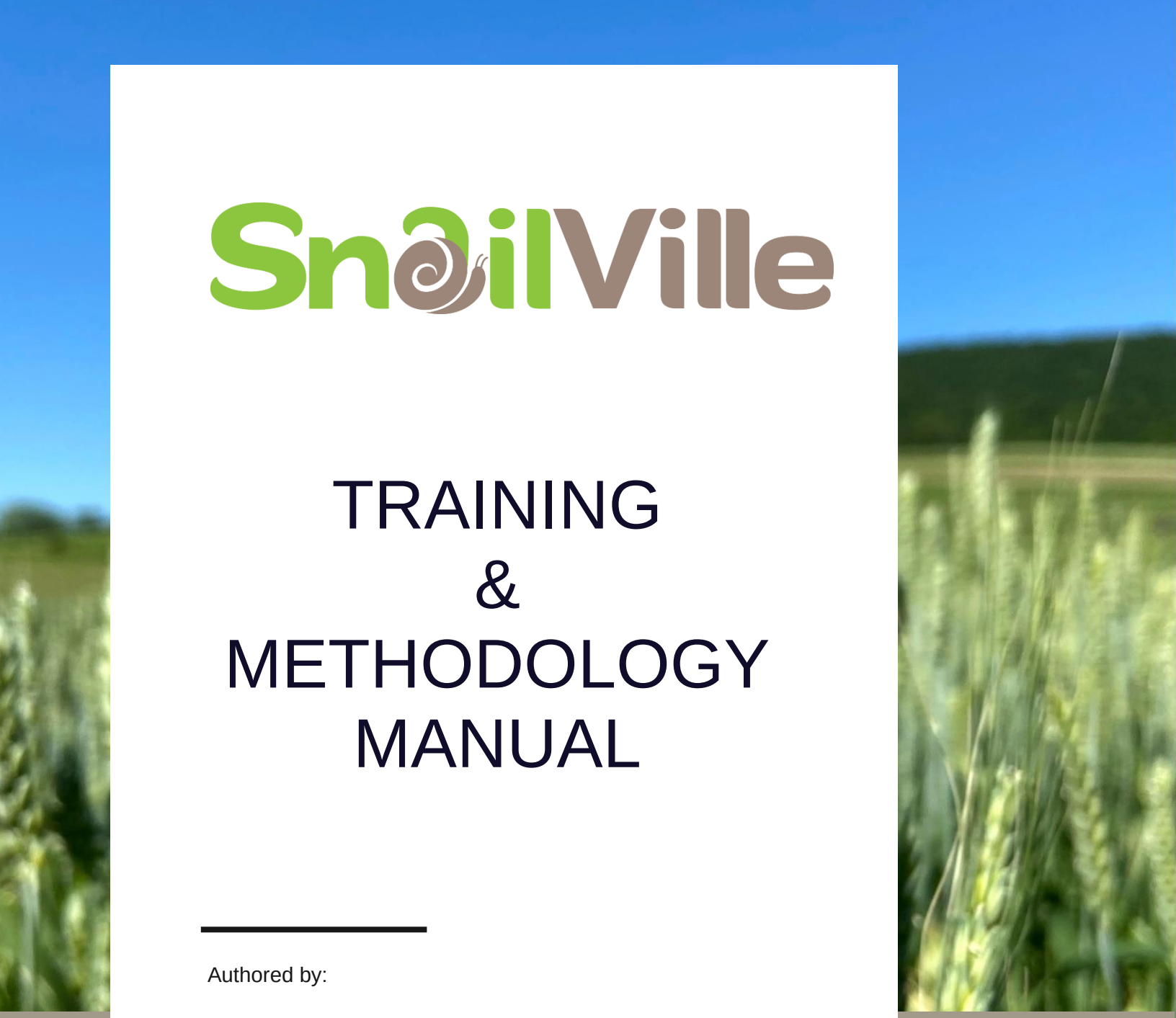

TRAINING & METHODOLOGY MANUAL

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Project Number: **2020-1-UK01-KA204-079017**

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REVISION HISTORY

Version	Date	Author	Description	Action	Pages
V1	October 2021	Snailville Consortium	Drafting the modules		
V2	November 2021	Snailville Consortium	Modules		
Final	June 2022	Snailville Consortium	A single document		

(*) Action: C = Creation, I = Insert, U = Update, R = Replace, D = Delete

REFERENCED DOCUMENTS

ID	Reference		Title
1	2020-1-UK01-KA204-079017		SnailVille Proposal
2			

Contents

Module I: Educational Game

Deliverable: A4

SnailVille

AKNOW
Project Number: **2020-1-UK01-KA204-079017**

Co-funded by the Erasmus+ Programme of the European Union

1. Introduction

1.1 Description

This module will familiarize learners with the benefits of using (online) games to learn and improve their skills. Through comparative literature and case studies, learners will understand why and how educational (serious) games can be a valuable and easily accessible tool for everyone.

1.2 Duration

4 hours

1.3 Aim

Within this module, you will learn:

- To appreciate the value of educational games
- To understand how knowledge can be acquired and retained via serious games and immersive technology
- To welcome experimentation in education
- To reduce resistance to change

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
Benefits of the gaming approach	Theoretical understanding of benefits in education	Open-mindedness
Game types, multimodality	Basic cognitive skills required to understand game categorisation	Embracing change, desire to constantly evolve
Maximizing learning through collaboration and/or competition	Cognitive, practical and social/emotional skills required for interacting with peers	Increased sense of connectedness and social well-being

2. Main content

2.1 Learn about [EDUCATIONAL GAME]

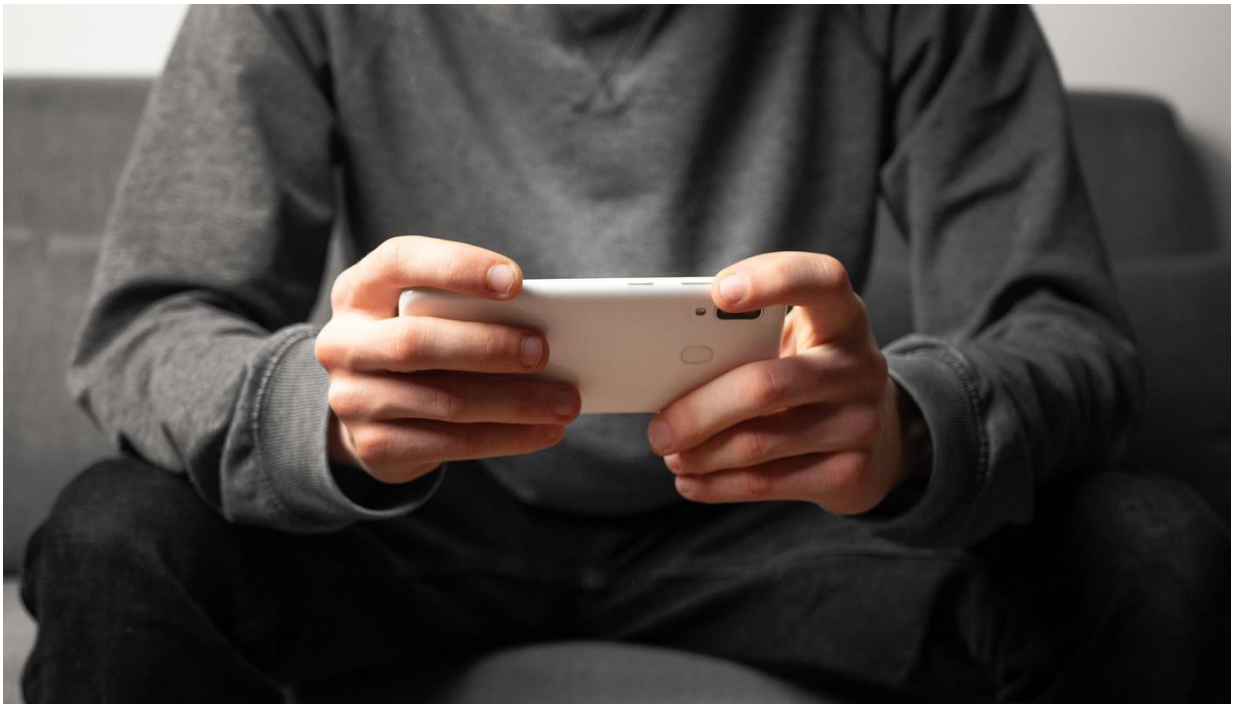

Image title: Mobile-Phone
Source: pixabay.com

Educational games are increasingly popular in the domains of online learning and adult training. While traditional games aim solely at entertaining, educational (serious) games have another, practical dimension: that of teaching and/or improving users' skills. Comparative literature in this domain suggests that there are numerous benefits in using games for knowledge and upskilling in different contexts.

Serious games differ from traditional games in that they have "a serious outcome": they are games that "allow people to learn" (Growth Engineering, 2019, 00:23', 00:36'). there exist several differentiations in serious games' *classification*, but this is mainly a matter of *marketing* (Laamarti et al., 2014, p.3). The main factor to consider here is that serious games combine recreation with practical advantages, namely enhancing knowledge and/or upskilling. While the entertainment dimension is not lacking, serious games are primarily designed for education or training.

As such, they seek to "enhance the user's experience through multimodal interaction" *in different contexts or interpersonal communication* via the inclusion of different media -e.g. *graphics, animations, audio, haptics*, etc. (Laamarti et al., 2014, p.3). New technology allows gaming to serve

educational purposes in various domains, such as knowledge acquisition, training, health care, and many more (Laamarti et al., 2014, p. 5). In a context where learners are more interactive and more engaged, the learning process is facilitated and motivation to learn is enhanced (Laamarti et al., 2014, p. 6).

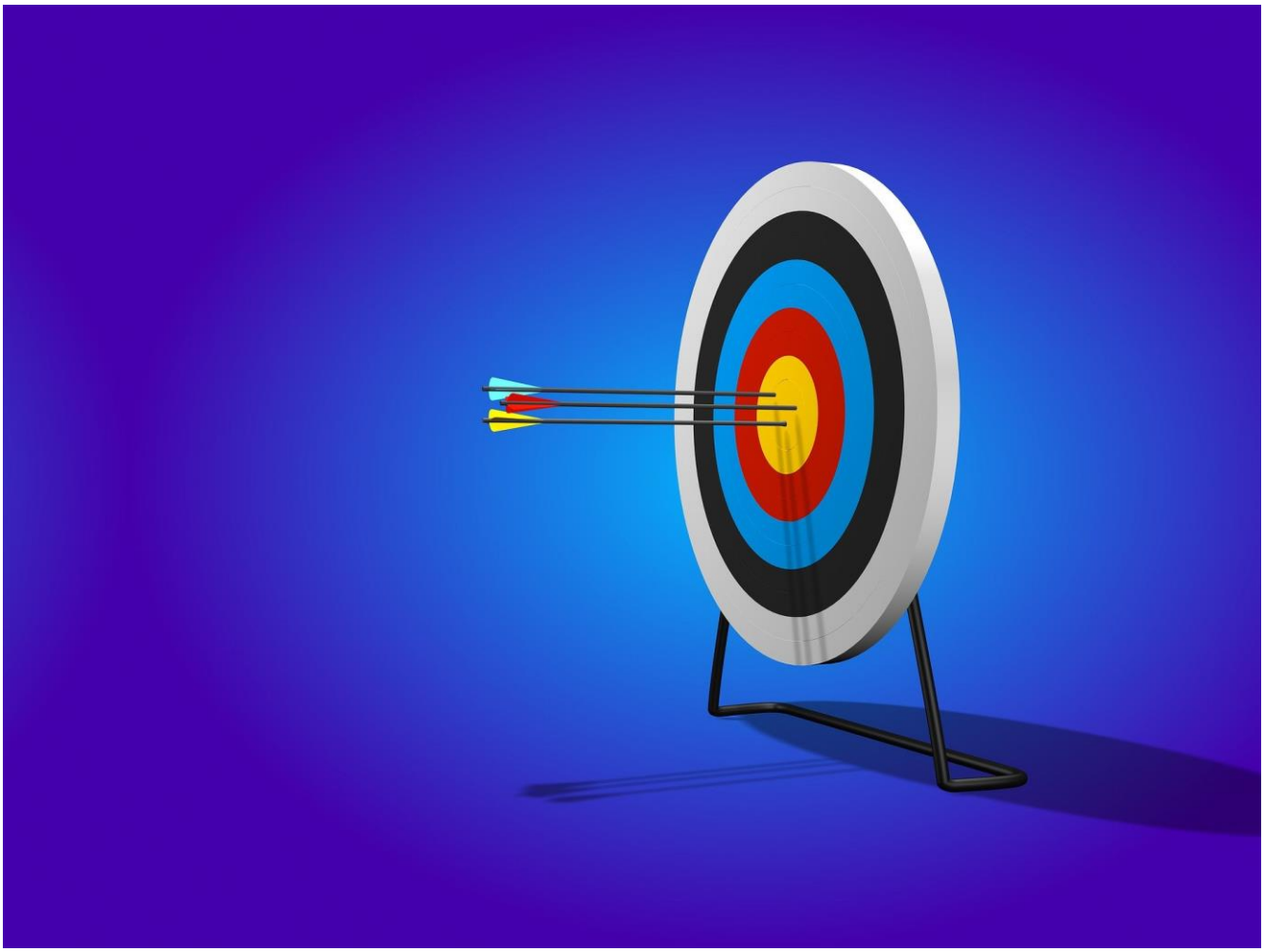

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Image title: laptop
Source: pixabay.com

Motivation is a key element in learning environments. Research shows that adult learners, in particular, are “highly pragmatic” and their needs include clearly stated goals and instructions which can be immediately implemented in life or at work: “They purposefully engage in learning situations to meet a goal, to achieve competence” (Bixler, 2006, p.3). Games allow learners to be in charge of their learning process, thus meeting both the inherent adult desire to be in control of things and the desire to grow and evolve. Gamification succeeds in including various features that increase motivational learning outcomes. Elements like *game fiction* and *social interaction*, as well as the effect of *competition* and *collaboration,* make gamification increase ambition, motivation, and engagement and *maximize learning* (Sailer and Homner, 2019, Faiella & Ricciardi, 2015). Subsequently, serious games have the potential to positively affect the development of various skills in adults, such as language acquisition, strategic thinking, and many more (Susi et al., 2007).

