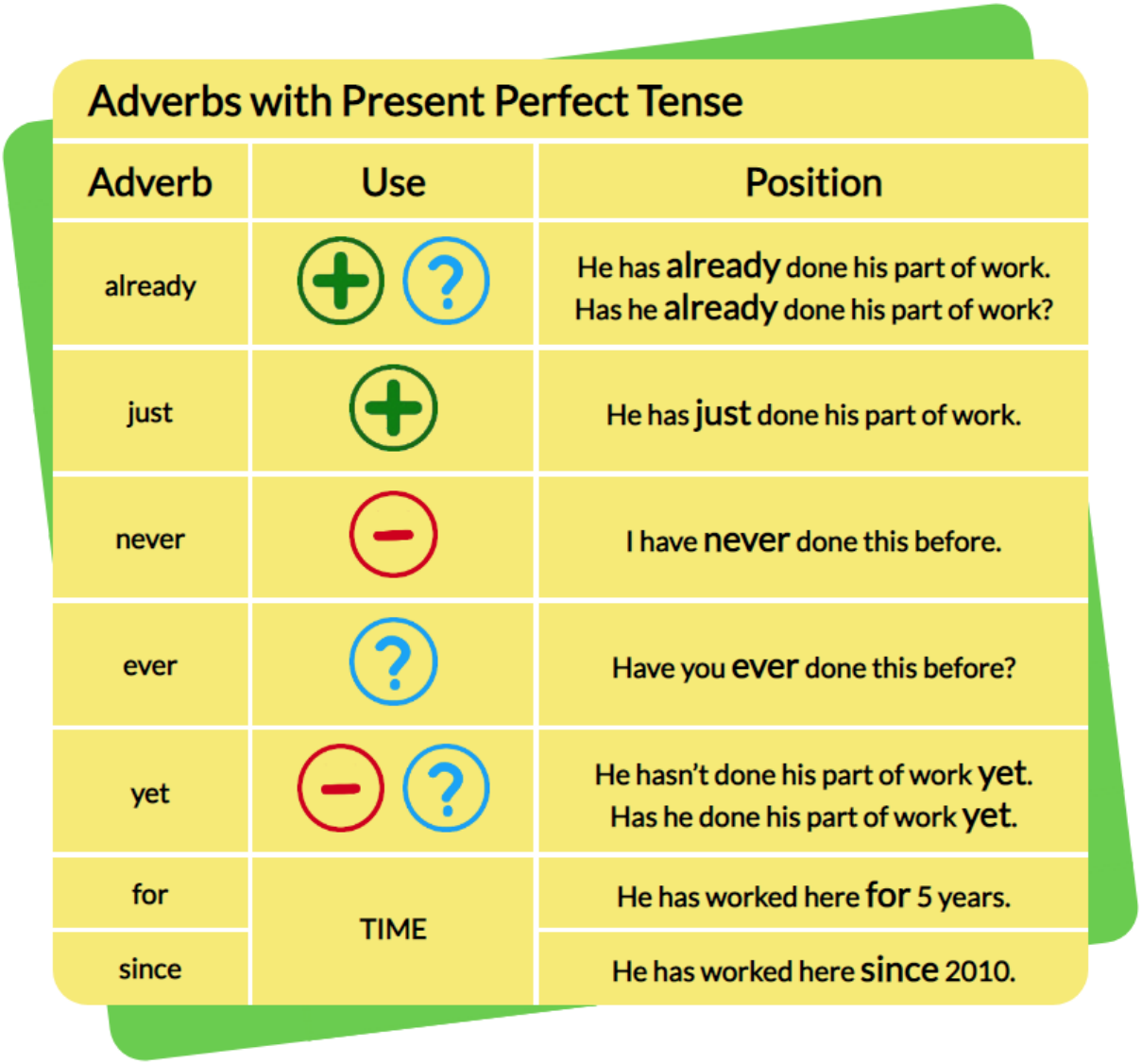
We can't enter the room. I've lost my key.

3) Для опису дій, які почалися в минулому і досі тривають:

I have known since 1990.

4) Для позначення дій, що мали місце у період часу, який ще не минув. (з виразами на кшталт “this morning” / “afternoon” / “week” :

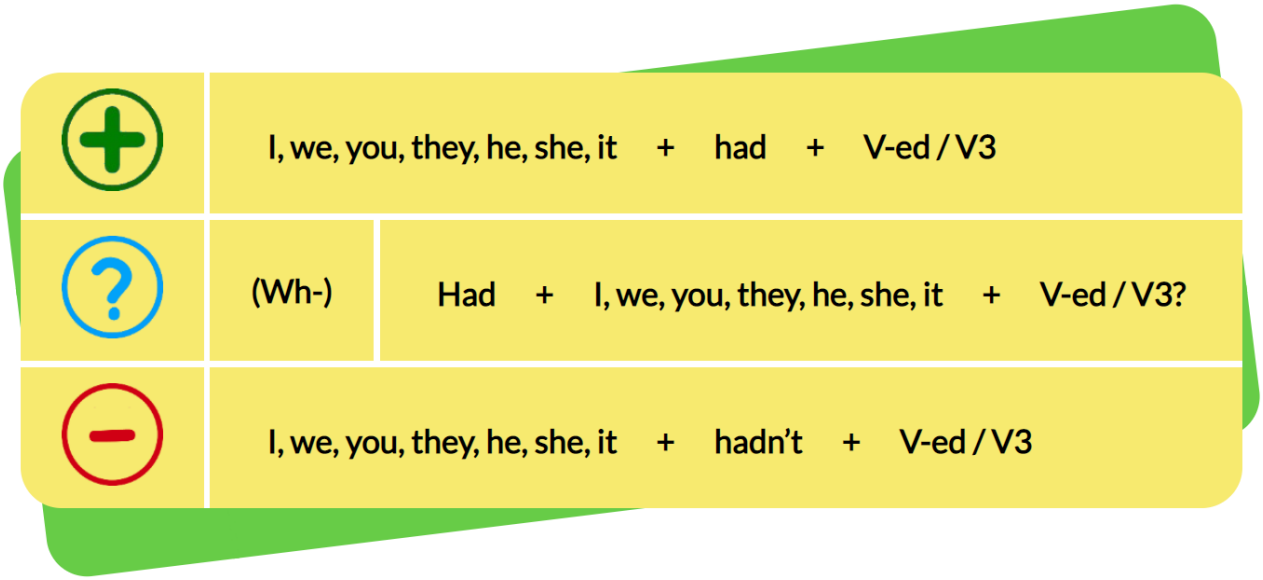
He hasn’t phoned this afternoon.



Adverbs with Present Perfect Tense		
Adverb	**Use**	**Position**
already	+ ?	He has **already** done his part of work. Has he **already** done his part of work?
just	+	He has **just** done his part of work.
never	−	I have **never** done this before.
ever	?	Have you **ever** done this before?
yet	− ?	He hasn’t done his part of work **yet**. Has he done his part of work **yet**.
for	TIME	He has worked here **for** 5 years.
since		He has worked here **since** 2010.

PAST PERFECT TENSE

Past Perfect Tense – це минулий доконаний час, який вживається у випадках, коли ми розповідаємо про дії, які закінчилися до певного моменту у минулому (або перед початком іншої дії в минулому). Точний момент закінчення дії у минулому може вказуватися, а може бути і пропущеним (але обов'язково зрозумілим з контексту).



Past Perfect Tense використовується:

1) Для опису дій, що відбулися раніше іншої дії у минулому:

He told me that he had met my boss before.

2) Для опису дій, що закінчились до певного моменту у минулому:

He had done all the tasks by 5 p.m.

3) Для опису дій, результат яких був зрозумілим у минулому:

She was surprised to know I had got a new job.

UNIT 3 INNOVATION IN AGRICULTURE

Language Point 3

PASSIVE VOICE

Форма пасивного стану дієслова (**Passive Voice**) вказує, що особа або предмет є об'єктом дії, вираженої присудком, тобто дія відбувається над особою або предметом.

Пасивний стан вживається, коли виконавець дії очевидний або несуттєвий, або коли дія або його результат більш цікаві, ніж виконавець.

	Active voice	Passive voice
Present Simple	V / V-s(es) (do/does+inf.)	am/is/are + V3/ed
Past Simple	V / V2/ed (did+inf.)	was/were + V3/ed
Present Continuous	am/is/are + V-ing	am/is/are + being + V3/ed
Past Continuous	was/were + V-ing	was/were + being + V3/ed
Present Perfect	have/has + V3/ed	have/has + been + V3/ed
Past Perfect	had + V3/ed	had + been + V3/ed
Present Perfect Continuous	have/has + been + V-ing	have/has + been + being + V3/ed
Modal verb	Modal verb + inf.	Modal verb + be + V3/ed
am/is/are going to	am/is/are going to + inf.	am/is/are going to + be + V3/ed

Часові форми пасивного стану утворюються за допомогою дієслова **to be** у відповідній часовій формі та дієприкметника минулого часу основного дієслова – **Past Participle**.

- **Present Simple Passive**

*Thousands of dollars **are spent** on building every day.*

- **Past Simple Passive**

*This house **was built** nearly 100 years ago.*

- **Future Simple Passive**

*The letter **will be sent** tomorrow.*

- **Present Continuous Passive**

*The car **is being repaired** now.*

- **Past Continuous Passive**

*The exam **was being taken** yesterday afternoon.*

- **Present Perfect Passive**

*This work **has** already **been done**.*

- **Past Perfect Passive**

*This problem **had been solved** before you came.*

- **Future Perfect Passive**

*The article **will have been rewritten** by tomorrow morning.*

Часові групи **Perfect Continuous (Present, Past і Future)** і **Future Continuous** не мають форми пасивного стану. Якщо виникає необхідність вжити один з цих часів, то вони замінюються дієсловом у активному стані або іншим часом.

- **Модальні дієслова**

*This work **should be done** today.*

ВЖИВАННЯ BY ТА WITH У PASSIVE VOICE

1) Прийменник by вживається перед суб'єктом (виконавцем дії):

*This invention was made **by our student**.*

2) Прийменник with вживається для зазначення інструментів, матеріалів, інгредієнтів тощо.

*The dough is made **with flour, milk and eggs**.*

UNIT 4 AGRICULTURAL ECONOMICS

Language Point 4

CONDITIONALS

Умовні речення складаються з двох частин: власне умови (підрядного речення) і результату виконання цієї умови (головна частина речення). У результаті вказується дія, яка має відбутися, якщо буде виконана умова. Умова найчастіше починається зі слова **if**. Замість **if** також може використовуватись **when**.

Дві частини речення можуть бути у будь-якому порядку: спочатку можна вказати умову, потім результат або навпаки. Однак, якщо умова стоїть на першому місці в реченні, то вона відокремлюється комою. Якщо ж спочатку стоїть результат, то кома не потрібна.
If I see Jeff, I will tell him about it.
I will tell Jeff about it if I see him.