The great variety and possibilities offered by new technologies have facilitated the emergence of a multitude of serious games that can be classified based on several different parameters (Breuer & Bente, 2010, p.19). As a result, this kind of learning environment can be considered more inclusive than traditional ones, as well as more appealing to wider audiences.

Label/Tag Category	Exemplary Labels
1. Platform	Personal Computer, Sony PlayStation 3, Nintendo Wii, Mobile Phone
2. Subject Matter	World War II, Sustainable development, Physics, Shakespeare's works
3. Learning Goals	Language skills, historical facts, environmental awareness
4. Learning Principles	Rote memorization, exploration, observational learning, trial and error, conditioning
5. Target audience	High school children, nurses, law students, general public, pre-schoolers, military recruits
6. Interaction mode(s)	Multiplayer, Co-Tutoring, single player, massively multiplayer, tutoring agents
7. Application area	Academic education, private use, professional training
8. Controls/Interfaces	Gamepad controlled, mouse & keyboard, Wii balance board
9. Common gaming labels	Puzzle, action, role-play, simulation, card game, quiz

Table 1: Label/tag categories for classifying serious games

(Table taken from: Breuer & Bente, 2010, p.19).

Image title: training
Source: pixabay.com

2.2 Good practices & Pitfalls to avoid

For serious games to be adopted by larger audiences, certain conditions must be met, all the while preserving “a balance between the fun element and the main purpose of the game which is obviously not entertainment” (Laamarti et al., 2014, p. 12):

1) The end users’ experience must be fully understood with the scope to develop the proper user-centred software
2) Multimodality must be incorporated, but without distracting the players too much
3) The development of new forms of social communication must be focused on social well-being and a sense of connectedness
4) Games must be designed to adapt to the diversity of their players (needs, interests, capabilities, etc.)
5) The game evaluation must be standardised, so as to measure effectiveness and increase the game’s credibility
6) Game worlds can be fully functional with sensory-based simulations

In a nutshell, games can be appreciated as appealing if:

- they *capture and sustain the learner’s attention,*
- if their instructions and goals seem relevant and important to the learner’s needs,

- if the offered experience provides both a challenge and a point of reference, all the while allowing the learner to control the learning process,
- if the fantasy world that they represent enhances satisfaction and self-esteem, as well as offers the sense of pertinence with own experiences -past or present (Bixler, 2006, pp.16-17).

2.3 Success stories, case studies, examples & more…

Cultural heritage: Comparative research has shown that *immersive technology* (virtual environments/ augmented reality) is highly beneficial when used for *cultural heritage* educational purposes: simulation and strategy games like *Building Detroit* and *The Battle of Waterloo* respectively, trivia and puzzle games like *My Culture Quest* and *Travel in Europe*, or adventure games like the 3D *Icura*, are all valid examples of games that successfully raise historical and cultural awareness (Mortara et al., 2014, pp.318-325).

Healthcare sector: "Pulse!!"

A simulation of an emergency ward in a hospital, *Pulse!!* is a video game that can help nurses train in lifelike and challenging situations. Here, the players' goal is to identify medical problems, make triage decisions and prioritize tasks, as well as choose the appropriate solution/treatment for each patient.
https://www.youtube.com/watch?v=NxwUMs4VCag

Language application: "Duolingo"

Duolingo offers a reward system for learning languages (English, French, Spanish, German): players gather points and go up to the next levels or suffer the consequences for failed attempts. Free and increasingly popular, this game is not as "serious" as the previous ones described; however, it has proven to be highly effective in learning outcomes.
https://www.duolingo.com

2.4 Further reading

https://www.growthengineering.co.uk/10-serious-games-that-changed-the-world/

https://www.youtube.com/watch?v=JmG3fdptY_k "What are Serious Games"

https://www.game-learn.com/en/resources/blog/all-you-need-to-know-serious-games-game-based-learning-examples/

3. Assessment

3.1 Multiple choice questions

1. Serious games can:

   - Answer A Increase engagement and motivation
   - Answer B Confuse and distract players
   - Answer C Hinder profound reflection

2. Serious games:

   - Answer A Simulate irrelevant situations
   - Answer B Facilitate real and safe practice
   - Answer C Decrease retention of information

3. Educational games aim primarily at:

   - Answer A Entertaining
   - Answer B Increasing ambition
   - Answer C Transmitting knowledge and/or improving one's skills

4. In serious games:

   - Answer A Players are in charge of their own learning process
   - Answer B Designers control the players' learning process
   - Answer C A remote teacher controls the learning process

5. Serious games can be classified based on:

   - Answer A Whether they are free or not
   - Answer B The extend of knowledge that they offer
   - Answer C Several parameters (e.g. platform, goals, audience, etc.)

3.2 True/False questions

1. To maximize learning, you need to erase the social interaction dimension.

   - True
   - False

2. Game fiction reduces players' engagement.

   - ☐ True
   - ☐ False

3. Different media can be combined and offer a successful multimodal interaction.

   - ☐ True
   - ☐ False

4. You can combine recreation with practical advantages.

   - ☐ True
   - ☐ False

5. Motivation is irrelevant in learning environments.

   - ☐ True
   - ☐ False

3.3 Assignment

Add a real-life scenario that will work as an exercise to your readers. It can be an essay or anything that can make them think and practice their knowledge themselves.

Your company needs a boost of morale: the staff lacks bonding activities, they feel unmotivated, they are not particularly creative in strategic decisions, and managers lack certain leadership skills. Would a serious game offer anything in solution?

Indicators for correct answers

Multiple choice questions

Question 1: A
Question 2: B
Question 3: C
Question 4: A
Question 5: C

True/False questions

Question 1: False
Question 2: False
Question 3: True
Question 4: True
Question 5: False

Assignment

Write an indicative answer to your scenario.

Yes, there exist serious games that help you practice leadership skills and empathy. Through a game of that sort, you may practice motivating and rewarding your colleagues, resolving conflicts, delegating tasks, etc.

4. References

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Module II : Morphology, anatomy and physiology of land snails

Deriverable: A4

SnailVille

University of Thessaly

Project Number: **2020-1-UK01-KA204-079017**

Co-funded by the Erasmus+ Programme of the European Union

1. Introduction

1.1 Description

The module is about basic knowledge of morphological and anatomical features of snails and physiological processes in their body. An understanding of snail body structure and function is a key tothe successful snail farming because the snail farmer is able to follow practices which are completely focused on snails' needs.

1.2 Duration

The estimated duration of completing this module is 4 hours.

1.3 Aim

Within this module, you will learn:

- The morphological characteristics of land snails
- The anatomical features of land snails
- The physiological functions of land snails

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
Morphological characteristicsof land snails	Understand and recognize the morphological features of snails	Comprehension of life cycle stages of snails Manage growth, reproduction, feeding and hibernation of snails
Anatomy of land snails	Understand and recognize theanatomical traits of snails	Comprehension of life cycle stages of snails Manage growth, reproduction, feeding and hibernation of snails
Physiology of land snails	Understand the physiological functions	Comprehension of life cycle stages of snails Manage growth, reproduction, feeding and hibernation of snails

2. Main content

2.1 Learn about morphology, anatomy and physiology of landsnails

Land snail is the common name for **terrestrial gastropod mollusks** that have shells. A part of a snail's **soft body** can be seen extended outside of **the shell.** when the snail is crawling around. This body part is flattened at the belly side (ventrally) to form **a flat sole** and mainly is used for locomotion (called **the foot)** (Figure 1). The snails of land and sea are **gastropods.** meaning “stomach footed” because there is usually a coiled shell containing the viscera which is carried above a slug-like foot. Mollusks are among the most successful of all animals and are second only to insects in numbers ofspecies. Land snails is one of the most successful animal groups on the earth According to the lateststate of scientific knowledge, the group is said to count about 25,000 species worldwide. Numerousspecial adaptations (**morphological**, **physiological**, and **behavioral**) on have made this possible for snails. These adaptations help in saving water and in breathing air while they also concern the sensoryorgans and the reproductive system. The majority of land snails are **pulmonates** that have a “lung” and breathe air.

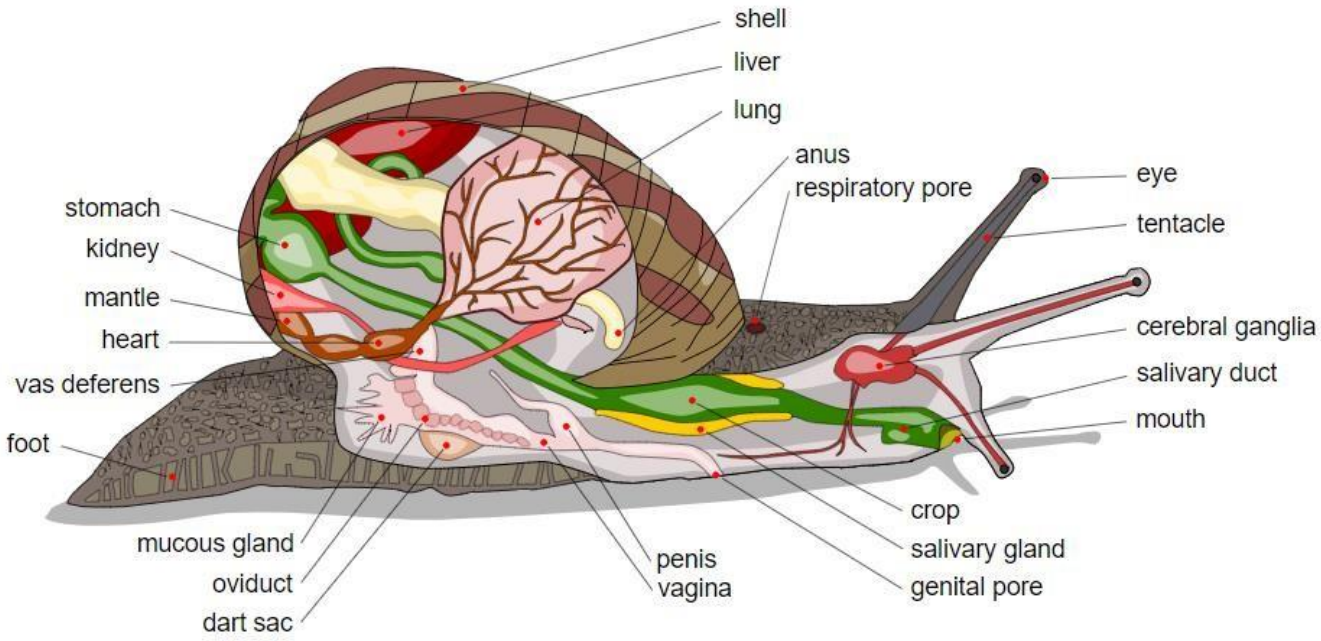


Figure 1. *The morphological and anatomical characteristics of snail (https://en.wikipedia.org/wiki/Land_snail#/media/File:Snail_diagram-en_edit1.svg)*

Shell

The snail's **shell** (Figure 2) protects its internal organs, prevent water loss, provide shelter from cold, and protection from predators. It is secreted by glands in its **mantle** rim and consists of three layers: the hypostracum - the innermost layer, closest to the snail's body, the ostracum – the middle, shell building layer and the periostracum – the outermost layer. The hypostracum grows layer by layer, is thicker in some areas and thinner in some others. The inner shell is almost exclusively made of crystals of **calcium carbonate** called aragonite (95-99% by weight), packed together by conchiolin. The remaining 1-5% is made of organic macromolecules which play an important role in the crystal morphology and mechanical properties. The ostracum consists of prism-shaped calcium carbonate crystals and organic molecules. The ostracum and the periostracum are secreted by a marginal band of cells, so that the shell grows at its outer edge.

Figure 2. Shell of the farmed snail Cornu aspersum maximum (common name gros gris)

Body

Snails (like all molluscs) have a **mantle**, a specialized layer of tissue which covers all the internal organs as they are grouped together in the **visceral mass**. The mantle is attached to the shell and makes shell growth possible by secretion.

The soft body is divisible into a head–foot mass and a visceral mass. The head–foot is concerned with sensory and locomotor activities and is protruded from the protective shell during movement and feeding.

Central nerve system is most concentrated in the head –foot mass due to concentration of sensual organs at the snail's head. Here ganglia are located (cerebral ganglia) and from here pairs of nerves stretch through the rest of the body.

Land snails possess **two pairs of tentacles** on the head, the cephalic tentacles with an **eye**

at the apex of each, and inferior tentacles on the anterior face of the snout below the cephalic tentacles. **Vision** is not an important sense in snails because they are active mostly at night. There are **olfactory organs** located at the tips of each of the four tentacles. The **statocysts** sense the direction of gravity and probably play a role in such behaviors as righting, vertical migrations after rainfalls and burrowing. It has also been reported that the statocyst receptor cells respond to low-frequency vibrations, for example of the substrate on which the animals crawl.