Існує чотири типи умовних речень:

1. Нульовий тип умовного речення (**Zero Conditional**)
2. Перший тип умовного речення (**First Conditional**)
3. Другий тип умовного речення (**Second Conditional**)
4. Третій тип умовного речення (**Third Conditional**)

Вибір типу речення залежить від того, який ступінь вірогідності виражає конструкція.

НУЛЬОВИЙ ТИП УМОВНОГО РЕЧЕННЯ (ZERO CONDITIONAL)

Нульовий тип умовного речення використовується в моментах, коли результат умови є відомим на сто відсотків, як науковий факт.

Всі речення (головне та підрядне) вживаються у **Present Simple Tense**.

*If you **heat** ice, it **melts**.*

I ТИП УМОВНОГО РЕЧЕННЯ (FIRST CONDITIONAL)

Перший тип умовного речення використовується в ситуаціях, коли мова йде про майбутнє. Мова йде про реальний результат, який можна отримати виконавши певну умову.

Для підрядного речення (власне умови) використовуємо Present Simple, а для головного речення – Future Simple:

*If I **see** Becky, I **will tell her about it**.*

II ТИП УМОВНОГО РЕЧЕННЯ (SECOND CONDITIONAL)

Другий тип умовних речень в англійській мові описує нереальні ситуації в сьогоденні або майбутньому часі, ймовірність яких дуже мала.

У підрядному реченняі використовується Past Simple Tense, а е головному – would + дієслово:

*If I **were at work**, I **would finish** this project.*

III ТИП УМОВНОГО РЕЧЕННЯ (THIRD CONDITIONAL)

Третій тип умовних речень також описує нереальні події, але у минулому часі. Часто цей тип речень використовуються, щоб передати співчуття про вчинені вчинки або для критики подій, що відбулися. Зі змісту третього умовного речення ми дізнаємося, що в реальності події розвивалися не так, як вони подані у реченні.

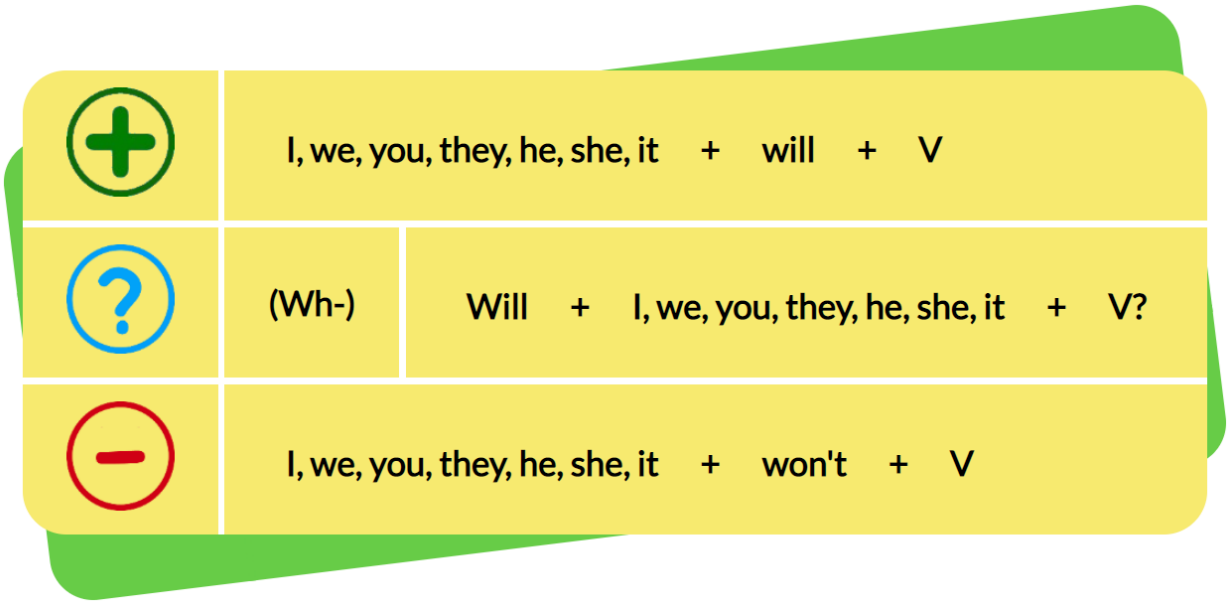
*If we **had known** it in advance, we **would not have booked** our tickets.*

UNIT 5 AGRICULTURE AND THE ENVIRONMENT

Language Point 5

FUTURE SIMPLE

Future Simple Tense – майбутній простий час вказує на те, що якась певна дія буде відбуватись у майбутньому.



1) **Коли приймаємо спонтанне рішення**

Your suitcases look heavy. I will help you.

2) **Коли припускаємо, що щось відбудеться у майбутньому, але це тільки у нашій уяві**

He will be famous one day.

3) **Коли щось обіцяємо**

I will do it, I promise.

4) **Коли когось попереджаємо або лякаємо**

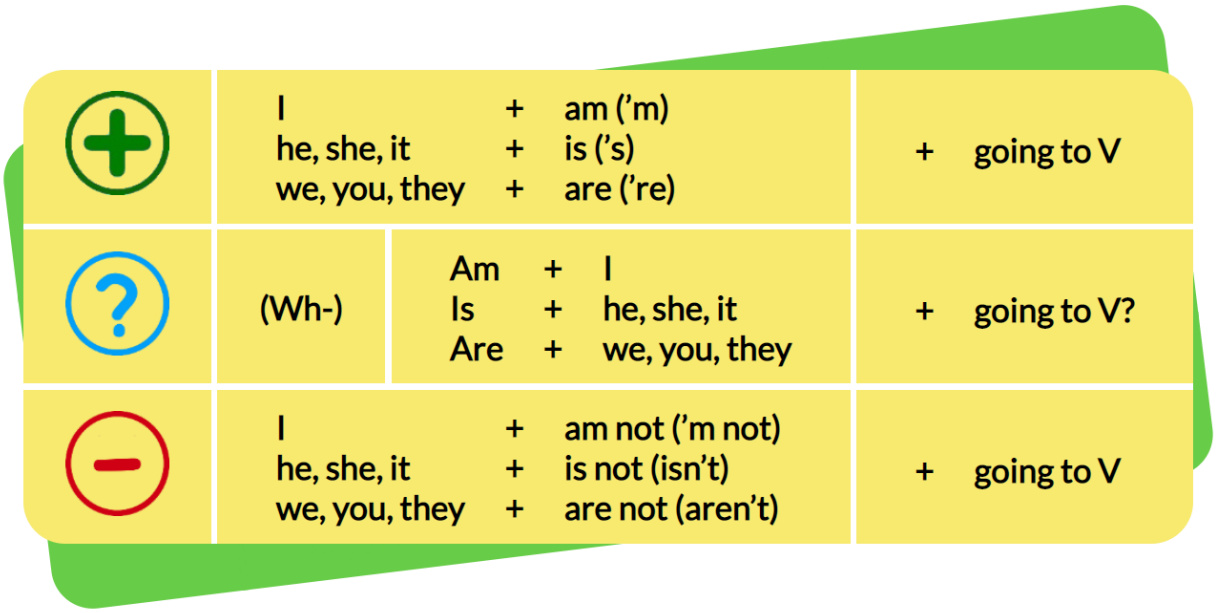
If you don't do it, I will not let you go out.

5) **Зі словами: probably, perhaps, I promise, I hope, I believe, I think, I expect, I'm sure, I'm afraid, I bet**

I hope you will be on time.

BE GOING TO

Конструкція **be going to** часто вживається в англійській мові і зазвичай перекладається як *мати намір, збиратися*.



+	I	+	am ('m)	+	going to V
	he, she, it	+	is ('s)		
	we, you, they	+	are ('re)		
?	(Wh-)	Am	+ I	+	going to V?
		Is	+ he, she, it		
		Are	+ we, you, they		
−	I	+	am not ('m not)	+	going to V
	he, she, it	+	is not (isn't)		
	we, you, they	+	are not (aren't)		

Конструкція be going to використовується:

1) Коли говоримо про свої наміри щось зробити

I'm going to buy a new company.

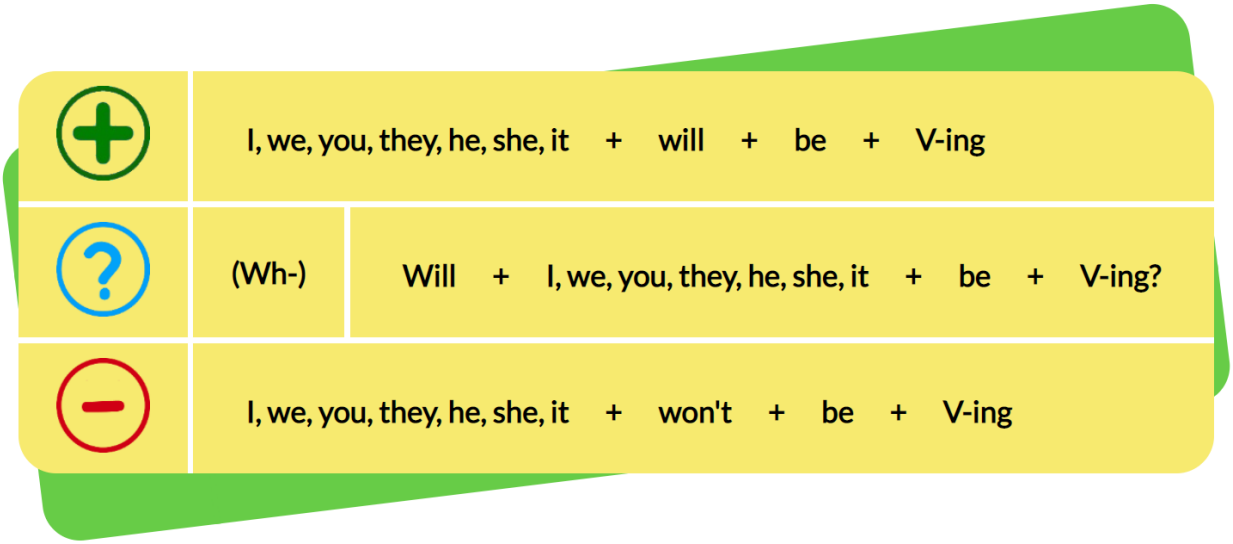
2) Коли бачимо, що зараз щось трапиться і вказуємо на це:

He is going to fall.

Look! The sky is grey. It is going to rain.

FUTURE CONTINUOUS TENSE

Future Continuous Tense вказує на процес, який триватиме в певний момент в майбутньому. На відміну від часу **Future Simple Tense**, цей момент в майбутньому повинен бути вказаний прямо (tomorrow at 4 o'clock, when we meet) або бути очевидним з контексту.

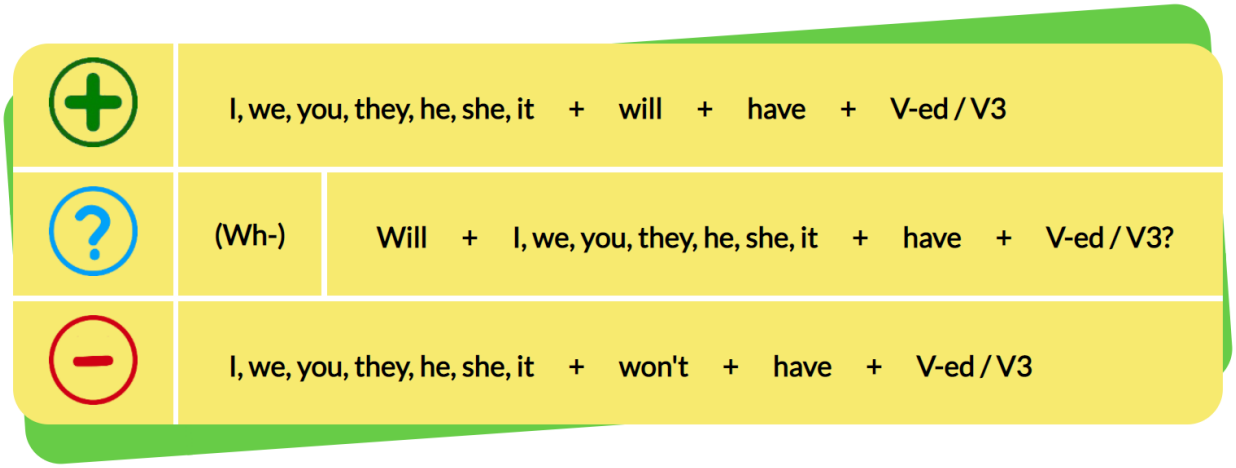


Future Continuous Tense використовується коли є вказівка на процес, який відбуватиметься у певний момент у майбутньому:

At 7 o'clock we'll be having a workshop, you are welcome to join.

FUTURE PERFECT TENSE

Future Perfect Tense використовується на позначення дії, яка закінчиться до певного моменту або початку іншої дії у майбутньому.



Future Perfect Tense використовується:

на позначення дії, яка закінчиться до певного моменту у майбутньому:

You will have spent much efforts before you can get a promotion.

AUDIO/VIDEO SCRIPTS

UNIT 1 SUSTAINABLE DEVELOPMENT

Hello, my name is Thaddeus Barsotti. I'm one of the owners at *Farm Fresh to You* and I'm responsible for growing or working with other small family farms to purchase the fruits and vegetables that go into your *Farm Fresh to You Box*. Sustainability: what does it mean to be sustainable? I think that sustainability is doing something that's going to last forever. But when we consider sustainability on a farm, that's really two key topics. The bottom line: if you're not able to financially take care of the company and the employees so that you can do it every year and stay in business, then there's no chance that your farming practices, albeit maybe very sustainable, will be able to continue to go on. So considering financial sustainability is a really important part of what we do at *Farm Fresh to You*.

When we talk about environmental sustainability, really it starts with our soil. This soil is important. It takes a long time to make, and we need to keep it on the ground, not in the waters so it can't erode away, and we also need to make sure that it has when it needs to continually provide for a plant like the Romanesco. And when we look at that, we have to realize that a farmer's job is to feed the soil. And if we feed the soil with the correct crops, right?.., we're growing the right cover crops on it, and if we feed the soil with the right compost and fertilizer choices, this soil is able to maintain itself in a manner that can consistently and sustainably produce a healthy crop which we can then harvest and eat.

The other part of sustainability is understanding the cropping selection that we make. When we select what crops we grow, that really needs to match to the field, it needs to match with the season that we want to plant things and it needs to match with the season that our customers want to eat things. On a bigger picture, that cropping selection needs to be selected in a manner that creates employment for our employees year round. So perhaps I don't really like growing leeks

in the winter, but I need something for the crews to do in the winter, and because consumers like to eat leeks in the winter, but not in the summer, and so we select fields and crops that enable us to always be moving different crops and different fields, and it also allows us to always be harvesting crops fifty-two weeks a year so that we have work for the people who are harvesting them and we also have products that we can sell to our consumers.

If a crop starts with healthy soil, the odds of that producing a healthy crop are very, very high. My philosophy of sustainably farming is to create an environment that's very healthy for the plants to succeed. And if the plants are healthy, they're able to fight off a small amount of natural predators. So when we look at the ecosystem that we're creating on our farms, it's one that is not a monoculture, it really focuses on having biodiversity. We want different things living in the soil. We want hedgerows filled with different types of bugs and insects and birds and mammals, and all of this comes together to create a healthy ecosystem which gives the plant what it needs to be successful. That's a different philosophy than somebody who's trying to monoculture of crop and only wants in that field growing exactly what they want and they're feeding it the exact things that they think it needs. And when you consider the practices that go into creating something that *Farm Fresh to You* grows versus a different crop, we're really creating an environment that is healthy for the plants and it's also healthy for the local environment and wildlife and workforces.

UNIT 2 FOOD PRODUCTION AND FOOD SECURITY

Introduction 0:00 – 1:19

This is the first Farm on Mars. Okay, technically, it's not on Mars. It's Wyoming so close enough. Anyway, it could be on Mars because this is one of the world's most advanced indoor farms, and it could be the future of farming right here on Earth.

With vertical farming you can start with a building roughly the size of a *Costco*, grow your

crops up and down instead of around you on the floor, ditch the pesticides, recycle the water and you can go pretty much anywhere anytime. Why do this? Well, look at this. It's all of the farmland in the world. All of that used to be nature. "It is probably one of the most defining acts of humanity. We literally changed ecosystem of the entire planet in order to meet our dietary needs. Plants today produce roughly what they produced 10-20 years ago. We've just managed to pack more of them into a field and there is a limit to that type of yield gain. Our job is to build the farms that unlock nutrition for everyone on a scale that no one's ever seen, and the only way we can do that now is by growing indoors." Indoors? Don't you need sunlight and rain to grow the world's food? Maybe, not. This is *Hard Reset*, a series about rebuilding our world from scratch.

***Part 1 The Technology* 1:20-5:10**

"So pods are where we do almost all of our environmental research. This is where we understand what drives flavour, what drives appearance, what drives yield in all of the different crops that we grow." Why would we want to farm vertically? Well, there's a reason the libraries don't spread their books all over the floor. They stack them up on shelves so that they can stack a lot of books in a small footprint. Vertical farms do the same thing for agriculture, and while vertical farms are not new, companies like *Plenty* are leading the charge and making them mainstream.

"So going vertical allows us to put a lot more product in a single spot. It allows us to circulate air easier, administer light easier, allows us to have massive growing plants." "We can condense about 700 acres of farmland into the size of a big-box retail store, and we harvest 365 days a year. We were able to condense the growth cycle to about 10 days for a lot of our products, which is about a 700% increase in yield. We are doing that all while saving about a million gallons of water per week and using about one percent of the land compared to traditional farming."

"In an indoor farm we put water in the roots, so they take the water up and they transpire that water, and then that water gets sucked into our air handling units. We condense it all and put it right back in the system. So 99% of the water that's transpired in the field and lost is

captured and recirculated in our in our farms. We have strawberries, in another space you've got upstairs space devoted to tomatoes. Overall, we've got over 50 different discreet spaces that we use to do these tests." Historically vertical farming has been too expensive and too inefficient to make it a better option than traditional farming, but that's all changing now as these technologies drop in price. "Humanity is on that cost curve right now. We just don't realize it. We're riding this cost curve down to a future where almost anything is possible in an extremely controlled environment."

That's not to say that one of these vertical farms is cheap. A new facility can cost a hundred million dollars to install, but the cost of each component is plummeting as industries like solar and robotics are flourishing. But the surprising technology that's helped make this possible is LEDs that vertical farms use to replicate the sun. Let's break that down. "Our system is just a system of energy transfers, and our ability to manage the efficiency of those energy transfers in some way or another is what makes us economical or non-economical as a business. It sounds crazy, but like most everything in the world, we can only save our species if it makes economic sense. You know, life and death. Let's make sure that we can afford it, right?" Right. Nate gets it. Basically, an LEDs efficiency comes down to how little loss there is between the grid's electricity and the amount of light it puts out, then how much light is actually absorbed and used by the plant. "We think about LEDs like the point of major energy loss in the system. We're taking electrons and converting them into photons." And thanks to all your TV and cell phone, light bulb buying, LED technology has gotten really, really efficient, and *Plenty* is getting really good at putting out the kind of light that actually results in plant growth and plant flavour. "LEDs have just been going down, down, down in price and up, up, up in efficiency, and our understanding of what makes it good photon versus a bad photon at the plant level has been going up, up, up as we've been researching and working.

We're really kind of transitioning into a world where humans and machines are partnering together in better and better ways to make farming awesome."

***Part 2 The Experience* 5:10-8:05**

Plenty is not vapourware, it's already on the market. Their first farm in the San Francisco Bay area has produce available at local stores today. It's premium price, but it's not unaffordable. *Plenty* is banking on their produce being better and more flavourful than produce from traditional farms. "What we can do with nutrients and lights, is we can change the flavour profile of our plants, so things like a blue light can make a more crispy crunch on a plant like a kale. That kale is nothing like a kale you would think of. It's soft, it's kind of sweet, it's crunchy. So I make a pesto out of it that I really love." I sampled *Plenty*'s products and they're not wrong. Baby arugula, baby kale and mizuna mixes all have a ton of flavour. And that kale pesto that Shireen mentioned? So good! And because farms like *Plenty* use a tremendous amount of automation, these plants have actually never even been touched by human hands. "When you grow things outside, the elements are much more unpredictable. If you grow indoors, you can control a lot of those factors in ways that aren't accessible to outdoor growers, and the result is that our produce can be, hundreds of times cleaner."

Plenty doesn't need to use pesticides because there are no bugs. Its produce doesn't have bird poop on it because why would you put birds inside a warehouse? That results in a product that's so clean, you don't need to wash it, and that's a huge step forward for human health and safety. Faster, unhealthy food dominates people's diets, but that's partially because alternative produce for most is kind of gross. "So, globally we eat about one-third of the fresh fruits and vegetables that we should be consuming. That's a huge problem. That's why we see the rise of heart disease and diabetes and all of these different things and places where people used to just struggle to get enough calories, right? And what we've done in the last really like 50 years is we figured out how to trick our bodies into wanting to eat the wrong things. Humanity is trapped in our addiction to those calories, and we don't have the land, or the resources, or the ability to compensate with high-nutrition food."

Most produce has been packed up and shipped off to another country or transported across state lines via trucks and trains. That's not great for the environment and it also sucks for the flavour of the produce. "Many products like tomatoes are designed for durability

because they got to be shipped across the country in these like massive trucks, and not for flavour. So our products can last longer on shelves because they're not spending three or four days on a truck." "We're able to concentrate on quality over the ability to ship. And so this is, in a lot of ways, the democratization of flavour."