The term integument (body wall or skin) is used to designate the tissues that make up the external form of snails. The integument of **the head–foot** is thick and with a reticulated, rugose surface pattern. The body wall is composed of an epithelium, muscle tissue and collagenous connective tissue. The epithelium has large secretory cells (mucous cells and calciferous cells).

The **body wall functions** in protection, respiratory exchange, water flux and ion regulation. Perhaps the most conspicuous property of the gastropod body wall is its facility to produce copious amounts of **mucus** and proteineous fluid. Muscle cells are innervated and, through integrated contraction patterns operating in conjunction with the haemocoelic fluid, serve as the animal's **hydrostatic skeleton**. Locomotion is by multiple direct pedal waves and the muscles of the sole are involved in locomotion through the generation of pedal waves.

Pallial organs

In snails, the **nephridium** is on the left side of the pallial cavity, is triangular in shape and its base shares a common wall with the visceral cavity, where it runs along the periaortic intestinal bend. The pericardium is applied to its left side and is prolonged towards the pallial border by the pulmonary venous system and towards the visceral cavity, outside the pallial cavity, by the aorta.

In land snails, respiration takes place in the pallial cavity (also called respiratory cavity). This is the primary site of respiratory gas exchange. The contractile pneumostome (respiratory pore), opens and the diaphragm (the floor of the pallial cavity) contracts to dilate the pallial cavity and draw air in.

Closure of the pneumostome and relaxation of the diaphragm produce a positive pressure

inside the cavity, facilitating gaseous exchange across the venous network on the pallial cavity roof. The pneumostome again opens to initiate repetition of the cycle.

Land snails have been shown to have remarkable physiological tolerance of the considerable variation in **body water content** that can occur during daily activity cycles and during dry and warm periods. The contractile **pneumostome** which reduces the extent to which the pallial cavity is exposed to the evaporative demands of the ambient environment, has been central to this. Most snails can **aestivate** over dry and warm periods, with the animal retracted into the shell and the shell aperture sealed with one or more **epiphragms** or cemented to the substrate. Snails can rehydrate rapidly by uptake of water through the integument, by drinking and through feeding.

The main body cavity of snails is the **haemocoel** which is filled with **haemolymph (blood)** returned from outlying venous sinuses. The **vascular system is open**, with the heart receiving haemolymph from the veins of the pallial region and pumping it to the various organs of the body. From the heart, the haemolymph passes to large arteries which branch to form increasingly smaller arteries. The ultimate ramifications of the arteries, the capillaries, invest the various organs. From the organs, the haemolymph passes to haemocoel and lacunae and thence to large veins and reaches the pallial cavity to enter the auricle(s). The respiratory pigment is **haemocyanin** (blue when oxygenized and colorless when deoxygenized). The haemolymph also contains several kinds of **blood cells**. Snails lack a specialized haemopoietic organ, and blood cell formation occurs within the connective tissue and vascular system. Their blood cells are usually classified into two types, namely spreading amoebocytes (macrophage-like) and round cells (lymphocyte-like). The main functions of blood cells are cellular defense (phagocytosis and encapsulation) and tissue repair.

Structure and function of the digestive system

The digestive system comprises the alimentary canal and its associated parts: buccal mass, salivary glands, oesophagus, gastric pouch or stomach, digestive gland, intestine, rectum, and anus. The buccal mass, located at the animal anterior, functions primarily in the ingestion of food.

The ventrally located mouth, which is surrounded by lips richly supplied with sensory cells, opens to the buccal cavity via a short oral tube. The buccal cavity houses the jaw, and the odontophore with overlying radula, and communicates dorsally with the oesophagus. Two salivary glands lie adjacent to the oesophagus. The odontophore and overlying radula protrude into the buccal cavity from the posterior. The **digestive gland** (also known as hepatopancreas and **liver**) is the largest organ in the snail body. It consists of two lobes communicating with the gastric pouch via large ducts. The digestive gland is concerned with production of digestive enzymes, absorption of nutrients, endocytosis of food substances, food storage, and excretion. The intestine is a thin-walled tube of uniform diameter, which makes, firstly, one forwardly directed loop, then one posteriorly directed loop, before again turning forward and running to the anus as the rectum.

From the functional perspective, the digestive system of snails can be divided into regions with roles in: (i) reception, conduction, and storage of food; (ii) digestion and absorption of nutrients; and (iii) formation of faeces.

Structure and function of the reproductive organs

The land snails are **hermaphrodites**. The hermaphroditic snails possess male and female, as well as hermaphroditic organs in one common **genital apparatus**. The reproductive system is complex with the common **genital orifice** opening on the right side.

Some primary functions are: (i) production of sperm and ova; (ii) storage and transport of mature gametes (iii) structural and physiological roles in the courtship (iv) transference of endogenous sperm to the partner's reproductive ducts (v) reception of exogenous sperm (vi) supplying a site and proper medium for fertilization of ova; (vii) covering the zygote with nutritive and protective layers and (viii) oviposition.

The **gonad**, typically embedded in the upper lobe of the digestive gland, produces both oocytes and spermatozoa. While male and female gametes may be produced simultaneously, there is often a degree of protandry. The **albumen gland** increases in size with sexual maturation of the animal.

The main component of the albumen gland secretion has been shown to be galactogen, a highly branched polysaccharide and protein elements, glycosaminoglycans.

The **embryonic development** of the young then takes place in the egg after **internal fertilisation** and **oviposition**. From the egg, complete young snails hatch, which have a complete set of organs and a shell. The **eggs** (Figure 3) form a mass protected from desiccation by mucus. Often the eggs are produced with a calcified shell, although the shell is often itself surrounded by a jelly-like, mucopolysaccharide layer of the egg capsule. Ground-dwelling species generally deposited their eggs on the soil surface or in a little hole in the soil. They need almost two weeks at 20 ^{o}C to hatch.

Figure 1. *Snail eggs in the soil*

2.2 Good practices & Pitfalls to avoid

Deep understanding of morphology, anatomy and physiology of land snails can lead to good breeding practices.

- ✓ **Shell characters** usually at least roughly allow the determination of a snail's species. A more accurate identification sometimes makes necessary a scientific anatomical examination of the snail's body by a specialist. Especially the characters of its genital apparatus are helpful

for determination purposes, as this part of the body is different between even the most closely related snail species.

- ✓ The **outer lip of the shell** may be either thin in species with indeterminate growth, or variously thickened and sometimes turned back or reflected in species with determinate growth.
- ✓ Blood cells are generally thought to play a role in **shell repair** by transporting calcium and organic shell matrix substances from the digestive gland to the sites of damage.
- ✓ The **love dart** comprises a bladed, usually hollow spicule of calcium carbonate. The dart is pushed out rapidly to pierce the flesh of the partner. The dart is never propelled through the air but is torn from the dart sac on becoming lodged in the partner's tissues. The dart of helicoidean species is lost during courship, so that the dart-sac epithelium must renew the dart if this structure is to feature in subsequent courtship. In Cornu aspersum, this dart renewal takes 5–7 days.

2.3 Success stories, case studies, examples & more…

The knowledge of biology of land snails is a crucial parameter of successful snail farming.

2.4 Further reading

AnimalBase, Available at: http://www.animalbase.uni-goettingen.de/zooweb/servlet/AnimalBase/search

Man and Mollusc's Data Base of Edible Molluscs. Available at: http://www.manandmollusc.net/molluscan_food_files/molluscan_food_terrestrial.html

The Living World of Molluscs. Available at: www.molluscs.at

3. Assessment

3.1 Multiple choice questions

1. The pairs of tentacles on the head of snails are:

□ one
□ two
□ three

2. The blood cell formations occurs:

□ within connective tissue and vascular system
□ only in vascular system
□ in the haemopoietic organ

3. The main body cavity of snails is the

□ haemocoel
□ mantle
□ gonad

4. Hatching of eggs lasts:

□ two days
□ two weeks
□ two months

5. The largest organ of snail body is:

□ hepatopancreas
□ oesophagus
□ stomach

3.1.2 True/False questions

1. The vascular system in snails is open and haemolymph works as blood:

□ True
□ False

2. Snails are hermaphrodites:

□ True
□ False

3. The statocysts sense the direction of hearing:

☐ True
☐ False

4. During aestivation, aperture remains open:

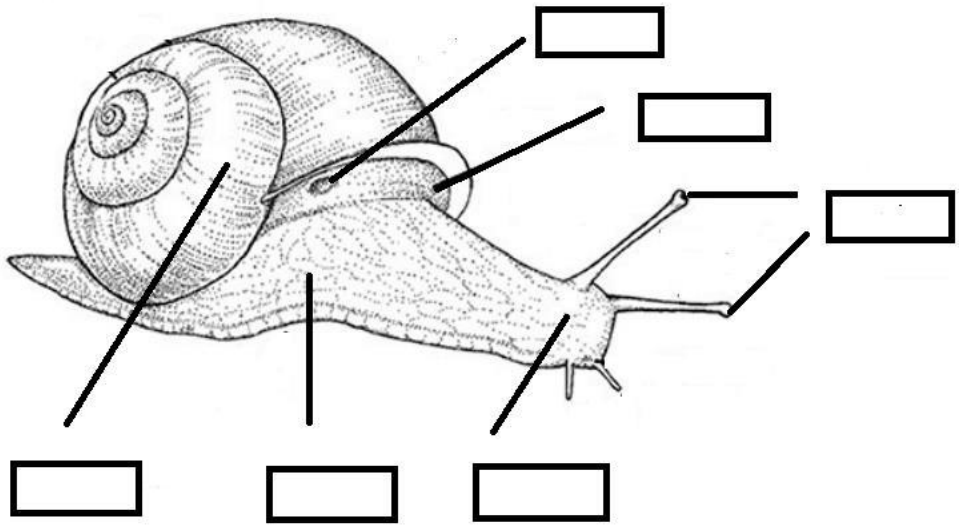
☐ True
☐ False

5. Snails are ovoviviparous:

☐ True
☐ False

3.2 Assignment

Based on the aforementioned information, observe in live snails their morphological and anatomical characteristics and then try to observe them in the picture below and fill in the boxes with the terms: **foot, head, shell, eyes, pneumostome and mantle.**



Indicators for correct answers

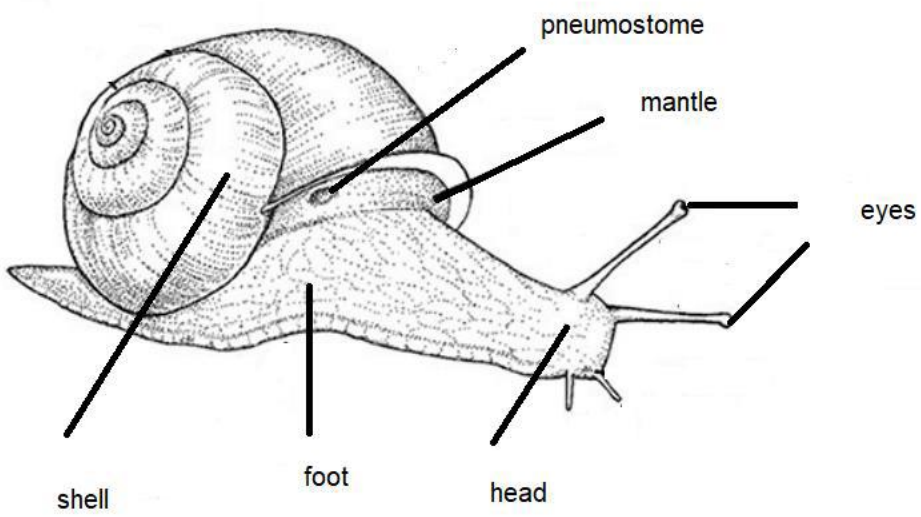
Multiple choice questions

Question 1: two
Question 2: within connective tissue and vascular system
Question 3: haemocoel
Question 4: two weeks
Question 5: hepatopancreas

3.3 True/False questions

Question 1: True
Question 2: True
Question 3: False
Question 4: False
Question 5: True

ASSIGNEMENT



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Module III: Where to Rear Snails

Deliverable: A4

SnailVille

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Project Number: **2020-1-UK01-KA204-079017**

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1. Introduction

1.1 Description

The module is about categories of snail farming systems. These systems can be held in open field farms or covered constructions of different types. Every farmer has equipment such as sprinkler to maintain the required humidity, temperature and humidity sensors for recording of climatic conditions and wooden shelter for snail's protection.

1.2 Duration

The estimated duration of completing this module is 4 hours.

1.3 Aim

Within this module, you will learn:

- The snail farming systems
- The facilities and equipment that is needed for snail breeding
- Preparing the farm for the beginning of the breeding cycle

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
Snail farming systems	Understand and recognize the snail farming systems	Ability to distinguish the farming systems. Comprehension of farm preparation for the beginning of the breeding cycle
Facilities and equipment	Learning the facilities and equipment needed for breeding cycle and understand their use in snail farming	Ability to distinguish the farming systems. Comprehension of farm preparation for the beginning of the breeding cycle
Preparations for the breeding cycle	Learning the preparations that are needed in order the breeding cycle to be successful	Ability to distinguish the farming systems. Comprehension of farm preparation for the beginning of the breeding cycle

2. Main content

2.1 Learn about farming systems, where snails are reared

Snail farming systems

Heliciculture exhibits a variety of classification schemes from extensive of small demand, to intensive of high producing and investing farms.

Snail farming systems can be held in open field farms or covered constructions of different types. Apart from the two aforementioned systems, there are recorded three other categories of farming systems:

- Mixed system with open field
- Mixed system with net covered greenhouse
- Elevated sections

Open Field

Open field farming system (Figure 1) is the oldest breeding system in snail farming.

In the open system farm all breeding stages (reproduction, egg hatching and brood fattening) take place in a fenced field where plants are grown, under natural climatic conditions.

The farm is surrounded by a sieve and is divided into smaller sections. The sieve is made of non-toxic polyethylene. To prevent the snails from escaping, it has two protrusions (same material as the sieve).

Inside there are broadleaf suitable plants (cabbage lettuce) and wooden shelters are placed. The plastic feeder is placed underneath so that it does not come into direct contact with water. Snails can be fed systematically or occasionally with these plants, which are either cultivated by the producer or procured commercially. The water spray to maintain the required humidity is done with a mist system (Injector).

The structure of the soil should be medium to light and friable. Clay soil is unsuitable for egg laying as it can become waterlogged. Good soil drainage is necessary so that water does not remain on the ground in puddles. It is important that plants and snails are kept moist by the night-time.

Figure 1 Open field farm

Net – covered greenhouse

In a net covered greenhouse (Figure 2), the environmental conditions are semi – natural (air temperature, relative humidity), while snails are protected by the shading net. There are divided sections which are separated by net, in which reproduction and fattening take place.

A net-covered greenhouse constitutes a type of modified arched greenhouse. It is constructed with a steel frame, covered with a shading net, with a coverage from 50 to 90%. In perimeter, there is coverage by means of a plate, 80 cm in height and 20 cm in depth, which prevents the entry of rodents and reptiles.

The maintenance of the required humidity is achieved by the cooling system, of high and low pressure in spraying water. The high-pressure system sprays droplets of water (some tens μm in size and 60 bar in pressure), thus allowing the creation of fog, until their total evaporation.

The low-pressure system, on the other hand, sprays droplets of water (200 μm in size and 3 bar in pressure), which mainly fall to the ground and evaporate depending on the environmental conditions.

Figure 2 Inside of net – covered greenhouses

Mixed system with open field

In a mixed system farm with open field, the reproduction of snails and the hatching take place under completely controlled environment in a hatchery (Figure 3). Then gastropods, transported to outdoor parks for fattening (indoor breeding and outdoor fattening).

Mixed system with net covered greenhouse

Breeding in a mixed system farm with net covered greenhouse, consists of 2 stages: a) reproduction and nursery take place in buildings under controlled ambient conditions (hatchery) and b) fattening of brood under semi-natural environment in a net covered greenhouse.

Figure 3 Hatchery of mixed snail farm system

Elevated sections

The snail breeding system in elevated sections applied mainly in Italy and Spain. All stages of production are carried out in elevated units placed in rows on the farm. Reproduction, hatching and fattening of a brood take place under semi – natural environment.

The basic installation is an elongated raised panel box with small width (1.50 m, pic. 1), to ensure the management of snails (Figure 4). The modules are filled with soil and plants that provide a suitable environment for living snails, while the water supply is ensured by simple wetting system.

The basic equipment also includes feed and shelters. The construction is protected with

shading net (50%), which limits the escape of snails and provide protection from predators. There are separate compartments for breeding and fattening of snails. In each section of rearing unit, there were tiles which functioned as shelters and plants.

Figure 4 Elevated Sections

Facilities and equipment

The most usual facilities snail farms have, are:

- Harvest Warehouse
- Hatchery
- Packaging Station
- Cooling chamber

Almost every snail farm has a harvest warehouse. In the warehouse, snails are gradually introduced to resting conditions. They are initially fed with corn flour or bran for several days, in order their

digestive system to clean. Snails remain there until they are sold or transported to packaging stations (Figure 5).

Hatcheries were found only in mixed system farms (Figure 3). Packaging stations and cooling chambers were not present in the minority of the farms.

Figure 5 Harvest warehouse

Also, the main equipment, snail farmers possess are:

- ✓ Fabric for low temperature
- ✓ Shelters (wooden) (Figure 6)

- ✓ Cages
- ✓ Tatters (Figure 7)
- ✓ Egg storage containers
- ✓ Temperature and humidity sensors
- ✓ Sprinklers
- ✓ Packaging materials
- ✓ Agricultural tools

Sprinklers are important in order to maintain the required humidity in the farm, while temperature and humidity sensors record the climatic conditions. Wooden shelters are used for snail's protection. Finally, agricultural tools are used in order to prepare the sections in the farm where the snails are going to breed and fatten.

Figure 6 Wooden shelter

Figure 7 Tatters with compound diet

Preparation for Snail breeding cycle

Before the operation of the farm begins, the breeder carries out agricultural work in the area. Farmers should plow and mill the area every year. Also, the fertilization of the soil is needed, and it is important to open drainage ditches in order the water to leave, in case of damage to the spray system or heavy rainfall. Producers must check the quality of irrigation water. In addition, disinfection of the breeding area should take place before commissioning and herbicides must be sprayed. Finally, rodenticide should perform every year.

Divided sections are constructed inside the farm (Figure 8), around the perimeter of which a low voltage power fence is placed. The electric fence is low voltage (12 - 14 V) and is located at the top of the screen. Then, broadleaf plants are planted (cabbage, lettuce). Wooden shelters and plastic feeders are placed inside.

Soil with the presence of aforementioned cultivated broadleaf plants, gravel and soil is used as a substrate in the farms (Figure 9). Finally, in order to maintain the humidity at the required levels, it is necessary to supply water either from drilling or from a water supply system of each area.

Figure 8 Divided sections with wooden shelters

Figure 9 Substrate with cultivated plants

2.2 Good practices & Pitfalls to avoid

Deep understanding of snail farming systems and their facilities and the preparation of the farm based on valid bibliography can lead to successful snail breeding cycle. Understanding the biology of snails before establishing a snail farm is very important. The good education of a farmer could lead to the comprehension of the behavior of snails, their nutrition and their environmental requirements. Also, training will help a future farmer understand changes in snails and predict health challenges before it becomes a problem.

2.3 Success stories, case studies, examples & more…

The knowledge of snail farming systems and the preparation of breeding cycle is a crucial parameter of successful snail farming.

2.4 Further reading

https://en.wikipedia.org/wiki/Heliciculture
http://www.nal.usda.gov/afsic/AFSIC_pubs/srb96-05.html
http://www.landscapejuice.com/tips and advice/index.html
http://www.minagric.gr/index.php/en/farmer-menu-2/livestock-menu/snail-menu
http://diae.uth.gr/?page_id=434
https://ec.europa.eu/growth/tools-databases/tris/en/search/?trisaction=search.detail&year=2017&num=505

3. Assessment

3.1 Multiple choice questions

1. How many types of snail farming system exists:

□ two
□ four
□ five

2. In the perimeter of net – covered greenhouse, there is coverage by means of a plate, which:

□ prevent the entry of rodents and reptiles
□ assist in supporting of greenhouse
□ divide the sections for breeding and fattening of snails

3. In a mixed system farm with open field after the reproduction, the snails are transported for fattening, to:

□ outdoor parks
□ packaging station
□ hatchery

4. The snails are gradually introduced to resting conditions in a:

□ Packaging station
□ Warehouse
□ Hatchery

5. Wooden shelters are used for:

□ limiting the escape of snails
□ maintaining the humidity at the required levels
□ snail's protection

3.2 True/False questions

1. In the open system farm all breeding stages take place under natural climatic conditions:

□ True
□ False

2. A net-covered greenhouse is covered with a shading net, with a coverage from 50 to 90%:

□ True

□ False

3. In elevated sections breeding and fattening of snails occur in one unit:

□ True
□ False

4. Wooden shelters are used for snail's protection:

□ True
□ False

5. The only substrate found in snail farms is gravel:

□ True
□ False

3.3 Assignment

Someone plans to start breeding snails in a net covered greenhouse. What facilities and equipment does the future farmer need?

Indicators for correct answers

Multiple choice questions

Question 1: five
Question 2: prevent the entry of rodents and reptiles
Question 3: outdoor park
Question 4: warehouse
Question 5: snail's protection

True/False questions

Question 1: True
Question 2: True
Question 3: False
Question 4: True
Question 5: False

Assignment

Breeding in a mixed system farm with net covered greenhouse, consists of reproduction and

nursery take place in buildings under controlled ambient conditions (hatchery), and fattening of brood under semi-natural environment in a net covered greenhouse.

A net-covered greenhouse constitutes a type of modified arched greenhouse. It is constructed with a steel frame, covered with a shading net, with a coverage from 50 to 90%. In perimeter, there is coverage by means of a plate, 80 cm in height and 20 cm in depth, which prevents the entry of rodents and reptiles. The maintenance of the required humidity is achieved by the cooling system, of high and low pressure in spraying water.

The most usual facilities snail farms have, are harvest warehouse, hatchery, packaging station and cooling chamber. Finally, the main equipment of a snail farm includes: fabric for low temperature, wooden shelters, cages, tatters, egg storage containers, temperature and humidity sensors, sprinklers, packaging materials and agricultural tools.

4. References

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Module IV: Snail breeding and reproduction

Deliverable: A4

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Project Number: **2020-1-UK01-KA204-079017**

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1. Introduction

1.2 Description

The module is about basic knowledge of snail breeding and reproduction of snails. A detailed analysis of snail breeders, hatching period, fattening of brood and juvenile snails, is a key to the successful snail farming because the farmer is able to understand the procedures and follow practices which maximize his production.

1.3 Duration

The estimated duration of completing this module is 4 hours.

1.4 Aim

Within this module, you will learn:

- Snail breeding
- Snail reproduction
- Procedures and practices which maximize production.

1.5 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
Snail breeding	Understanding the importance of adequate breeding conditions	Applying snail breeding protocol following good practices and increase of production
Snail reproduction	Proper management of eggs and brood	Applying snail breeding protocol following good practices and increase of production

2. Main content

2.1 Learn about snail breeding and reproduction

Breeding cycle

The duration of a breeding cycle is the time required to complete in natural cycle of the following four stages that take place in the field:

• breeding of snails (mating and laying eggs)

• incubation and hatching of eggs

• fattening of brood

• thickening of snails.

The period during which the snails are bred in the farm, from the moment the breeders are placed for reproduction until the moment of their collection is called: **Rearing Duration.** The duration depends initially on the biological cycle of the farmed snail species (*Cornu aspersum maximum, Cornu aspersum, Helix pomatia, Helix lucorum*). Climate of the area where the snail farm is located and the microclimatic conditions must be taken into account both in the selection of the breeding species and in the selection of the farm system. A very important factor for the success of breeding is the choice of generators.

Also, an important parameter for snail farmer to consider, is the welfare of gastropods. The minimal standards for farm snails (known as the 'five freedoms') are: a) freedom from thirst, hunger and malnutrition b) freedom from discomfort c) freedom from pain, injury and disease d) freedom to express normal behavior e) freedom from fear and distress.

Placing the breeders in the farm

In Southern Europe, breeders (*Cornu aspersum – Cornu aspersum maximum*) are placed in an open snail farm or a net – covered greenhouse in March to April. Adult snails which are intended to be **breeders,** are kept in the farm in a state of artificial hibernation in a chamber. They can also be collected from nature or purchased from another farm. Hibernation is interrupted from January to the end of February depending on the area of the farm and the planning that has been done for the breeding cycle.

Breeders need a period of one (1) or two (2) weeks to adapt to the net – covered greenhouse. An increased mortality is likely to occur during this period.

Reproduction of snails

Reproduction in terrestrial gastropods is characterized by internal fertilization and often complex pre-mating behavior (Figure 1).

Figure 1 Mating of snails

The breeders are placed in reproduction units in the snail farm in April or May in Mediterranean countries. From May to September is the main period during which the reproduction of the brood takes place and the thickening of the snails. During this period, oviposition is observed, while eggs are also incubated and hatched. The reproductive process continues throughout that period and we have constant egg laying while it is observed by the breeders, mainly in the broadleaf plants.

Breeding areas must not be overcrowded because that will cause dwarfism, low weight gain and mortality due to mucus accumulation in the soil. In the snail mucus can be found the pigment-forming bacteria of the genus Pseudomonas (Pseudomonaceae) which are generally the causative agents of yellow fluorescence disease in snails. These bacteria live in the mucus on the body surface, and disease is associated with bacterial invasion of the epidermal mucus cells, the hemolymph and the reproductive tract. The disease is associated with the copious release of yellow fluid and mucoid materials from the body surfaces, which generally results in death of the infected snails within a few days. The rate of survival and recovery of infected gastropods is poor.

In addition, overcrowding favors parasitism in the snail population. The presence of various parasites in terrestrial gastropods have mentioned, such as Nematodes, Platyhelminthes and the micro-arthropods (Mites), which are ectoparasites of snails. Mites or Acari causes anemia, which results in weight loss or even death of the snail.

Laying eggs – Hatching period

Mating is observed from the first days of breeding cycle. During the breeding season, which can last several months, snails mate repeatedly and usually with multiple mates. Repeated mating during a single reproductive season is not unusual in terrestrial gastropods. After a sufficient number of matings, the snail is ready to fertilize and lay its eggs.

Snails lay their eggs in holes they dig in the ground with the help of their foot. For this reason, the soil must have a suitable light texture and enough moisture. The depth depends on the species of snail. For large terrestrial snails of the Helicidae family, such as Helix pomatia or Helix lucorum, the holes in which they lay their eggs reach a depth of 3-5 cm. When the hole is complete, the snail extends the anterior part of the body into it, so that the genital opening from which the eggs will come out at the bottom of the hole before the egg laying begins (Figure 2).