***Part 3 The Future* 8:05-10.53**

"Right now we are really focused on building our facility in Compton. We're in the middle of construction and hoping to open that facility in the next year or so. Compton is a food desert. So we're bringing jobs to communities that really are looking for investment in people. These aren't seasonal jobs, they're full-time jobs, 365 days a year, living wages. Being able to grow in communities anywhere means that we will be able to offer that produce to places that traditionally haven't had access. I mean, that's what we can do, is we can create local farms everywhere."

With their San Francisco and Compton facilities *Plenty* will only be growing leafy greens and shorter plants, tall crops like wheat or corn don't make much sense to farm vertically, but that may change in the decades to come. So picture a scenario where we got rid of all the traditional farms and replaced them with just vertical farms. Fresh produce could be grown in arid places like Cairo and Phoenix or frigid places like Helsinki and Calgary. Every place in the world would be able to grow the same crops grown in California and Tuscany. How would that change diets and cuisines and our impact on the environment? The businesses and lives of people associated with traditional farming would be severely disrupted, farming communities would lose their identities, but does that outweigh the potential benefits?

"That hard reset is one where the vast majority of our food is grown indoors. It's grown in a completely protected environment under artificial light, you know, given exactly the nutrients it needs, it's hyper productive, it's in the cities or in the regions where the people live, and humanity is fully untethered from the environment in terms of how our population grows. We can go anywhere and grow these crops in almost any conditions. Now we can expand kind of this human consciousness of flavour in ways that we're never possible when we were seasonally

locked into production cycles."

This is the kind of technology and efficiency we'll need with the *Artemis* based on the moon, and eventually on Mars. But it's also kind of what we need here on Earth. "We can give the world back a lot. We can give the world back land, we can give back the jungles of Borneo to the orangutans, we can give back the Amazon to the planet, we can give back the Midwest to the buffalo we can give back the things that we've taken and we can be a lot less extractive."

UNIT 3 ROBOTIC FARMING

Part 1

Small Robot Company is looking to transform the way the farming works. Since 1990 productivity hasn't increased at all. So we need a revolution. Our mission is to use technology to make farming more sustainable. We see the solution as being about robotics and artificial intelligence, highly accurate robots that can deal with an arable field on a plant-by-plant basis, much more precisely, much more sustainably and much more profitably. The fundamental benefit of this is the precision farming.

Managing plants at a per-plant level is really game-changing. It's actually incredible. This round of investment is to build on the work we've done this year and take the company forward to scaling it out to a much bigger market place. We are developing three small robots called Tom, Dick and Harry. The first round of funding was to take Tom from a prototype to commercial readiness, and we've delivered on that. The next round of funding is about delivering a commercially ready Dick. This will allow us to be able to take the early proof of concept work we've been doing around working with *Rootwave* and move those into reliable robust units, which we can take out in the field. Dick will kill weeds using electricity with no chemicals at all. We're focusing on enabling the artificial intelligence identification of grass weeds: things like black grass, brome, rye grass. We're now starting to build much

more robust, farm-ready technology. Tom is capable of working in adverse conditions and Tom can gather data at 200 times the pace of the first generation Tom could do.

At the Waitrose and Partners Farm we do try to work in harmony with the environment and our sustainable farming model is something that really aligns with the way that Small Robot guys are working. I think I decided to invest in the robot company for the same reason that I wanted to become an Advisory Board Member really because Robotics and automation are going to be at the heart of everything. Being at the forefront of this technology for me is where you need to be in agriculture today.

We're always trying to look at how can we do things better. That's why we engaged with *Small Robot* Company fairly early on, and now we're moving to the next phase, where we're actually going to be looking at weed recognition at scale across the whole farm which is really impressive. Robotics and artificial intelligence are going to completely change what is possible on farms.

We're looking at the largest crops in the world, and we're addressing this as an end-to-end solution for a massive problem, so the scale of opportunity is huge. We are a really good investment now because we are on the cusp of huge breakthroughs, commercially and technically. We are now offering an opportunity for farmers to come on board, and if they invest 10,000 pounds or more, their farms will be the first farms in the world where there will be robotic, non-chemical weeding for arable crops. What we can do is back British technology start-up that is backed by farmers, is for farmers and is really going to change the way that your industry operates.

Part 2

We're here on the local estate it Hampshire, and we've been trying here through the autumn and now into the spring. To prove the power of PerPlant farming, we are focusing on answering the biggest problem that farmers face at the moment, which is weeding. So we're working with farmers in the UK to be able to provide them with ongoing view of their crop plants and

their broad leaf weeds in the field. One of the newest tools in the toolbox for us locally is the relationship with the *Small Robot* Company. The robot offers us a real chance to stop using artificial input which goes towards regenerative model of farming. It is a synergy between farmer and scientist. With the new generation of robotics we're really focusing on every individual plant in the field rather than taking a blanket view that we're going to spray the entire field with pesticide. We have delivered this end-to-end service that is taking our Tom, who is now developed up to a commercial specification, to be able to gather the data. Tom then passing that data to Wilma, AI-driven operating system who is now capable of absorbing terabytes of information and converting that to PerPlant information in the field, and then that information being passed to Dick, who then goes out to the field to find the individual weeds that Tom has seen through his cameras, and then killing those with electricity.

This is our Tom V3 robot, he's now covering two point five hectares and hour, so 20 hectares in an eight-hour shift. Tom will go out in the field, do a survey and we'll be able to take it a really detailed picture of literally every millimetre of field that they're looking at. So for instance, this field is 11 hectares, 25 acres. This field will turn into a million little fields within a field, and that accuracy of data is really important. It's really exciting to be in a situation where we now have a commercially viable product in Tom. These capabilities also really applicable to lots of other players in the wider ag industry, and what we can offer them is quite literally billions of data points and the opportunity for every field to become a trial plot.

So we've moved to the point now where we can take the data from Tom, absorb it into Wilma, process it through the AIs and create this PerPlant map of the field. This year we are focused on improving the granularity and detail of the data that we're feeding into Wilma to be able to monitor every single plant in the field as it grows over the course of the season. So this is using the Wilma AI to say this particular weed is a very severe threat to the target crop, and then to go in and choose which plants we treat and choose exactly how we treat them. We recognize the type of weed, if we don't want to kill that particular weed the farmer can make the decision about that. We're not looking to eliminate everything from every crop. Let's identify weeds that can

actually bring benefits, the robots can do that, but they can't be selective for the herbicide that goes through a chemical sprayer. In Phase 3 we're using our non-chemical weeding robot Dick to go out and kill those weeds. Electrical weed-zapping, which were produced by Rootwave, puts an electric current through a weed from the tip all the way through to the root. It's very similar to a lightning strike. The biggest challenge that farmers are facing at the moment is around herbicide resistance and weed control. We went to farmers and said: What would you tell us? What is the most important thing for us to solve? Unanimously it came back: herbicide resistance, weeds. We just can't control them. We have got resistant weed issues in big parts of the UK with grass weeds in particular. Black grass is crippling. It's costing the industry a fortune for the cost of pesticides have gone up 50 percent in ten years. It's the number one problem, which is here now when it needs to be fixed, we can't continue to go at this page. So we need to change, and that's where the robots offer us a different solution.

Now we can recognize the weed in the shot and we can get a probe onto those weeds. At that point we can do what we want. The robotic platforms we've got at the moment can have many different technologies bolted onto them and the world's our oyster on that. It could be really powerful and industry-changing.

We've been here today on a field trial we've had technology, we've shown that it works, but we need to get to the point where we can drop it in any field on any day anywhere in the country, and internationally as well. Our next stage is being able to take the proof of concept of our electric weeding system and convert that into a commercially viable robust service. Product design is really important for us. We don't want to continue to reinvent the wheel every time, we want to take chunks that we know work and reapply them onto as many platforms as we can. The real benefit of around that is that it allows us to be able to create this modular platform for robotics to have reusable components. So in 2023, when our machinery is ready, we are going to be able to ramp up massively. The industry is changing beyond recognition, housing whether you adapt or you just watch. We should have an ear towards robots in agriculture. The robots can offer a heck of a lot more in my opinion than just treating weeds. In my lifetime robots will be a huge part of our farming system. I mean, it's endless, potential is

endless.

UNIT 4 AGRICULTURAL ECONOMICS

When I try to explain "What is agribusiness?", I usually like to start with a little bit of history. Today's world of agribusiness grew out of fundamental changes on what was happening at the farm. We went from farm management to something different. There was a time when farm management was our focus, and that's because the farmer wore all the hats: the farmer supplied the inputs, supplied the labour, was the manager and the owner. Now those hats may be worn by multiple individuals so that the input supplier is no longer necessarily the farmer. And the agri-food system that has emerged to accommodate this diversity of roles and responsibilities has led to something other than farm management. It has started us down the path of agribusiness.

The second expansion of our thinking that has taken us from the farm to something like agribusiness has to do with recognizing that the farm is no longer just a unit of production, just a place where things are produced. Today, a farm is inescapably linked to the market beyond the farm gate, and as a consequence, as we think about the decisions made on a farm, we have to think about the implications of those decisions all the way to the point of consumption. So in today's marketplace, we cannot let the farmer think they live in a field of dreams, where somehow when they produce a product, buyers will magically appear. Rather, we have to look at the integration of the system from the farm to the end consumer and all the activities that happened between those two points. Today, agribusiness is the entire agri-food system that links input supply to farm production, to assembly, and distribution, and processing, and then onto wholesaling and onto retailing all the way to the consumer and their preferences. As a consequence, it's a much more integrated agri-food system. No longer is it just farm management.

And lastly, agribusiness is expanding its role into the broader economy. It's easy to think about agriculture in terms of farming and

ranching, but in reality agriculture is linked to many different components of our national economy. It's just not food, beverage, fiber and textiles. Really we have to think even in terms of things like energy with biofuels, we have to think in terms of pharmaceuticals, in terms of things like super foods, and people eating not only because the food tastes great, but also because it has direct health benefits.

So in today's system when we think about farming and agriculture, we're really thinking about multiple components of today's economy. So agribusiness, by necessity, is the integration of concepts, and theories, and practices across multiple subject areas. So when we think about agribusiness in today's context of agri-food system, we have to not only think about economics and management and marketing, but also things like political economy, political science, environmental science, psychology. We're really an integration of multiple disciplines of thought. But at his core agribusiness is about how decision-makers working within the agri-food system are making choices. And how those choices lead to the ability to have a safe, abundant, diverse and accessible source of plant and animal based products. That's agribusiness.

UNIT 5 AGRICULTURE AND THE ENVIRONMENT

Forty years ago hungry cattle deforested an entire region of Costa Rica. Now these same hills are covered with trees and healthy pastures – a testament to Costa Rica decades-long commitment to agriculture that protects the environment and reduces global warming. Jose Leon Vargas runs his cattle ranch with this commitment in mind. Fences are made from living tea trees, forest ecosystems absorb carbon dioxide and protect native wildlife, water comes from naturally maintained springs, nutrient-rich grass protects against soil erosion and feeds his livestock. To Leon Vargas and other farmers and ranchers in Costa Rica climate-smart practices are not just good for the planet. They make economic sense.