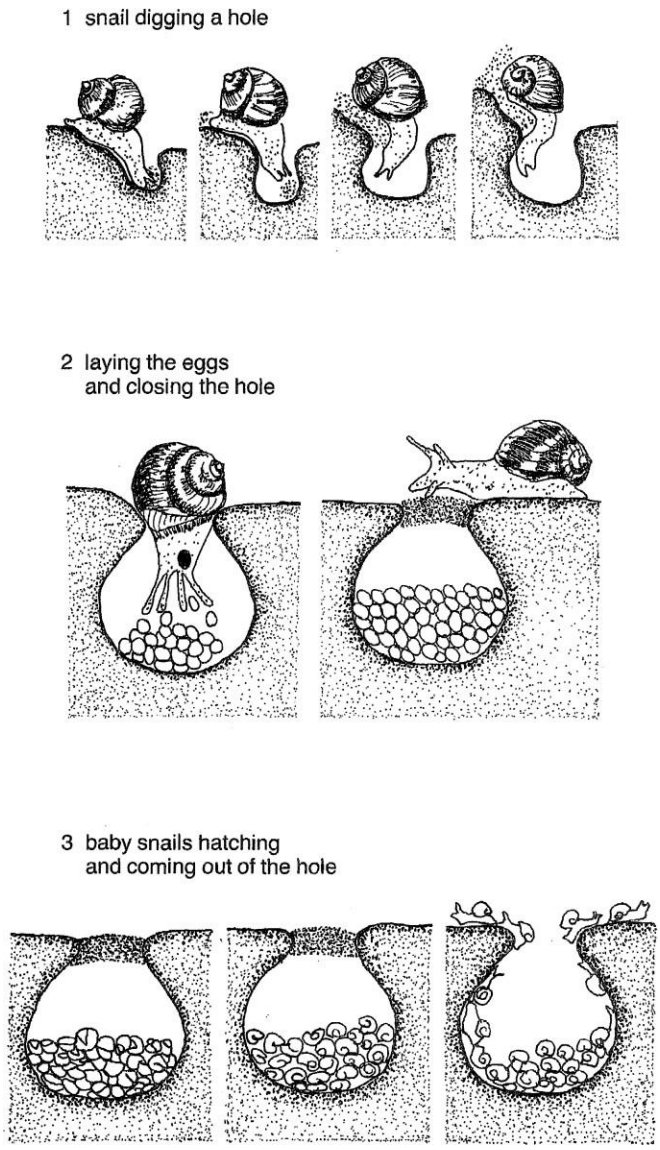


Figure 2 Snail laying eggs ang hatching (Food and Agriculture Organization of the United Nations,FAO, 1986)

The duration of egg laying varies in different species and depends on the number of eggs laid, but in general the process takes a few hours. When the laying of eggs is complete, the snail withdraws its body and crawls over the hole, to close it with soil. Within species, there is often considerable variation

in number and size of egg clutches, regulated by the size and age of the parent animal, but also strongly modified by environmental factors such as intraspecific and interspecific competition, and seasonality in climate.

The laying period lasts 10 to 15 weeks. 63% of egg-laying takes place between the 2nd and 6th week after placing the pots. Beyond that, the egg-laying curve decreases and the mortality increases notably in the breeding animals.

Hatching period lasts from the moment the eggs are born until they hatch. Incubation is completed in 15-30 days and the hatching takes place within 24 hours. The total hatching and post-hatching losses are of the order of 35%.

The time required for the eggs to hatch varies depending on the species but also depending on the temperature and humidity of the environment. In the first days immediately after hatching, the young snails (brood) remain in the ground, where they feed on the remnants of the nutrients present in the egg (Figure 3).

Figure 3 Eggs and new- hatched brood

A conspicuous example is the age-dependent egg cannibalism observed in many gastropods immediately after hatching. Because hatching is often asynchronous, snails that hatch first can also feed their siblings who have not hatched. Cannibalism, which has been studied in several species, is also a selection mechanism, since it has been found that young snails that indulge in cannibalism show larger size and faster growth than their siblings. After a period of 8-10 days in the ground, the young snails appear on the surface of the soil and begin to feed on plants.

After hatching, successive steps (nursery, growth, differentiation and maturation of the genital tract and reproduction) are observed in the terrestrial snail Cornu aspersum, over a 23-week cycle (18 weeks for growth and then reproduction from the 18th to the 23rd week).

Fattening of brood

Fattening of brood take place during months June to November. This stage continues until almost the end of the operation of the farm, when the harvest takes place. However, in intensive and semi-intensive breeding (nets, mixed farms) a large percentage of animals reaches the marketable size from the 5th month of breeding (July). In this case the snail farmer collects these snails for sale and leaves the brood for fattening. About 2% of adult snails are collected for use as breeders for next year.

The brood (Figure 4) is transferred to the snail farms from the beginning of March until July. The productivity of a snail fattening unit depends on the climatic conditions of the area where the unit is installed as well as on the breeding methodology and the management of the snails (introduction of brood at different periods, application of dilutions). The treatment of the brood during transport and the first period of growth is crucial for the survival of the snails. The mortality of snails at this stage is 10%. In addition, amphibians (frogs and salamanders) feed with juvenile snails, so in an open farm system the percentage of mortality is a little higher.

Figure 4
Snails brood

Snail fattening requires a mild climate with moderate temperatures (20-25oC) combined with high humidity (75-95%), although most species can survive a wider range of temperatures. When the temperature drops to 5oC, the snails go into hibernation while in southern Europe, well above 38oC or when the climate is too dry the snails go through aestivation (summer dormancy).

Snails need a moist but not wet environment, and the soil must be drained so that they can grow properly and because snails breathe air and can drown in excessively wet soils. Favorable soil moisture

is the one with 80% retention. During the night, the atmospheric humidity above 80% greatly facilitates the snails in their activity and growth. The night coolness facilitates the motor activity, while during most of the day they hide in the shelters which are usually wooden constructions.

Completion of fattening – Harvest

After the fattening is completed, harvesting of live snails that have reached marketable size takes place mainly in November on all breeding methods. These are also the product of the farm. These snails are dried, packaged and then sold.

During the harvest, only live snails are selected and active snails, which are a sample of a strong organism, should be especially preferred (Figure 5). Harvesting takes time, is done by hand and with special care. During the harvest, the snails that have not completed the growth of the shell are not selected and it remains thin and fragile at its tip. The harvest also concerns the adult snails selected by the farmers to be used as breeders in the next production cycle.

Harvesting of marketable snails of species Cornu aspersum maximum, is gradual and can take up to three months. This is due to the heterogeneity of the growth rate of snails but also to the management of snails during the stages of reproduction and fattening.

In the first year of operation of an open farm system, there is no production and only the breeders that were installed in the spring are collected, which are sold. Usually, the mortality rate of the original brood is high.

Hibernation

The entry into artificial hibernation is done by stopping the feeding and by gradually reducing the temperature so that in a period of 15 -20 days it is reduced to 4-6 ° C. Hibernation can also take place in safe and cool places such as warehouses. The duration of this stage of adults snails (breeders) is 3 months or more.

At this stage there is weight loss and the mortality of snails depends on many factors such as their age, proper handling, proper management before going to sleep.

Figure 5
Harvested snails

2.2 Good practices & Pitfalls to avoid

The snail breeding cycle involves stages which require proper handling in order to successfully raise snails. The rearing process starts with the placement of the breeders in the farm and ends after breeding, hatching of eggs and fattening of the brood with the harvest of marketable snails. Temperature and humidity conditions and also photoperiod play an important role in all the aforementioned stages. Proper handling based on basic knowledge of snail farming will avoid mistakes that will affect the quantity and quality of snail production.

2.3 Success stories, case studies, examples & more…

The successful farmer knows how to put theoretical knowledge about snail farming into practice. Detailed monitoring of all operations and proper planning can guarantee successful snail farming.

2.4 Further reading

http://www.molluscs.at/
https://www.nal.usda.gov/afsic/snails
https://www.snailcoop.eu/
http://www.minagric.gr/index.php/en/farmer-menu-2/livestock-menu/snail-menu

3. Assessment

3.1 Multiple choice questions

1. How the period during which the snails are in the farm, from the moment the breeders are placed for reproduction until the moment of their collection is called:

□ Rearing Duration
□ Fattening
□ Hatching period

2. Which are the factors that regulates the variation in number and size of egg clutches:

□ Size, age of the breeders and climate conditions
□ There is no variation in the same species
□ Feeding rate and farm system

3. Hatching period lasts:

□ From the moment the eggs are born until they hatch
□ From the moment adult snails mate until the eggs hatch
□ From the moment eggs hatch until the end of operation of farm

4. Cannibalism has been observed in many gastropods immediately after hatching:

□ when snails that hatch first can be fed with their siblings who have not hatched
□ when adult snails can be fed with new-born snails
□ when bigger juvenile snails can be fed with new-born snails and eggs

5. After the fattening is completed, the snails that farmer harvest:

□ snails that have not completed the growth of the shell
□ adult snails which have reached marketable size
□ juvenile snails

3.2 True/False questions

1. Breeders are the brood after hatching from eggs:

□ True
□ False

2. During the breeding season, which can last several months, snails mate repeatedly and usually with multiple mates:

□ True
□ False

3. Snail fattening requires a mild climate with moderate temperatures (20-25$_o$C) or high humidity (75-95%):

□ True
□ False

4. Fattening of brood take place from June until almost the end of the operation of the farm:

□ True
□ False

5. At the stage of hibernation, there is weight loss and the mortality of snails:

□ True
□ False

3.3 Assignment

The understanding of snail breeding stages is a crucial parameter of successful snail farming. The future farmer is required to complete the frames of the flowchart with the seven following phrases:
1. Placing breeders in farm

2. Hibernation of harvested snails

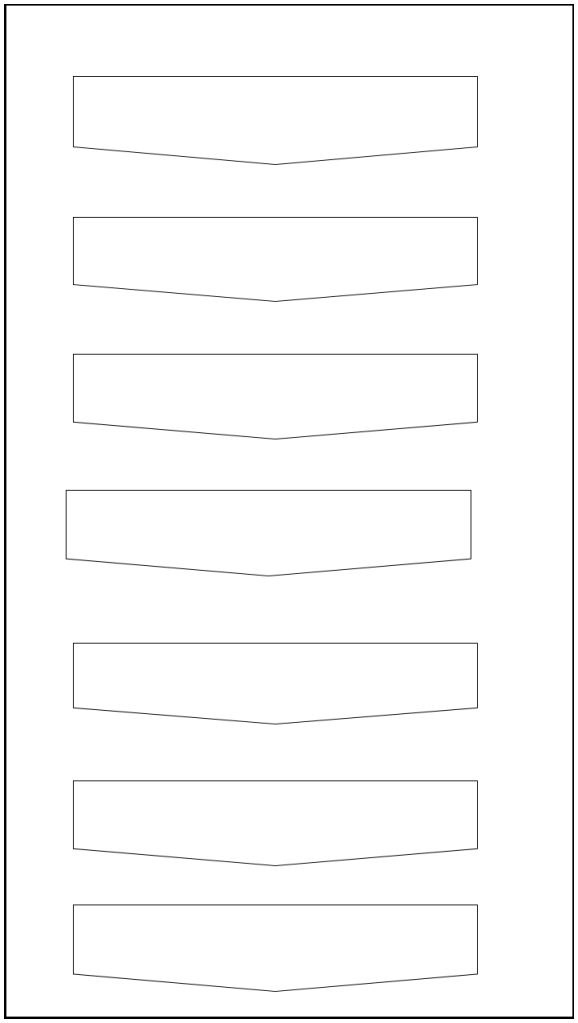
3. Snail harvest

4. Fattening of brood

5. Laying of eggs

6. Snail mating

7. Hatching of eggs



Indicators for correct answers

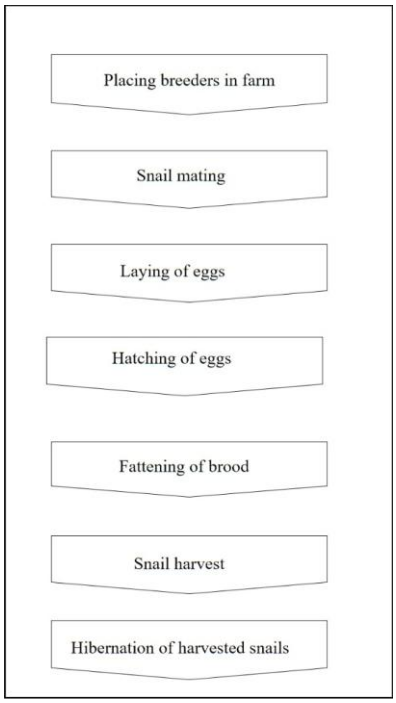
Multiple choice questions

Question 1: Rearing Duration
Question 2: Size, age of the breeders and climate conditions
Question 3: From the moment the eggs are born until they hatch
Question 4: when snails that hatch first can be fed with their siblings who have not hatched
Question 5: adult snails which have reached marketable size

True/False questions

Question 1: False
Question 2: True
Question 3: False
Question 4: True
Question 5: True

Assignment



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Module V: Selection of Foundation Stock

Deliverable: A4

SnailVille

CIVIC Computing
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Project Number: **2020-1-UK01-KA204-079017**

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1. Introduction

1.1 Description

The aim of this module is to give a broad understanding of the factors to consider when choosing your initial foundation stock. This includes sections explaining some of the common characteristics of snails that you will want to consider, as well as sources of foundation stock snails to pursue and avoid. Finally, it goes into detail about three different types of edible snail that can be procured in Europe, describing how they might function as the basis for your snail farm.

1.2 Duration

1.3 Aim

Within this module, you will learn:

- Where to source your foundation stock
- How to prepare for your foundation stock
- Some of the most commonly-farmed species of Snail in Europe
- Some features and habits of different edible species of Snail

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
The difference between species of edible snail	Evaluating the best species of edible snail for your business	Decision-making and business planning
The requirements of foundation stock snails	How to prepare for your foundation stock	Planning and preparatory work

2. Main content

2.1 Learn about selecting foundation stock

One of the most fundamental parts of snail farming, of course, is the snails themselves. Snails are common enough animals in most of Europe – there are probably plenty of them around the nearest garden right now – but for a variety of reasons, it is not generally advisable to start your snail farm with livestock that you've just picked off the garden wall. For a start, not

all snails are the same species, and you'll want to do plenty of research before committing yourself to a single type of snail. Each species has different breeding habits, grow to different sizes, and have different flavours and textures in terms of their meat when eaten.

Furthermore, it is much more effective to go to professionals to get snails that you know will be healthy and a suitable condition for breeding. Indeed, you might not even be able to find certain breeds of snail in the wild in your area, so either way, it's better to buy your initial snail foundation stock from a reputable source. Beyond just selling the snails to you, these sources will be able to tell you the age and any particular characteristics of your snails, and may also be able to give you tips and advice about the care of your snails that might be difficult to find elsewhere. Such sources may include organisations and institutions like: snail breeders, agricultural or research institutes, other snail farmers, or at markets where these sorts of animals might be available.

2.1.1 General snail breeding

Before delving into more details on snail species and their advantages and disadvantages, there are some general rules about procuring your snails that it is worth keeping in mind. Indeed, while there is of course plenty of variety across species of snails, there are some commonalities to remember.

The first of these is the timing of your procurement. Many snails ordinarily start breeding in the late Spring or early Summer, although in their preferred climates, they can breed later into the year and some can even breed more than once in a year. This is something to keep in mind as you get your first ever batch of snails – the people you buy them from should also be able to help you get a sense of when the snails you're interested in might start breeding.

That being said, although snails generally prefer warmer climates, it is important to note that moisture is also very important to them. It is generally important to their breeding habits, which makes moisture of their environment something that you will particularly want to pay attention to. Indeed, all of the species that we will delve into here are capable of hibernating or estivating – essentially going dormant for months or even years at a time in the winter or summer – when the conditions are too try for them. In these cases, you have not much chance of them breeding at all, so keep their conditions right!

On a different note, though it perhaps sounds obvious, decide on one species of snail. They do not generally interbreed, and so it is best to just pick one and run with that. Furthermore, it worth bearing in mind that snails are hermaphrodites – they have what we would consider both female and male sexual organs – so there is no need to worry about getting a certain number of males and

females.

Any snail you acquire will be able to play both roles, and can even change those roles from one mating season to the next.

One other unusual fact of which you will want to be aware is that newly hatched snails can cannibalise their unhatched siblings. All of the species that will be detailed below require high levels of calcium to build their shell after they are born – an absolutely crucial feature of their development. If calcium is scarce or their immediate environs are hostile for other particular reasons, they have been known to eat snail eggs, even of their own species or their own siblings, as these eggs are notably high in the calcium that is so crucial to their growth.

2.1.2 Helix Aspersa

Of the three main types of snail that this module proposes to present, Helix Aspersa (Figure 1) is the most common in Europe. Also known as Cornu Aspersum, or the Common Garden Snail, it is quite adaptable and as such can be found fairly easily all over the world. In Europe, certainly, it is ubiquitous, not having so much of a problem with the colder Northern European climates as some other snail species do. This means that it is a well-recognised edible snail throughout Europe, a common and safe option if you are looking to start a snail farming business.

Figure 1: Helix Aspersa

Although it is very commonplace, as mentioned above, it is inadvisable to just go outside and grab one off your garden wall. A more effective means of procuring your Helix Aspersa foundation stock is from a snail farm nearby, a research or agriculture institute, or other similarly reputable body. This will ensure that you geta healthy set of snails that are ready and able to reproduce.

In this case, that means that your foundation snails will probably be at least a year old, as this is the age at which they generally mature into their reproductive functions. These snails generally live not more than about seven years, which therefore gives you several years of breeding from any given newly mature snail.

Helix Aspersa tend to lay about 80 eggs at a time, and have been known to breed three or four times a year, explaining in large part both their ubiquity and their popularity among heliculturists. Like most snails, they tend to bury these eggs a short distance under a patch of warm, moist soil, so it is important to bear this in mind when you start initially breeding them.

2.1.3 Helix Pomatia

Helix Pomatia is quite similar to the Aspersa variant, but it does have some key distinctions. For a start, it is considerably rarer than the Helix Aspersa, and less commonly found in the wild, particularly in Northern Europe. Indeed, in some areas it is considered a protected species, so be sure to check local regulations and rules before moving forward with this, although as stated above, you should avoid trying to collect your foundation stock snails from the wild in any case.

Figure 2: Helix Pomatia

Despite, or perhaps in part because of, its rarity, the Helix Pomatia is in many ways considered the superior edible snail to the Helix Aspersa, as the flavour of its meat is said to be better and they are generally considerably larger. In fact, in terms of weight, the Helix Pomatia can grow to almost twice the mass of the Aspersa! As such, you are certainly looking at a trade-off here. Helix Pomatia is harder to find and to breed, but is considered much more appealing in culinary terms.

One of the reasons that this snail is not quite so easy to find is that they are considerably less active in terms of their breeding habits. For a start, it takes them a few years to sexually mature, albeit that their lifespan is also longer; over 10 years in good conditions in captivity. Beyond that, they generally breed less frequently than Helix Aspersa and lay considerably fewer eggs: twice a year, compared to three or four for the Aspersa; and not ordinarily laying more than 30 eggs at once, compared to the Aspersa, which will lay up to about 80 or more. They share with the Aspersa the habit of laying their eggs under a layer of moist soil, so again, this is something to bear in mind and have ready for your Helix Pomatia when you introduce them to your habitat.

This is the major trade-off: Helix Pomatia may be considered the better quality of snail meat, but it will require considerably more care in terms of breeding and keeping up numbers if you select it as your foundation stock.

2.1.4 Achatina

The Achatina is much more distinct from the Helix Pomatia and Helix Aspersa in a wide variety of ways. For a start, Achatina does not describe one specific species of snail, but rather a genus of snail, of which several separate species are considered edible. While it is possible (though difficult) to acquire these snails in Europe, Achatina is not native to nor generally found wild in there. Achatina are generally found only in Africa, and indeed are more commonly known as the Giant African Snail. As such, keep in mind that the institutions and breeders who are able to provide you with good examples of these snails will likely be much more hard to find than with the Helix Pomatia or Aspersa.

One of the main reasons for their scarcity is that they are considerably less adaptable than the other species mentioned above. They strongly prefer hot climates, and struggle to survive in cooler environs. As such, if you want to use a species of Achatina as your foundation stock, bear in mind that you are likely to have to set up quite a specialist habitat for them.

Figure 3: Achatina

Given this clear geographic preference, it is perhaps unsurprising that Achatina is not common in European cuisine, but is rather a specialty in parts of Africa. Of course, this does not mean that it is never eaten in Europe, but the market to which you will be selling these snails is likely to be more niche than with the alternative species enumerated above. This, along with the climate issues mentioned above, will require considerably greater research and planning for anyone hoping to rear them.

That being said, even if you can find a supply of Achatina sufficient to breed and start your own snail farm, it is also important to check local laws and regulations on ownership of this sort of snail. Some species of Achatina are considered highly invasive and dangerous to local vegetation and crops, and, given the scale at which they reproduce, can become an even bigger problem over time. In many European countries like the UK, no such law exists since Achatina cannot normally survive outside captivity in the UK anyway due to the cold climate, but it is important to check.

On the upside, as Figure 3 shows, the Giant African Land Snail – describing members of the Achatina family such as Lissachatina fulica, Achatina achatina, and Archachatina marginate - is well named. They are generally vastly larger than the other species discussed above, or indeed any other species of snail found in the world, and consequently produce considerably more meat. Indeed, they can grow to up to 30 centimetres – a full foot – in length!

Furthermore, as referenced above Achatina, are notoriously (at least for farmers in affected areas) good at reproducing. They reach reproductive maturity relatively early and can lay eggs about five or six times a year under the right conditions. What's more, Achatina generally produce about 200 eggs in every clutch, but have been known to lay even up to 500 at a time. If you can build the capacity to rear that many snails, the advantages are clear: it will take very little time at all to have an enormous stock of snails. Indeed, it has the potential if unchecked to become a problem, and so the breeding habits of these snails should be managed with care, if this is the snail you choose as your foundation stock.

2.2 Good practices & Pitfalls to avoid

2.1.1 Good Practices

There are a number of good practices, some of which have been listed above, that it is worth trying to emulate when choosing your foundation stock for your heliculture business.

- Consider your target market and business model

Any successful business needs to have a clear understanding of who its customers will be and how it will operate, and this is particularly true when you are a snail farm choosing your foundation stock. The species of snail you opt for will inform what sort of customers you target, how likely they are to buy your product, and how quickly you can grow your stock of snails. As such, it is very important to do thorough research and make informed decisions about what sort of business you want to run before choosing your snails.

- Prepare for your snail's breeding habits

As covered in the previous section, snails can have very different breeding habits, depending on their species. It is important that you do your research in advance to establish when they are most likely to breed so that you can procure them at the best time of year. Furthermore, when you construct their enclosure, it is crucial to consider not just how many snails you are purchasing, but also how many snails you will end up with once they have started laying eggs. Once you have your enclosure

and the snails in them, it is then necessary for you to make sure that they have sufficient space and nutrients, as well as that they are not breeding beyond your capacity to care for them properly.

2.1.2 Pitfalls to avoid

On the other hand, and again some of these have been covered in previous sections, it is also important to note what practices to avoid. There are some problematic activities that can make your life quite difficult if you are not careful.

- Getting your foundation stock from the wild

This is a bad idea for a number of reasons. For a start, you have no way of knowing the condition that a wild snail might be in, its age, or its reproductive capabilities. This leaves the quality of your potential produce very much to chance, which is not a good way to start any business. But beyond that, certain types of snail are not easy to find everywhere in Europe, and when you can find them, there are often laws preventing you from acquiring them from the wild. In parts of Northern Europe, for example, Helix Pomatia is considered endangered and so taking them from the wild is forbidden. For the good of the snails themselves, your own self-interest, and your business, use a reputable source for your foundation stock, such as another snail breeder, an agricultural or a research institute.

- Attempting to cross-breed

This may sound like an obvious one, and it probably should be, but it is worth re-stating. It is best to pick one species of snail and go with that. Snails do not ordinarily breed between species – they have even sometimes been known to refuse to breed with snails of their own species who come from a geographical area that is too far away from their own. It is important to recognise that there are several different species of snails, that mixing them is unlikely to work very well, and that it is best for your initial foundation stock to all be of a single type.

2.3 Success stories, case studies, examples & more…

The success story for this module can be found in the further reading section below, and involves an Irish Snail farm, Gaelic Escargot based in County Carlow in Ireland. As this particular snail farm was the first successful commercial snail farm in Ireland, there was not to the owners' knowledge any well tried and tested method for breeding snails there. Given that the climate in Ireland is cooler and wetter than the preferred habitat of some types of Snail, the owners therefore describe how they went through a lengthy process of trial and error in order to figure out the best way to raise and process their

snails commercially.

As you might have guessed, they decided to opt for the Helix Aspersa – its adaptability and ability to thrive in the cooler and wetter climates presumably made it a relatively straightforward choice. This adaptability and the fact that the climate, while cooler than for example the Mediterranean, remains largely temperate all year round means that the snails at Gaelic Escargot can start reproduction as early in the year as January, with incubation then taking place as Spring begins.

The choice of Helix Aspersa and in-depth research about their behaviour and the best way to raise them even allows Gaelic Escargot to raise the snails entirely outdoors, in a free-range style environment. This gives the company an extra selling point, all through careful research on and choice of foundation stock.

It is also worth mentioning the second case study in the further reading section, which is the story of a British snail farmer, Mike, based in France. Mike's research was so in-depth that he even chose to be specific about the sub-species of Helix Aspersa that he chose to breed as his foundation stock, the Helix Aspersa Maxima. The motivation for this choice was not just for the sake of financial success though, as one of his central aims was to explore the best recipes possible using the best snail meat possible. Mike's judgement was that the Helix Aspersa Maxima was the meatier and the tastier snail, and so chose that as the specific subset of snail he wanted to raise.

2.4 Further reading

https://www.gaelicescargot.com/farming
https://thegoodlifefrance.com/a-british-snail-farmer-in-france/

3. Assessment

3.1 Multiple choice questions

1. The Giant African Land Snail has been known to produce up to how many eggs at a time?

- ☐ 80
- ☐ 300
- ☐ 500

2. Which of these is often considered highly invasive and dangerous to crops and vegetation?

- Achatina
- Helix Pomatia
- Helix Aspersa

3. Which of these is not a good source for your foundation stock?

- The wild
- Agriculture institute
- Snail breeder

4. Which of these is protected because of its rarity in some European countries, particularly Northern?

- Achatina
- Helix Pomatia
- Helix Aspersa

5. Which of the following is true, when it comes to choosing foundation stock in snails?

- It is better to choose more males than females
- It is better to choose more females than males
- All snails have both female and male reproductive organs, so it does not matter

3.1.2 True/False questions

1. Snails of differing species do not normally interbreed

- True
- False

2. Achatina is generally considered a key part of European cuisine

- True
- False

3. Newly hatched snails will sometimes resort to cannibalism if space or nutrients are scarce

- True
- False

4. Helix Pomatia is thought to have better meat than Helix Aspersa for eating

- True
- False

5. The Giant African Land Snail can grow to up to 30 centimetres in length

□ True
□ False

3.2 Assignment

Imagine that you are thinking about starting a snail farm. You have done a fair amount of research on the business model and on the market for snail products, but you have not yet bought the equipment or procured your snails. Your top priority right now is to acquire the foundation stock of snails, but first you must choose what sort of snails you want.