(*in Spanish*) "Yes, we can see the economic benefits, it also gives me personal satisfaction that comes from having a relationship with the environment."

These workers are busy growing saplings from seeds donated by farmers. When they're a little larger, they'll be sold back to farms at a minimal cost. Trees are a vital part of Costa Rica's climate-smart agricultural movement. So-called living fences stretch across the lush landscape. Growing trees are planted in rows and strung with barbed wire. They're sturdier than fence posts of deadwood and the roots fix nitrogen in the soil.

Trees are also planted in fields to provide shade for cattle and for coffee plants. Farmer Julio Jimenez Hernandez has more than a thousand cedars and other trees on his farm of four-and-a-half hectares. Every three years he receives a payment of one dollar thirty cents for each eligible tree through a World Bank supported carbon credit program. Besides the cash payments, the leaves and bark protect and nourish the soil, so he doesn't have to buy much fertilizer. But there's more. In a few years the trees will reach maturity after 14 years of growth and Hernandez will be allowed to sell the timber for a windfall profit he projects could be around $50,000.

(*in Spanish*) "The trees need about 4-5 more years to harvest, and when they reach maturity they will be worth $350-$400 per tree."

Trees are not the only way for farmers to reap windfalls. 20 years ago dairy farmer Carlos Gomez spent a chunk of his profits on the grains and fodder. Now, he mostly feeds his cows grasses he harvests on his own land. He grows several varieties. They're specifically bred to fix nitrogen into the soil and to provide protein, fibre and energy. Saving money on cow feed has increased the profit Gomez makes from his 17 cows, three calves and a half a dozen goats. He's also spending less on fertilizer because he corrals his cows into small areas of his 22 hectare farm, and he moves them to a new plot every day so grass has time to recover.

(*in Spanish*) "In this community and on this farm, many producers use environmentally sustainable practices that lower our costs by using local resources."

Everything here is designed to lessen the farm's carbon footprint and save money. Water comes from a spring on his property. To ensure

that the water supply doesn't run dry, he and his neighbours allow natural forests to grow on the banks to protect the stream bed. That has the additional advantage of protecting birds and other wildlife as well as preventing erosion. Even cow manure is put to use. It's collected in this contraption. It's called a biodigester. Manure goes in, and with water and time it captures methane. Gomez uses the fuel to operate the equipment he needs to make cheese, and a line runs to his house to provide fuel for cooking and heating water. Another savings.

Gomez says that he and his neighbours believe in climate-smart agricultural processes because they make economic sense and because they're proud that Costa Rica is considered a world role model. He has seen climate change and he knows action must be taken.

(*in Spanish*) "The climate has changed and is changing. It's had a strong effect on agriculture. Yes. There is change."

Of course the methods and species used in Costa Rica won't work for every country. Climates, soil conditions and water supplies differ around the world. For instance, these cows at a research facility are being specifically bred to tolerate Costa Rican heat and still give milk. But other countries could adopt Costa Rica's commitment to a climate-smart approach to growing crops, raising livestock, maintaining forests.

It not only saves the planet, but makes good economic sense. It could become a universal trend, a mindset. At his ranch, Leon Vargas is so committed to sustainable practices, he even uses guppies to clean the water in the trough used by his cattle.

(*in Spanish*) "Yes, I would continue to do it because of my convictions. Not only for business. Not for a few Colones more or a few Colones less. I believe it is an obligation of all citizens to help conservation and mitigate the effects of global warming."

So in this small country at the crossroads of two worlds a carbon footprint is reduced at minimal cost and maximum benefits.

(*in Spanish*) "For the land, be thankful to it and give back to it."

WORD LISTS (BY UNITS)

UNIT 1 SUSTAINABLE DEVELOPMENT

abstract _____

academic database _____

accessible _____

accurate _____

against the odds _____

albeit _____

algae _____

bigger picture _____

biodiversity loss _____

bottom line _____

caloric intake _____

carbon emission _____

citation _____

conference proceedings _____

consumption _____

coverage _____

database _____

demand _____

economic growth _____

enhance _____

famine _____

farmland efficiency _____

fertility _____

in depth _____

income _____

investigation _____

maintain _____

peer-reviewed _____

poverty alleviation _____

preliminary search _____

quotation marks _____

relevancy _____

relevant _____

reliable _____

research paper _____

resilience _____

scarce _____

search engine _____

soil depletion _____

sustainable development _____

tackle _____

technological breakthrough _____

the odds _____

truncation symbol _____

undernourishment _____

valuable _____

water management _____

wildcard character _____

UNIT 2 FOOD PRODUCTION AND FOOD SECURITY

academic community _____

academic integrity _____

accidentally _____

acknowledge _____

adjust _____

aeroponics _____

AI (artificial intelligence) _____

aquaculture _____

assignment _____

at a very high rate _____

authorities _____

average _____

avoid _____

awesome _____

be expelled _____

be short (of) _____

big-box retail store _____

bio cultures _____

citation style _____

cite _____

collaboration _____

come from _____

consequence _____

consume _____

ditch _____

double cropping _____

efficiency _____

end up _____

figure out _____

fraction _____

from scratch _____

give a credit _____

grid _____

gross _____

growing season _____

habitable _____

high-tech _____

human touch _____

hydroponics _____

impact on _____

implement _____

include _____

input _____

in-text citation _____

irrigation _____

lab-grown meat _____

land reclamation _____

LED _____

legitimately _____

nutritional value _____

obese _____

obtained _____

offence _____

overconsumption _____

pest resistance _____

plagiarism _____

plagiarize _____

plummet _____

quote _____

reference _____

rely on _____

replicate _____

rich in _____

silo thinking _____

source _____

stakeholders _____

start out _____

suffer from _____

threaten _____

under pressure _____

untethered _____

validate _____

vapourware _____

violation _____

weeds _____

UNIT 3 INNOVATION IN AGRICULTURE

abstract _____

accurate _____

aim _____

article _____

augment _____

blockchain _____

broadband _____

chatbots _____

comprise _____

conclusion _____

dam levels _____

data-driven agriculture _____

digital agriculture _____

discussion _____

drones _____

embedded _____

empower _____

end-to-end _____

farm-ready _____

food supplies _____

forge _____

game-changing _____

GPS _____

heat maps _____

implication _____

impressive _____

incredible _____

infeasible _____

introduction _____

IoT _____

keyword _____

livestock health _____

machine learning _____

method _____

misconception _____

nanotechnology _____

nurture _____

objective _____

on the cusp of _____

overview _____

profit margins _____

purpose _____

reference _____

remotely _____

result _____

RFID _____

robotics _____

robust _____

significance _____

sophisticated _____

telematics _____

the world's your oyster _____

thrive _____

title _____

to have an ear towards something _____

to reinvent the wheel _____

unanimously _____

value chain _____

viable _____

white space _____

UNIT 4 AGRICULTURAL ECONOMICS

aggregator _____

assess _____

assessment _____

bar chart _____

be prone to _____

bear market _____

bull market _____

capacity _____

cash cow _____

cash flow _____

collateral _____

commodity _____

competition _____

data visualization _____

decline _____

decrease _____

drop _____

eager beaver _____

entrepreneur _____

equity _____

exposure _____

fat cat _____

fluctuate _____

fluctuation _____

grow _____

histogram _____

incentives _____

increase _____

input supplier _____

insurance costs _____

job sector _____

lame duck _____

level out _____

lift _____

line graph _____

lion's share _____

loan _____

logistics _____

mission statement _____

mitigate risk _____

monkey business _____

opportunity _____

pie chart _____

price volatility _____

processor _____

purchase _____

retail _____

scatterplot _____

smallholder farmer _____

stable _____

strengths _____

surplus produce _____

target market _____

threat _____

trader _____

trading position _____

value _____

Venn chart _____

weaknesses _____

wear all the hats _____

youth unemployment _____

UNIT 5 AGRICULTURE AND THE ENVIRONMENT

abusive use _____

accelerate _____

attention-grabbing _____

audience _____

background _____

bullet _____

carbon footprint _____

catastrophic effects _____

clearing land _____

commitment _____

complement _____

consistent _____

core _____

corral _____

correspond _____

deforestation _____

destructive _____

disruption _____

distraction _____

dominant _____

drastically _____

endangered species _____

exacerbate _____

excessive fishing _____

feeding crops _____

fodder _____

font _____

food requirements _____

grassland _____

graze _____

greenhouse emissions _____

greenhouse gases _____

habitat destruction _____

healthy ecosystem _____

inadequate land use _____

industrial agriculture _____

irreversible _____

lush _____

mindset _____

mitigate _____

pasture _____

policy _____

presentation _____

reinforce _____

resolution _____

respond _____

sapling _____

slideshow _____

species extinction _____

strain _____

template _____

threaten _____

top priority _____

trough _____

waste _____

waste disposal _____

water contamination _____

wetland _____

windfall profit _____

ANSWER KEY

UNIT 1 SUSTAINABLE DEVELOPMENT

1.1. Transforming the World: Sustainable Living

Ex. 4

1 Poverty alleviation
2 Water use
3 Energy use
4 Economic growth and employment
5 Sustainable consumption and production
6 Climate change
7 Ecosystem management

Ex. 6

1 poverty alleviation
2 soil depletion
3 sustainable development
4 technological breakthrough
5 economic growth
6 caloric intake
7 water management
8 biodiversity loss
9 farmland efficiency
10 carbon emission

Ex. 7

1 d
2 b
3 e
4 a
5 c
6 i
7 h
8 f
9 j
10 g

Ex. 8

1 accessible

2 resilience
3 fertility
4 demand
5 consumption
6 tackle
7 scarce
8 income
9 maintain
10 enhance

1.2. How Sustainable Farming Works

Ex. 2 1 F
2 F
3 F
4 F
5 F

Ex. 3 1 d
2 c
3 b
4 a

Ex. 4 financial sustainability
environmental sustainability

Ex. 5 Possible answers:

Financial sustainability	**Environmental** sustainability
• taking care of the farm • providing employment year round • stay in business • healthy workforce • meeting the demand for products	• fertilizer choice • cropping selection • preventing soil erosion • healthy crops • biodiversity

Ex. 6

1 the odds
2 bottom line
3 bigger picture
4 bottom line
5 the odds
6 albeit

Language Focus

Ex. 2

1 Present Simple
2 Present Continuous
3 Present Simple
4 Present Simple
5 Present Continuous
6 Present Continuous
7 Present Simple
8 Present Continuous
9 Present Simple

Ex. 3

1 grow; are growing
2 are expecting
3 results
4 is becoming
5 believe
6 lasts
7 are experiencing; need
8 are meeting

Ex. 4

1 d
2 c
3 a
4 b
5 without

Ex. 5

1 e
2 a, g
3 c, d

4 h
5 b
6 f

Ex. 6 1 can
2 could
3 may
4 mustn't
5 could
6 might
7 should
8 won't be able
9 needn't
10 could

1.3. Databases and Search Strategies

Ex. 4 1 articles
2 general or multidisciplinary
3 thousands of articles, dissertations, theses, etc.
4 quotation marks
5 truncation symbol
6 filters or limiting criteria
7 truncation symbol
8 key words
9 quotation marks
10 Search or Boolean operators

Ex. 5 1 c
2 d
3 a
4 b

UNIT 2 FOOD PRODUCTION AND FOOD SECURITY

2.1. Fighting the Global Food Crisis

Ex. 3

Traditional methods: aquaculture, control of weeds and pests, double cropping, irrigation, mechanization, soil conservation, use of fertilizers

Innovative methods: aeroponics, foods from bio cultures, hydroponics, lab-grown meat, seaweed and algae cultivation, land reclamation

Ex. 4

1 G
2 C
3 E
4 H
5 A
6 B

Ex. 5

33%	- soils degraded
1/3	- food wasted
38%	- the shortage of land for
12	- plants producing most of food
5	- animal species producing most of food
4	- kg of tomatoes per square meter produced on an open field
1.9 billion	- people who overeat
150	- litres of water necessary to produce a cup of coffee
80	- kg of tomatoes per square meter produced in a greenhouse in the Netherlands
600 mln	- obese people

Ex. 6

1 human touch
2 silo thinking
3 AI (artificial intelligence)
4 short

5 replicate
6 habitable
7 adjust
8 high-tech
9 stakeholders
10 fraction

Ex. 7
1 consume
2 nutritional value
3 collaboration
4 threaten
5 overconsumption
6 pest resistance
7 implement
8 efficiency

Ex. 8

1 out	2 from	3 on	4 up	5 out
6 down	7 from	8 in	9 on	10 under

2.2. Farms of the Future

Ex. 2
1 big-box retail store
2 awesome
3 ditch
4 LED
5 untethered
6 plummeting
7 gross
8 from scratch
9 vapourware
10 grid

Ex. 3
1 F
2 T
3 F
4 T
5 T

Ex. 4

1 banking on
2 automation
3 accessible
4 one-third
5 consuming
6 addiction
7 high-nutrition
8 durability
9 flavour
10 quality

Ex. 5

1 They bring full-time jobs to communities that really are looking for investment.
2 They grow leafy greens and shorter plants (strawberries, tomatoes etc), tall crops like wheat or corn don't make much sense to farm vertically.
3 Negative. The businesses and lives of people associated with traditional farming would be severely disrupted, farming communities would lose their identities.
4 People can give the world back land, the jungles of Borneo, the Amazon, the Midwest and they can be a lot less extractive.

Language Focus

Ex. 1

1 Past Simple
2 Present Perfect
3 Present Perfect
4 Present Perfect
5 Past Simple **and** used to
6 after
7 the first

Ex. 2

1 We **used to use** spray a lot of pesticides.
2 **Did you use to work** on a traditional farm?

3 The facility **used to be** in San Francisco.
4 Traditional farming **used to waste** a lot of water.
5 In the past all the farmland **used to belong** to nature.
6 **Did people use to eat** more fresh fruit and vegetables?
7 In the past, farmers **used to depend** on the seasons to grow vegetables.
8 In the past, factories **used to be** very dangerous.
9 Twenty years ago, it **used to take** a long time to grow kale.
10 In the past, we **didn't use to need** AI to grow vegetables.

Ex. 3
1 have fallen
2 have been
3 got
4 has phoned
5 arrived
6 haven't seen
7 didn't see
8 ordered

Ex. 4
1 I've just sent you an email.
2 Have you ever been to the USA?
3 They've already put up their home page.
4 They haven't done any of the product pages yet.
5 We have never thought about growing plants indoors.
6 They have harvested 50 tons of produce so far.

2.3. Processing Information

Ex. 3
1 F
2 T
3 F
4 F
5 T

Ex. 4
1 professional reputation
2 quote

3 academic community
4 plagiarism
5 sources
6 obtained
7 cite
8 academic integrity

UNIT 3 INNOVATION IN AGRICULTURE

3.1. Data-Driven Agriculture

Ex. 4

1 B
2 C
3 A
4 C
5 B

Ex. 5

1 d
2 g
3 e
4 i
5 a
6 h
7 c
8 j
9 f
10 b

Ex. 6

***Farming*:** livestock health, food supplies, dam levels, data-driven agriculture.

***Technology*:** digital innovations, data-driven agriculture, white space, heat maps, machine learning.

***Finance*:** profit margins, value chain.

Ex. 7

1 augment
2 embedded
3 remotely
4 nurture
5 sophisticated
6 thrive
7 infeasible
8 empower
9 broadband
10 forge

3.2. Agriculture 4.0: Robotic Farming

Ex. 2

game-changing
incredible
accurate
robust
farm-ready
impressive
end-to-end

Ex. 3

1 b
2 a
3 b
4 b
5 a

Ex. 4

1 T
2 F (Dick kills only the most dangerous weeds.)
3 F (Wilma, the AI, makes a decision about killing the weeds)
4 T
5 T

Ex. 5

1 E
2 C

3 D
4 A
5 B

Ex. 6 1 the world's your oyster
2 unanimously
3 on the cusp of
4 have an ear towards
5 to reinvent the wheel

Language Focus

Ex. 3 1 the action
2 don't know
3 formal
4 be
5 third
6 am/is/are
7 was/were
8 have/has + been
9 will + be
10 need to/have to/can + be
11 omitted

Ex. 4

1. Our software is being developed by a famous engineer.
2. A lot of IT research is made in the Silicon Valley.
3. The algorithm will be checked by my assistant.
4. All the analytics are ordered from the local ICT company.
5. The company was established in 1998.
6. The beta testing hasn't been carried out yet.
7. $100,000 of investment was received last year.
8. Modular construction is used in our robots.
9. You will be collected from the airport.
10. A presentation of our product can be organized at the fair.

Ex. 5

1. encourage/are encouraging
2. are carried out/are being carried out
3. have to be made
4. will produce
5. has recently been developed; can be programmed
6. performs
7. will be debugged
8. are used
9. are provided
10. is able to cover

3.3. Article & Abstract

Ex. 5

1 Introduction
2 Results
3 Discussion
4 Abstract
5 Aims / problems / results / discoveries / outcomes
6 Conclusions

UNIT 4 AGRICULTURAL ECONOMICS

4.1. Agricultural Finance

Ex. 4

1. e
2. f
3. b
4. a
5. c
6. d

Ex. 5

1. Agricultural business
2. Client assessment
3. Cash flow assessment
4. Price risk management
5. Value chain financing

Ex. 6

1. c
2. g
3. h
4. e
5. b
6. f
7. a
8. d

Ex. 7

1. cash flow
2. surplus produce
3. mitigate risk
4. insurance costs
5. trading position
6. youth unemployment
7. price volatility
8. job sector

Ex. 8

1. assess
2. exposure
3. incentives
4. entrepreneur
5. are prone
6. retail
7. loans
8. purchases
9. commodity
10. logistics

Ex. 10 *(possible answers)*

Shared Mission Values

- Farm viability
- Farmland preservation
- Healthy food access
- Sustainable production methods

Shared Operational Values

- Accountability
- Long-term commitment
- Open and ongoing communication
- Transparency

4.2. Agribusiness

Ex. 2

1. input supply
2. farm production
3. assembly
4. distribution
5. processing
6. wholesaling
7. retailing
8. consumer

Ex. 3

1 F
2 T
3 F
4 T
5 T

Ex. 4 b

Ex. 5

1 bear
2 bull
3 cow
4 beaver
5 cat
6 duck
7 lion
8 monkey

Ex. 6

1. D
2. B
3. F
4. A
5. E
6. C

Language Focus

Ex. 2

1. likely
2. future
3. imaginary
4. future
5. imaginary
6. past
7. negative

Ex. 3

1. contributed, would be
2. maintain, will meet
3. were, would cut
4. wait, will be
5. call, will let
6. would apply, were
7. will arrive, get
8. would you support, were

Ex. 4

1. had known
2. had made
3. would have arrived
4. had been
5. had made
6. would have got
7. Would you have agreed
8. would have gone

4.3. Working with Visuals

Ex. 3

1 F
2 F
3 T
4 T
5 F

Ex. 4

1 vertical axis
2 horizontal axis
3 broken line
4 curve
5 dotted line
6 solid line

Ex. 6

Going up	increase, rise, lift, grow, go up, jump an upward/rising/increasing trend, extend, expand
Going down	decrease, drop, decline, fall, go down
No change	remain stable/constant/steady at, stay at the same level, keep stable
Change	level out/off, stand at, stop falling and start rising, stop rising and start falling, change
Frequent change	fluctuate
At the top	reach a peak, the highest point
At the bottom	reach/hit a low (point), the lowest point

UNIT 5 AGRICULTURAL ECONOMICS

5.1. Environmental Issues Caused by Agriculture

Ex. 2

1. inadequate land use
2. species extinction
3. habitat destruction
4. waste disposal

5. greenhouse gas
6. excessive fishing
7. deforestation
8. water contamination

Ex. 5

1. D
2. B
3. H
4. C
5. G
6. A

Ex. 6

1. h
2. e
3. f
4. i
5. b
6. c
7. j
8. a
9. g
10. d

Ex. 7

1. irreversible
2. strain
3. destructive
4. dominant
5. grassland
6. accelerate
7. pasture
8. exacerbate
9. wetland
10. disruption
11. drastically
12. graze

5.2. Climate-Smart Agriculture

Ex. 3

fix nitrogen
provide shade
stop erosion
provide habitat for birds and insects
provide timber
use carbon dioxide

Ex. 4

1. JH, CG
2. LV
3. CG
4. LV, CG
5. JH
6. LV, CG
7. CG
8. LV

Ex. 5

1. mindset
2. commitment
3. mitigate
4. fodder
5. carbon footprint
6. trough
7. lush
8. windfall profit
9. corral
10. saplings

Language Focus

Ex. 2

1 going to
2 will
3 Present Continuous
4 Present Perfect
5 won't

Ex. 3

1 will be
2 are going to take up
3 will cost
4 will meet
5 won't need
6 are going to utilize
7 will be able
8 will make
9 won't work
10 are going to sell

Ex. 4

1 b
2 a
3 b
4 b
5 a
6 a
7 b
8 a
9 b
10 a

5.3. Presenting a Project

Ex. 2

1 F
2 B
3 D
4 H
5 E

Ex. 5

1. b
2. a
3. g
4. c
5. d
6. e
7. h

8. f

Ex. 6

1. Does everybody have a handout of my report?
2. I'll be handing out copies of the slides at the end of my talk.
3. I can email the PowerPoint presentation to anyone who would like it.
4. If you have any questions, I am happy to answer them
5. If you don't mind, I'd like to leave questions until the end of my talk
6. I'd like you to think about the significance of this figure here