Although the European country in which you live does have a culture of snail consumption, your specific city does not have a particularly strong demand. That being said, this could be a good thing, as it also means that there are no current suppliers of snails in the area. As such, one option you're thinking of is to appeal to the traditional market that consumer snails in the European way, as Escargots.

That's not your only possible approach, though. You're also aware that there is a significant African population in your city and nearby areas, and that parts of Africa also have a snail-eating culture, albeit in a different way. These communities, as far as you are aware, are also not well-served for snails in your area, and so you could also go down this route and sell to this market.

Which of these approaches would you take and, with particular reference to the foundation stock involved, why?

Indicators for correct answers

Multiple choice questions

Question 1: C
Question 2: A
Question 3: A
Question 4: B
Question 5: C

True/False questions

Question 1: True
Question 2: False
Question 3: True
Question 4: True
Question 5: True

Assignment

If you chose to take the European approach, you might choose either Helix Pomatia or Helix Aspersa. These species are common in European markets and in nature, and so the foundation stock will probably be relatively easy to come by. You can probably even procure your stock from other snail farmers. These species are also very versatile and adaptable in terms of habitat, so they are likely to be quite healthy and their enclosure will not necessarily require lots of specialist material or technology to be viable.

If you chose the African approach, on the other hand, you will want to choose a species of Achatina. This snail is rarer in Europe than its Helix counterparts, but comes with other advantages. It is a very prolific breeder, producing potentially hundreds of offspring every time it mates, and also often grows much larger than native European snails do. Despite its rarity, you will likely still be able to find some at an agricultural or other such institute, and you should be able to keep and raise them, if you can ensure the right conditions, such as the warmer climates that these snails prefer.

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Module VI: The risk of snail breeding

Deliverable: A4

SnailVille

FyG Consultores
Authored by: Irene Esteve
Project Number: **2020-1-UK01-KA204-079017**

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1. Introduction

1.1 Description

This module contains information on the types of snails that exist and which of them can be most beneficial for snail farming. In addition, the types of farming and the different risks involved in farming are also explained. Finally, a series of activities related to the theory of the module can be found at the end of the document.

1.2 Duration

The duration to complete this module is 3 hours.

1.3 Aim

In this module you will learn:

- The types of snails
- Different types of snail farming and their pros and cons
- The risks faced during snail farming
- Solutions to the risks

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
The types of snails	Identify the types of snails that exist	Knowing which of them is best for snail farming
Types of snail farming	Take stock of the pros and cons of each of them	To know how to start a snailfarm taking into account the capacities of each one of them
Risks in snail farming	Identifying a problem	Knowing how to provide solutions to problems that arise

2. Main content

2.1 Learn about The Risk of Snail Farming

Snail farming, often called heliciculture, is the practice of cultivating snails for human use. Agriculture is classified as a sub-category. Snail farming is also known for being a highly profitable and low-risk kind of agriculture. Snails that are raised for food, cosmetics, or reptile food are all possibilities. Escargot shells can be sold to be used as decorations. Snail eggs are being produced as a caviar alternative. Furthermore, statistics reveal that snail farming has been more popular in recent years. The number of snail farms in Europe and the United States is rapidly expanding. However, there are obstacles that must be overcome in order to properly farm snails. Snail farming can be tough if the necessary precautions are not taken to mitigate the effects of problems found on the farm.

2.2 Type of Snails & Farming Systems

Land snails are the type of snails that may be farmed, and there are many different types of land snails that are edible. Some types of land snails, on the other hand, are not good to eat and can even make you sick. As a result, you must be extremely cautious while selecting snails to farm. It's also worth noting that before laying eggs, snails must mate with another snail of the same species. They are occasionally uninterested in mating with another snail of the same species that has traveled a long distance. A H. aspersa from southern France, for example, might reject an H. aspersa from northern France.

There are three main types of snails:

Helix Pomatia

This little snail, sometimes known as the Roman snail, can be found all throughout Europe and the United States, in areas where the weather is warm for part of the year and cold for the rest. They can be found in vineyards, gardens, valleys, and forested slopes at elevations of up to 2000 meters. These snails have a robust pale brown and off-white shell that can grow to be 40 to 50 mm across. If properly nourished, they can reach full size in two to three years. The Helix pomatia

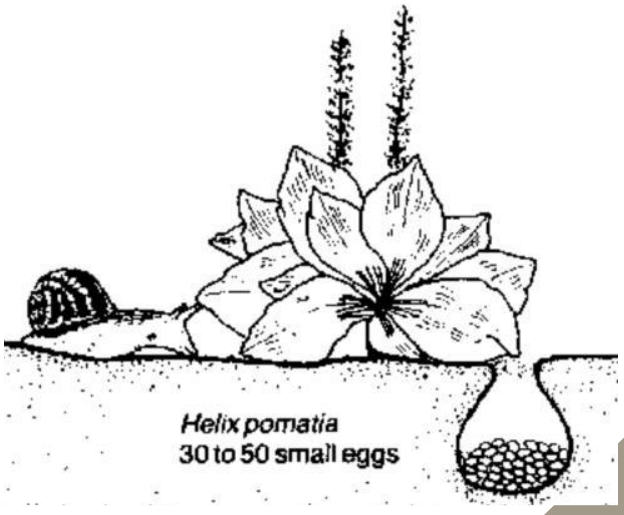

Image by Harald Matern from Pixabay

species is particularly popular with foodies all over the world because of its delicious flavor.

Helix Aspersa

Also known as Cornu aspersum, this type of snail is small too and very popular with foodies. They live across Europe, USA, Australia, South Africa, New Zealand, and some parts of South America. Helix aspersa are considered mature when the shell measures 30 to 45 mm across and it has weak shell with broken stripes which are light brown to black. As well, grows to full size in one year if it is well fed. What is very special for Helix aspersa is they can adapt to almost any condition and climate, which is why Helix aspersa is so commonly considered as profitable farming. Helix aspersa can be found in sand dunes, forests, fields and gardens, which increases Helix aspersa's range and makes farming them less risky.

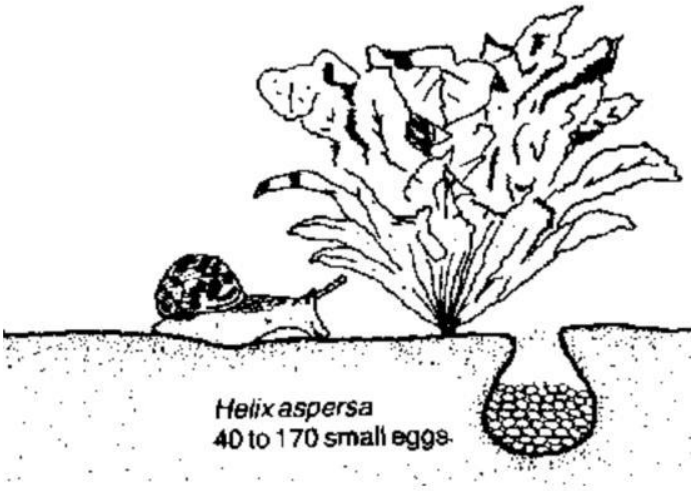

Image by VIVIANE MONCONDUIT from Pixabay

Achatina achatina

Also known as giant snail or tiger snail, are reputedly the largest land snails in the world, measuring from 90 to 130 mm and have a very strong brown shell. They are a widely distributed species in West Africa (particularly in Benin, Côte d'Ivoire, Ghana, Liberia, Nigeria, etc.). Achatinas require higher humidity than the other two species and needs a longer growing time to reach sexual maturity. It grows to full size in two years if it is well fed.

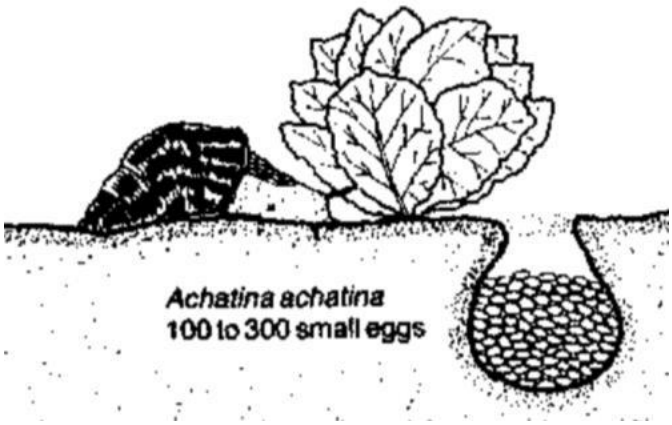

Image by shabalovich from Pixabay

In snail farming, there are three main types of snail farming systems one can choose from. Each system has its unique features, advantages and disadvantages and is practiced by different farmers.

Intensive Type of Snail Farming (Indoor)

In this type of system, the snails are kept in a closed environment and the farmer controls and supervises feeding, water supply, cleaning and other activities. Normally, this system is the most commonly used among breeders who do not have enough space for breeding and usually use pens to keep the snails, tyres, boxes, etc.

In this type of snail farming, the farmer is responsible for feeding, keeping the snails moist and spraying. But what are the pros and cons of this type of farming?

Pros

- The risks of external attacks on snails are reduced
- they are better monitored.
- it is the safest system.
- the mortality of snails is reduced because they can be organised by size.

Cons

Due to the dense nature of the system:

- Overcrowding
- Cannibalism
- Slow growth
- Death

Semi-Intensive Type of Snail Farming

This system consists of a combination of intensive and extensive rearing systems. The farmer introduces plants and flowers to simulate the environment in which the snails usually breed and reproduce. In this way, egg laying and hatching is fully controlled as well as most of the activities they perform. This system can contain nets and wires to prevent attack and/or invasion by other animals.

Pros

- There is an increased growth of snails as there is more capacity.
- Snails can feed on the surrounding plants.

Cons

- Fencing the entire enclosure can be expensive.
- Less protected than the invasive system
- Requires more space

Extensive, Outdoor or Free-range Type of Snail Farming

This System attempts to recreate the exact natural habitat of the snails by artificial methods. These artificial methods can be plastic tunnels, greenhouses, pens and climate-controlled buildings. Thanks to this system the snails can move freely and feed in the open air thanks to the plants, fruits and vegetables that are planted, while they can take shelter and cover in the shadows. All these plants also help to regulate the climatic conditions of the farm.

Pros

- It is profitable
- Snails feed on natural products
- It is easy to handle
- Snails feel they are in their habitat

Cons

- Requires more space, land
- Difficult to locate eggs
- Predators/hunters cannot be controlled
- More risk of disease.

2.3 Good practices & Pitfalls to avoid

Snail farming in its high profitability nature is no exception, there are challenges and problems of snail farming that can cost one his investments if not managed well.

Snail rearing can be quite challenging and uneasy if the measures needed to succeed are not put in place. So, to be successful in snail farming, you must deal with these challenges even before they manifest. Following we will tackle the main pitfalls of snail farming, how it affects farmers and their solutions and good practices.

- **Climate**

Have you ever wondered why snails always come out when it rains? These animals need a humid environment with low temperatures to live and reproduce. However, climate change and weather conditions affect the climatic stability of these animals. An artificial system that controls humidity and ambient temperature can help snails to reproduce naturally without hindering their life cycle.

Solution: Maintain the temperature between 23 and 28 degrees Celsius. If the temperature is not adequate, it may affect the development and reproduction of the snail. The humidity should be kept between 70-90%, because if the humidity is lower than this, the snails run the risk of dying from the hot air.

- **Soil Type**

The soil in which the snails live greatly affects the health of the snails. This means that a poor state of the soil can affect both reproduction and capacity. This is why soil contamination can be a risk factor for snail mortality.

Solution: Keep the soil sterilised and check the pH regularly. The soil must have sufficient calcium for the snails' shells to strengthen. Take care of the texture and check that it is well milled and of a clayey texture, with little water retention. Finally, for the health of the snails, change the soil every three months if it is an intensive housing system.

- **Snail Feed**

Feeding your snails the right feed is as important as the air they breathe. Giving snails the wrong feed will most likely affect their growth or increase the mortality rate among them. You need to understand that, breeding snails on a large scale requires a large feeding commitment and as such, you should prepare what your snails will eat ahead of your stocking period.
Always remember that; snails are not slow in growth but the quality of the food you give them influence their growth rate.

- **Predator**

Snail farming has a number of issues, including predators. Snails are delicate, and their slow movement makes them vulnerable to predators. Most people believe that the only snail predators
are snakes, soldier ants, and rats, however this is not the case. A terrestrial species of snail, such as the Green Snail, preys on land snails. Achatina achatina juvenile hatchlings can be eaten by the green snail. Insects, millipedes, crabs, crickets, turtles, frogs, toads, and birds are among the other predators.

Solution: safeguard your snails by killing these predators whenever they are spotted, and avoid keeping animals such as birds, cows, and other livestock on the same field as the snails. Trenches should be dug around your snail farm, and the snail home should be high (this makes access harder for creeping predators) (which should also contain spent oil to ward off ants).
To keep rodents and other creeping animals away, predator control structures should be erected, and snails should be examined at regular intervals because they can't shout for aid when in trouble.