PRACTICE FILES ANSWER KEY

Practice File 1

1.1. Vocabulary Practice

Ex. 1

1 d
2 g
3 a
4 c
5 e
6 h
7 j
8 i
9 f
10 b

Ex. 2

1 b
2 c
3 a
4 a
5 b
6 c
7 b
8 a
9 c
10 b

1.2. Grammar Practice

Ex. 1

1 are working
2 is growing
3 provides
4 ensures
5 produce
6 (correct sentence)
7 live

8 (correct sentence)
9 (correct sentence)
10 exists

Ex. 2 1 need to
2 must
3 might
4 should
5 can
6 will be able
7 had to; could
8 needn't
9 mustn't
10 could

1.3. Academic English

Ex. 1 1 citation
2 quotation marks
3 relevant
4 search engine
5 valuable
6 abstract
7 research paper
8 investigation
9 accurate
10 reliable
11 database

Practice File 2

2.1. Vocabulary Practice

Ex. 1 1 e
2 f

3 d
4 a
5 g
6 b
7 c

Ex. 2 1 a
2 b
3 b
4 a
5 b
6 a
7 a
8 b

Ex. 3 1 out
2 on
3 out
4 under
5 down
6 on
7 from
8 up
9 in
10 from

2.2. Grammar Practice

Ex. 1

1. Compton **used to be** a food desert with high unemployment, but now it **has** a lot of opportunities.
2. Compton **used to be** difficult to travel to, but now it **has** good transport links.
3. Compton **used to have** social problems, but now it **is** a popular area.
4. Compton **used to have** housing, but now it **has** luxury flats.
5. Compton **didn't use to have** any facilities, but now it **has** a museum, an airport, and a casino.

Ex. 2

1 have made
2 Have they finished
3 have completed
4 have built
5 spoke
6 said
7 have never been
8 haven't started yet
9 called
10 complained

2.3. Academic English

Ex. 1

1 Citation style
2 Plagiarize
3 Violation
4 Reference
5 Academic integrity
6 Offence
7 In-text citation
8 Assignment

Practice File 3

3.1. Vocabulary Practice

Ex. 1

1 dam levels
2 white space
3 profit margins
4 Livestock health
5 Data-driven agriculture
6 value chain
7 machine learning
8 heat map
9 food supplies

10 digital innovations

Ex. 2
1 broadband
2 forge
3 empower
4 infeasible
5 remotely
6 augments

3.2. Grammar Practice

Ex. 1

1. Farming robots **can transplant** rice seedlings without human interaction.
2. The robot's steering and accelerator systems **are controlled** by an on-board computer.
3. The robot is **equipped** with multiple modules including fertilizer hopper and herbicide applicator.
4. The sensors **have been embedded** into a robotic tractor and combine harvester.
5. A new generation of autonomous robots **will help/will be helping** plant breeders to create new the crop varieties.
6. The robot **navigates** around the field by sending out laser pulses to scan the environment.
7. The robot **was designed** to generate as detailed heat map of a field as possible. - OK
8. Previously, plant breeders **have measured** the plant's phenotypes by hand.
9. Automation **has always played** a big part of agriculture, and with the use of modern IST tools farms might become fully autonomous.
10. Using robots, the best-yielding plants **can be identified** which will cut the time needed to breed a new variety.

Ex. 2
1 C
2 B
3 C
4 A

5 A
6 C
7 B
8 B
9 C
10 A

3.3. Academic English

Ex. 1
1 Title
2 References
3 Keyword
4 Discussion
5 Introduction
6 Abstract
7 Conclusion
8 Results

Practice File 4

4.1. Vocabulary Practice

Ex. 1

1	g
2	i
3	h
4	j
5	c
6	e
7	b
8	f
9	d
10	a

Ex. 2

1	a	assess	b	judge
2	a	loans	b	incentives
3	a	involved	b	prone
4	a	retail	b	wholesale

5	a	entrepreneur	b	commodity
6	a	purchases	b	logistics
7	a	exposition	b	exposure

4.2. Grammar Practice

Ex. 1

1. unless
2. when
3. if
4. unless
5. in case

Ex. 2

1. told, wouldn't
2. are, will
3. improve, will
4. were, would
5. will, goes
6. will, don't
7. is having, is
8. would make, could

Ex. 3

1. If you hadn't checked the invoice, we would have lost the money.
2. Unless Peter had been in New York, he would have come to the meeting.
3. If we had known the summer would be so dry, we wouldn't have invested in arable farming.
4. If I had realised the interest rates were going to rise, I wouldn't have taken a big loan.
5. If they had given a good presentation, they would have got the contract.

4.3. Academic English

Ex. 1

1 drop
2 grow

3 level out / off
4 decline
5 remain stable
6 decrease
7 fluctuate
8 increase

Practice File 5

5.1. Vocabulary Practice

Ex. 1

1 B
2 A
3 B
4 C
5 A
6 B
7 C
8 B
9 B
10 A

Ex. 2

1. emissions
2. policy
3. crops
4. use
5. requirements
6. effects
7. species
8. agriculture
9. land
10. priority

5.2. Grammar Practice

Ex. 1

1. are going to be
2. won't have
3. will grow/will be grown
4. 'm not going to sell
5. will contain
6. 'm going to water
7. will mitigate
8. 'm going to corral
9. will turn
10. won't happen

Ex. 2

1. In January, we **will be preparing** seed bed and land for rice.
2. By April, we **will have transplanted** the winter paddy.
3. By the end of April, we **will have prepared** land for maize. (prepare)
4. In May, we **will be planting** maize.
5. In June, we **will be weeding** winter paddy.
6. By the end of summer, we **will have harvested** winter paddy.
7. By October, we **will have weeded** maize.
8. In October, we will be preparing for maize storage.
9. In November, we will be harvesting spring paddy.
10. By the end of the year, we will have sold maize.

5.3. Academic English

Ex. 1

1 font
2 background
3 template
4 presenter
5 bullet
6 slideshow
7 audience
8 presentation

VOCABULARY

A

absorb	поглинати
abstract	анотація, тези
academic community	академічна спільнота
academic database	академічна база даних
academic integrity	академічна доброчесність
accelerate	прискорювати
accessible	доступний
accidentally	випадково
accurate	точний
acknowledge	визнавати
acre	акр (близько 0,4 га)
addiction	залежність
adjust	адаптуватися
adopt	приймати
adverse	несприятливий
aeroponics	аеропоніка
aesthetic value	естетична цінність
ag	сільське господарство
against the odds	всупереч
agar	агар
aggregator	агрегатор, організатор оптових поставок
AI (artificial intelligence)	штучний інтелект
aim	мета
albeit	хоча й

algae	водорості
algorithm	алгоритм
align with	співпадати з
all of the above	все зазначене вище
alter	змінювати
amazing	дивовижний
amount	кількість
appearance	зовнішній вигляд
applicable	придатний
application	застосування
approach	підхід
approximately	приблизно
aquaculture	аквакультура
arable farming	землеробство
arid	посушливий
article	стаття
arugula	рукола
assembly	збирати
assess	оцінювати
assessment	оцінка
assignment	завдання
at a very high rate	дуже високими темпми
at the forefront	попереду
attention-grabbing	той, що привертає увагу
audience	аудиторія, глядачі, публіка
augment	збільшувати, примножувати
authorities	влада
automation	автоматизація

auxiliary verb	допоміжне дієслово
average	середній
avoid	уникати
awesome	чудовий

B

backed by	за підтримки
background	фон
bar chart	стовпчикова діаграма
barbed wire	колючий дріт
bark	кора
be expelled	бути відрахованим (з навчального закладу)
be prone to	бути схильним до
be short of	не вистачати
bear market	ринок, на якому спостерігається тенденція до зниження курсів
benefit	перевага
beta testing	випробування в реальних умовах
beverage	напій
big-box retail store	супермаркет
bigger picture	комплексне бачення
bio culture	біокультура
biodigester	біореактор
biodiversity loss	втрата біорізноматніття
bird poop	пташиний послід
black grass	лисохвіст польовий
blockchain	блокчейн

bottom line	практичний результат, підсумок; баланс
breakthrough	прорив
breed	виводити породу
breeding	розведення
broadband	швидкісний інтернет
brome	стоколос
bull market	ринок, на якому спостерігається тенденція до підвищення курсів
bullet	пункт, ключовий момент

C

caloric intake	вживання калорій
calf	теля
capabilities	можливості, потенціал
capable of	здатний на
capacity	номінальна потужність, місткість, здатність
capture	захопити, схопити
carbon dioxide	двоокис вуглецю
carbon emission	викиди вуглецю
carbon footprint	вуглецевий слід
carry out	здійснювати
cash cow	підприємство із стійким доходом
cash flow	грошовий обіг
catastrophic effects	катастрофічні наслідки
cause	спричинити
cedar	кедр

challenge	виклик, проблема
chatbot	чатбот
citation	цитування
citation style	стиль цитування
cite	цитувати
clearing land	розчищення земель, меліорація
collaboration	співробітництво
collateral	додаткове забезпечення
Colones	колон (грошова одиниця Коста-Ріки)
come from	надходити з
commitment	зобов'язання
commodity	товар
competition	конкуренція
complement	доповнювати
comprise	складати
compromise	піддавати ризику
concern	занепокоєність
conclusion	висновок
condense	стиснути
conference proceedings	матеріали конференції
consciousness	свідомість
consequence	нслідок
consistent	послідовний
consistently	послідовно
consume	споживати
consumer	споживач
consumption	споживання

contraption	хитрий винахід
convert	перетворювати
core	головний, основний
corral	гнати
correspond	відповідати
cover crops	покривні культури
coverage	охоплення, масштаб, покриття
crew	команда
crippling	шкідливий
crispy	хрусткий
cropping selection	вибір культур
crunch	скоринка
cuisine	національна кухня

D

dairy	молочна продукція
dam level	рівень дамби
damage	пошкодження
data visualization	візуалізація даних
database	база даних
data-driven	той, що керується даними
deadwood	засохле дерево
debt forgiveness	списання боргів
debug	налагодити
decline	спадати
decrease	зменшуватись
deforestation	вирубування лісів
demand	попит

destructive	руйнівний
devoted	відданий
diabetes	діабет
dietary needs	харчові потреби
digital agriculture	цифрове сільське господарство
digitalization	цифровізація
disadvantaged	незаможний
discussion	дискусія
disrupted	порушений
disruption	порушення
distraction	відволікання
distribution	розподіл
ditch	викинути, відкинути
dominant	домінуючий
donate	жертвувати, дарувати
double cropping	одночасне культивування двох культур
downside	недолік
drastically	кардинально
drone	дрон
drop	падати, різко знижуватись
dung	гній, послід
durability	міцність, стійкість

E

eager beaver	роботяга, надто завзятий працівник
economic growth	економічний зріст

efficiency	ефективність
electric current	електричний струм
eliminate	усунути
embedded	вбудований
emerge	виникати
empower	уповноважувати, надавати можливість
enable	надавати можливість, задіяти
end up	закінчитись тим, що
endangered species	вимираючий вид
endless	нескінченний
end-to-end	завершений
engaged	залучений
enhance	підсилювати
enormous	величезний
ensure	забезпечувати
entrepreneur	підприємець
equality	рівність
equity	капітал
estate	нерухомість
evaluate	оцінити
evaporation	випаровування
eventually	згодом
ewe	вівця
exacerbate	посилювати, поглиблювати
excessive fishing	надмірний вилов риби
excluding	за винятком
expand	розширювати

expansion	розширення
exposure	піддавання
extractive	той, що видобуває

F

famine	голод
farm production	фермерське виробництво
farmland efficiency	ефективність сільськогосподарських земель
farm-ready	готовий до використання на фермі
fat cat	багатій
feeding crop	кормова культура
fence	огорожа, паркан
fertility	родючість
fertilizer	добриво
fibre	клітковина
field trial	польові випробування
figure out	з’ясувати
firewood	дрова
flourish	процвітати
fluctuate	коливатись
fluctuation	коливання
fodder	фураж, корм для худоби
font	шрифт
food desert	продовольча пустеля
food requirements	харчові вимоги
food supplies	продовольче забезпечення

for instance	наприклад
forge	налагоджувати (стосунки)
founder	засновник
fraction	частка, крихта
frigid	холодний
from scratch	з нічого, з нуля
fuel	паливо
full-time	на повний робочий день
funding	фінансування

G

gallon	галон (міра рідких і сипких тіл: англ. галон — 4,54 л; амер. галон = 3,78 л)
game-changing	інноваційний, унікальний
GDP	ВВП
gender	стать
georeferenced	географічно прив'язаний
give a credit	віддати належне
GPS	глобальна система навігації
grassland	лукопасовищне угіддя
graze	пасти
greenhouse emissions	парникові викиди
greenhouse gases	парникові гази
grid	мережа
gross	неприємний, противний
grow	зростати
growing season	сезон вирощування

growth cycle	цикл росту
guppies	гупі (сітчаста пецилія)

H

habitable	придатний до заселення
habitat destruction	руйнування природного середовища
hard reset	повне перезавантаження
healthy ecosystem	здорова екосистема
heart disease	серцеве захворювання
heat map	температурна мапа
hedgerow	шпалера, жива огорожа
high-tech	високотехнологічний
histogram	гістограма
human touch	втручання людини
hydroponics	гідропоніка

I

impact on	вплив на
implication	результат, висновок
impressive	вражаючий
improper	неналежний
in depth	глибинно
inadequate land use	невідповідне землекористування
incentive	стимул, заохочення, пільга
include	включати
income	прибуток
increase	збільшуватись

incredible	неймовірний
industrial agriculture	промислове сільське господарство
ineligible	який не має права, невідповідний
infeasible	нездійсненний
input	грошовий внесок
input supplier	постачальник засобів виробництва
insurance cost	вартість страхування
intelligent	розумний
intended	задуманий
in-text citation	цитування в тексті
introduction	вступ
investigation	дослідження
IoT	інтернет речей
irreversible	незворотній
irrigation	зрошення
issue	проблема, питання

J

job sector	сфера діяльності

K

kale	кейл (капуста)
keep pace with	не відставати від
keyword	ключове слово

L

lab-grown	вирощений в лабораторії
lack	відсутність, нестача
lambing	окіт, ягніння
lame duck	невдаха, банкрут
land reclamation	освоєння земель
lasting	тривалий
lawsuit	судовий позов
leachate	фільтрат, промивна вода
leading	провідний
leaves	листя
LED	світловипромінюючий діод
leek	цибуля-порей
legitimately	законно
lessen	зменшувати
level out / off	вирівнюватись
lift	підійматись
limited	обмежений
line graph	лінійний графік
lion's share	левова частка, найбільша частина
literally	буквально
livestock health	здоров'я домашньої худоби
loan	позика
logistics	логістика, постачання
low-cost	недорогий, бюджетний
lush	соковитий, буйний, пишний

M

machine learning	машинне навчання
maintain	підтримувати
make economic sense	бути економічно вигідним
mankind	людство
manure	гній, добриво
matter	мати значення, бути важливим
maturity	зрілість
measure	вимірювати
mechanization	механізація
meet the criteria	відповідати критеріям
methane	метан
method	метод
mimic	імітувати
mindset	ментальність, загальна духовна налаштованість
misconception	помилкове уявлення
mission statement	заява про цілі
mitigate	зменшувати, пом'якшувати
mizuna	мізуна (японська капуста)
moisture	волога
monkey business	витівка, темні справи
monoculture	культивування однієї культури

N

nanotechnology	нанотехнології
necessities	необхідність, потреби

negotiate	вести переговори, домовлятись
nitrogen	азот
nurture	виношувати, вирощувати
nutrients	поживні речовини
nutritional value	харчова цінність

O

obese	огрядний, який страждає на ожиріння
objective	мета
obligation	зобов'язання
obstacles	перепони
obtained	отриманий раніше
offence	правопорушення
omit	пропускати, не включати
on the cusp of	на межі
opportunities	можливості
output	товари і послуги, виготовлені за допомогою ресурсів
outweigh	переважати
overcome	подолати
overconsumption	надмірне споживання
overview	огляд

P

pandemic	пандемія
pasture	пасовисько
peer-reviewed	що рецензується колегіально

pest resistance	стійкість до шкідників
pesto	соус песто
phosphates	фосфати
pie chart	кругова діаграма
pillars	стовпи
plagiarism	плагіат
plagiarize	займатись плагіатом
plant-based	переважно рослинний
plummet	стрімко падати
pods	підвісний контейнер
policy	політика
potassium	калій
poverty alleviation	викорінення бідності
precipitation	опади
precision agriculture	точне рільництво
predators	хижаки
predicate	присудок
preference	перевага
preliminary search	попередній пошук
presentation	презентація
preserve	зберігати
pressures	тиск
prevent	попереджати
price volatility	коливання цін
probe	зондування
processing	переробка
processor	переробник
profit	прибуток

profit margins	показники рентабельності
prohibition	заборона
prospects	перспективи
protein	білок
prototype	прототип
pump	насос
purchase	купувати
purpose	призначення
put on hold	тимчасово призупинити

Q

quotation marks	лапки
quote	цитата

R

ramp up	нарощувати обсяги
rancher	фермер, господар ранчо
rapidly	різко, швидко
reap	жати, пожинати плоди
recognition	визнання
reference	посилання
reinforce	підсилити
release	випускати, викидати
relevancy	релевантність, актуальність
relevant	актуальний, важливий
reliable	надійний
reluctance	небажання

rely on	покладатись на
remarkable	видатний, дивовижний
remotely	віддалено
replicate	копіювати
research facility	дослідницька лабораторія
research paper	науково-дослідна робота
resilience	стійкість
resistant	стійкий
resolution	роздільна здатність екрану
respond	відповідати
result	результат
retail	роздріб
reusable	придатний для повторного використання
RFID	технологія радіочастотної ідентифікації
rich in	з великим вмістом
robotics	робототехніка
robust	стійкий, надійний в експлуатації
Romanesco	цвітна капуста Романеско
run dry	пересихати
rye grass	райграс пасовищний, пажитниця

S

sapling	пагін, паросток; відсадок; молоде деревце
satisfaction	задоволення
savings	економія

scale	масштаби
scarce	рідкий
scatterplot	діаграма розкиду
search engine	пошукова система
seaweed	водорості
severe	суворий, сильний
shade	тінь
shed	сарай
shift	зміна
ship	перевозити, відправляти
shoreline	берегова лінія, узбережжя
shortages	нестача
significance	значення, значущість
significant	значний, суттєвий
silo thinking	бункерний менталітет
slideshow	слайд –шоу
slightly	злегка, трохи
smallholder farmer	дрібний фермер
small-scale	маломасштабний
soil depletion	збіднення, виснаження ґрунту
sophisticated	складний, вишуканий
source	джерело
soybeans	соєві боби
species extinction	вимирання видів
spray	обприскувати
spring	джерело (водне)
stable	стабільний
stack	складати стовпчиком

staff	персонал, штат
stakeholders	стейкхолдер, партнер, зацікавлена особа
start out	починати
strain	напруження, навантаження
stream bed	річище
strengths	сильні сторони
sturdy	міцний, стійкий
suffer from	страждати від
suffering	страждання
surplus produce	надлишкова продукція
survey	дослідження, опитування
survive	вижити
sustainable development	сталий розвиток
synergy	синергізм, спільні зусилля

T

tackle	вирішити питання, впоратись
target	мішень, ціль
target market	цільовий ризик, обраний сегмент ринку
technological breakthrough	технологічний прорив
telematics	передача комп'ютеризованих даних (за телефонними і под. мережами)
template	шаблон
terabyte	терабайт
the odds	вірогідність, ймовірність

the world's your oyster	весь світ біля твоїх ніг
threaten	загрожувати
threat	загроза
thrive	процвітати
thriving	процвітаючий
tight	щільний
timber	пиломатеріал, деревина
title	назва, заголовок
to have an ear towards something	мати хист, здібності до
to reinvent the wheel	вдруге винаходити колесо
tolerate	терпіти, зносити
tools	знаряддя
top priority	найпріоритетніший, першорядної ваги
trader	торговець, біржовий маклер
trading position	рівень продажів
transpire	випаровуватись
trap	захоплювати, уловлювати
tremendous	величезний, приголомшливий
trial plot	майданчик для випробувань
trials	випробування
trough	корито, годівниця
truncation symbol	символ усічення

U

unanimously	одностайно
under pressure	під тиском

undernourishment	недоїдання, недостатнє харчування
uneven	нерівномірний
unpredictable	непередбачуваний
untether	звільнити
urban farming	міське фермерство

V

validate	обґрунтувати
valuable	цінний
value	значення
value chain	виробничо-збутова кооперація
vapourware	новий товар, який ще недоступний для купівлі
vehicle	транспортний засіб
Venn chart	діаграма Венна
viable	життєздатний, життєвий
violation	порушення
vital	життєво важливий

W

wages	заробітна плата
warehouse	склад
waste	марнувати
waste disposal	прибирання відходів
water contamination	забруднення води
water management	використання водних ресурсів
waterway	водний шлях

weaknesses	слабкі сторони
wear all the hats	виконувати всі обов'язки одноосібно
web of life	павутиння життя
weed	бур'ян, знищувати бур'ян
wetland	болото
white space	невикористані радіочастоти
wholesaling	оптова торгівля
wildcard character	символ підстановки
windbreaker	захисна лісосмуга
windfall profit	неочікуваний прибуток

Y

yield	урожай
youth unemployment	безробіття серед молоді

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