- **Light Intensity**

Snails, unlike plants, do not require a high level of light to create their food. Because snails prefer to hide from light, you must reduce the light intensity of your farm to a minimal minimum to guarantee that your snails have a continuous growth pattern, including mating events and egg-laying activities.

Solution: Because snails are more active at night than during the day, the pen should always be chilly at night when there is less light available.

- **Pest and Diseases**

In agriculture, pests and illnesses have become an unbeatable obstacle; snail farming is no exception; they can't be eradicated, but they may be reduced to a bare minimum.
The danger is that, in most situations, they are invisible to the naked sight.

Fungal diseases can cause snails various problems in their reproduction and even in their morphology, causing absence of tentacles, loss of colour and fragility of the shell, excessive secretion of serum, etc. All these symptoms are caused by the bacterium Pseudomonas spp and can cause intestinal dysfunctions in snails.

Insufficient food and lack of nutrients and minerals in snails is essential for proper development and growth. This can lead to cannibalism in snails and cause larger, older snails to feed on smaller snails to supplement the nutrients they lack.

Solution: For this reason, the farmer in charge of the snails should pay attention and check that the snails are being fed correctly and getting all the nutrients they need. In addition, it is important to separate the diseased snails so that the hygiene of the farm is not affected.

2.4 Success stories, case studies, examples & more…

Snail Farming Success – New Zealand's Only Commercial Snail Operation

Raewynne Achten is a complete amateur when it comes to heliciculture. However, thanks to the snail farming she started just over four years ago in her backyard, she has become New Zealand's only commercial operation.

At the moment, he has nine farms, spread between the Raukawa Valley and Onga Onga, and estimates that he can keep hundreds of thousands of snails.

The idea was born in 2005 when Raewynne wanted to give her hectare of land an activity. She had heard about it and the idea had always crossed her mind.

"It sounded pretty basic. Within a week I had made my first trial bed and filled it up with snails from my garden".

Within just 6 weeks the New Zealander had snail offspring.

However, problems arose, such as the threat posed by a few snails and the sweltering summer heat. Both caused the snail breeding to go bad.

For this reason, he decided to cover the farm with shades and nets and give it a short term solution. But eventually he decided to change the system to an open-air system.

Raewynne says the key is to give the snails the conditions they need. "Lots of food they love to eat, not overcrowding them is a big thing, and the temperature," Raewynne says.

Later, she contacted restaurants and wineries in Hawke's Bay to consider using the curltivated snails and the response was very positive.
At the moment, Raewynne believes there is a lot of potential in the heliciculture sector for the retail market and does not rule out exploring other ideas.
Full text: https://snailfarmingbusiness.com/article/snail-farming-success-new-zealands-only-commercial-snail-operation

2.5 Further reading

There are many things that need to be looked on for snail farming, so here are some further readings to guarantee a successful harvest:

Building a snail house to protect your snails from harsh weather conditions and predators, prevents them from escaping and creates a favourable space for their growth. It is, therefore, crucial you construct your snail house the right way: The Best Guide To Building A Snail House

Understanding how to treat soil for snail farming is important in having a productive snail farm: 10 Most effective ways to treat soil for snail farming [A complete guide on Soil treatment for Snail Farming]

Land snails have similar eating habit, they enjoy a wide variety of food ranging from naturally occurring food materials to formulate feeds: What do snails eat? Essential snail foods and how to feed snails [What to feed snails and what not to feed snails]

3. Assessment

3.1 Multiple choice questions

1. Snail farming is a sub-category of agriculture also known as _____.

□ a. Escargot
□ b. Snail breeding
□ c. Heliciculture

2. This type of snail is very special as it can adapt to almost any condition and climate, thus commonly considered as profitable farming. Which snail is it?

- a. Helix pomatia
- b. Helix aspersa
- c. Achatina achatina

3. In intensive (indoor farming), due to the dense nature of the system there are some disadvantages, which one is not one of them?

- a. Overcrowding
- b. Fast growth
- c. Cannibalism

4. The growth rate of snails can vary significantly, but if this factor is well taken care of, the snails can grow really fast:

- a. Quality of food
- b. Housing size
- c. Amount of light received

5. The main problem with pests and diseases is that they cannot be seen with the ordinary eye. What is a noticeable symptom in an infected snail?

- a. Vivid colour
- b. Isolation
- c. Fragile shell

3.2 True/False questions

1. Even thought snails must mate with another snail of the same species, some are uninterested in mating with another snail of the same species that originated from a considerable distance away.

- True
- False

2. Any temperature higher than 28 degrees will affect proper development, normal feeding, reproduction, and daily activities of your snails.

- True
- False

3. The Achatina achatina is smaller type of snail that can be found across Europe and USA.

- True

 False

4. Land snails are preyed upon by a terrestrial species of snail-like the Green Snail.

 True
 False

5. In semi-intensive farming the farmer tries to create an environment similar to the snail's natural breeding environment where the snails' activities are not controlled.

 True
 False

3.3 Assignment

Mario has a farm and has decided to start raising snails on one of his plots. But due to a pest problem in his neighbourhood, he has had to use strong insecticides.

Multiple choice questions

Question 1: ¿ What type of contamination can be caused by the use of insecticides?
A: Food B: Environmental C: Chemical

Question 2: Which type of snail farming has Mario decided to use?
A: Indoor B: Outdoor C: Semi-intensive

Question 3: What problems can the use of insecticides/pesticides cause for snails?
A: None B: More fragile shells, among others C: Strengthening of their immune system

Question 4: What solutions can Mario implement to prevent this from affecting his snails?
A: Be more observant, provide them with a good diet and separate the healthy snails from the sick ones
B: Let them go free C: Use more pesticide

Question 5: Which of these options is a plus over the type of breeding Mario has decided to use?
A: Requires more land than other rearing systems.
B: It is more difficult to protect eggs

C: Snails can be felt in their natural habitat

True/False questions

Question 1: Pests and diseases have become an unbeatable challenge in agriculture. True.

Question 2: Pesticides can cause problems in snail reproduction. True

Question 3: Very little land is needed to raise snails outdoors. False

Question 4: Mario has to pay attention not only to pesticides but also to other risks such as other animals, the type of soil on his plot, light, food and climate. True

Question 5: The use of pesticides to control pests does not affect snails. False

Assignment

Before starting a snail farm, you should make sure that you have enough space to house and feed them. In addition, it is essential to be aware of all the risks that may be involved in each of the breeding systems that exist. The different risks in snail farming that we have just seen can affect the morphology, reproduction and health of the snails themselves. Even these risks and diseases in snails could cause problems for us if we consume them.

Perhaps, making a list of pros and cons can help you, but without a doubt, surrounding yourself with experts in the field of heliciculture and a good advisor is essential so that there are no problems either on the farm or with the health of the snails.

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Snail Farming – Heliciculture. (2021). Escargot World. Retrieved 14 October 2021, from https://escargot-world.com/snail-farming/

Snail Farming Business: Raising Snails for Food and Profit In Ghana. (2012, February 9). Snail Farming Business. Retrieved 20 October 2021, from https://snailfarmingbusiness.com/snail-farming-business-raising-snails-for-food-and-profit-in-ghana

Module VII : Entrepreneurship

Deliverable: A4

SnailVille

Authored by: AKNOW - FYG
Project Number: **2020-1-UK01-KA204-079017**

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1. Introduction

1.1 Description

With this module, learners will find out why entrepreneurship in the sector of heliciculture consists of a dynamic process that calls for informed decisions. Learners will learn about the importance of establishing and maintaining multiple networks to tackle challenges in snail farming and minimize risks. Success stories and case studies will reveal good entrepreneurship strategies both from the field of snail farming and other fields as well.
In this module we will analyse the dynamics of the process of launching a business with the heliciculture trade and sector in mind. Detailed information on the importance of establishing a network of experts in the sector will be presented and the risks and threats involved in this business model will be analysed. In addition, some of the strategies from other fields that can also help in the heliciculture sector will also be presented.

1.2 Duration

Please estimate the time needed to complete the module (including all activities, quizzes, case studies)
3 hours

1.3 Aim

Within this module, you will learn:

- Why entrepreneurship is a dynamic process
- Why it is crucial to establish networks
- Which are the main risks and dangers in heliciculture
- What kind of entrepreneurial strategies can be employed in heliciculture

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
General entrepreneurial knowledge	Basic cognitive and practical skills required to organize and manage a business	Organise and manage a business while assessing related factors and circumstances
The importance of networking	Basic skills to create and maintain beneficial networks	Communicate productively forthe benefit of one's business and utilise different networks
Risks and dangers in heliciculture	The entrepreneurial mindset required to tackle challenges in the snail farming sector	Analyse risks and respond to challenges

2. Main content

2.1 Learn about [Entrepreneurship]

Theoretical information that will help readers gain knowledge of your module.

Image title: Office Source: pixabay.com

Heliciculture –or snail farming- is an agricultural entrepreneurial endeavour that demands knowledge and skills to be profitable in the competitive market. Before launching a snail farming business, the entrepreneur needs to research organization, management and risk assessment strategies to ultimately become able to tackle challenges that are present in the particular sector.

Snail Farming also known as heliciculture is the farming of land snails for commercial purposes. In the previous modules we have seen the different types of snails and their characteristics. So, we know that Helix Aspersa is the most common snail species used for snail
farming in heliciculture. Heliciculture is part of agriculture, i.e. a set of economic activities and techniques that transform the natural environment for food production.

In order to start a heliciculture business it is necessary to have an entrepreneurial spirit. Entrepreneurship is a process that goes beyond the creation of a company. For this, it is necessary to

analyse the possible risks and monitor the market in order to be able to move forward in creating a new one. In addition, it is also important to set and define the objectives as well as the future jobs.

Starting a snail business can be very economical as it requires less work and minimal expenses (only water, sprinkler-operated electricity and minimal work of the employees). But in order to do so, we must take into account different factors such as:

- The type of snail
- The soil
- The conditioning of the farm to regulate temperature, humidity and light.
- The risks that may be involved in snail farming

Entrepreneurship in heliciculture is a dynamic process that requires vigilance during all its stages due to its risky nature. From the moment that an opportunity is identified till the creation of a successful, growing business, snail farming calls for entrepreneurial actions that are similar to those taken in other fields and that are mostly related to establishing and maintaining *social networks*, both *formal* and *informal* (Fayolle et al., 2016). Once an entrepreneurial idea is conceived, the aspiring entrepreneur needs to research the respective market and identify the competition (Teagasc, 2021). In this context, they also need to assess problematic areas that may threaten the viability of small-scale agricultural systems (Hatziioannou & Kokkinos, 2021, p.2). For instance, in Cyprus, research revealed that the existence of *business-to-business unfair trading practices* in the case of the *food supply chain* hinders micro-scale agricultural development and sustainability (Markou et al., 2020). Dangers of this sort can be prevented if entrepreneurs utilize prior knowledge, experience and entrepreneurship strategies from the heliciculture as well as from other sectors.

In general, an entrepreneur is usually a self-employed person who carries out a specific work activity on his or her own account. This entrepreneur usually starts working in micro-enterprises with no employees and with a local scope of action. In this sense, entrepreneurship requires technical and managerial skills. The individual entrepreneur detects or creates business opportunities. This is the person who can sell the project idea through small and medium-sized enterprises. On the other hand, there is the corporate entrepreneur. This entrepreneur is the top executive and must know how to manage the changes that the company needs or requests at any given time. In other words, the corporate entrepreneur is in charge of reinventing the company on a daily basis. Finally, the manager must supervise the process and efficiently manage the company's business portfolio.

Existing entrepreneurial activities expose factors that affect *decision making* and *business planning*, as well as risks and challenges to be tackled during *implementation* and during the *stage of maturity* to *maximize profitability* (Barraza, 2021). Snail farming depends on various structural and

managerial parameters that affect annual production, such as a country's *farming system*, the *geographical location* that is chosen and the available resources - like *equipment* and *facilities* (Apostolou et al., 2021). A country's climate and the condition of its habitats affect both the market and the methods of snail farming, as do factors like *elevated consumption*, *overexploitation* and environmentally unfriendly land use (Conte, 2015). Even though "the establishment of a snail farm does not represent a major investment," factors like the aforementioned impose the necessity for exchanging knowledge per the different possible snail farming methods: *plastic tunnels, intensive breeding, extensive breeding, and mixed system* that incorporates outdoor fattening during the feeding season (Conte, 2015). However, the farming system itself does not suffice to add value.

Depending on a country's infrastructures and distribution systems, networking can also prove valuable, when seeking to add value. Value is affected by whether or not processing facilities exist, and whether distributors collaborate with individual farms or prefer to buy in bulk (Teagasc, 2021). In cases like that of Ireland, snail farming business models need to adjust to the fact that: a) there are no snail-processing facilities to add value and b) big distributors want to buy in bulk; therefore, a centralized producer hub needs to be established and solutions like shared premises should be considered to minimize costs (Teagasc, 2021). Similar strategic steps should be taken under consideration in every case and locality in order to ensure sustainability and growth rates.

In heliciculture, correct management will ultimately require investments in optimal technology to improve breeding and harvesting processes, provided that expertise regarding the different qualities of the snail species and the production differences: snail farming can generate different forms of income, through the marketing of live snails, as well as through the sale of snail by-products like shells, eggs and slime (Conte, 2015). Subsequently, the range of beneficial and productive networking will determine the viability of the business, as well as the successful management of related risks and dangers.

Image title: Snails Source: pixabay.com

2.2 Good practices & Pitfalls to avoid

In order to run a snail farm, it is a good idea to choose a mentor who can advise and guide you in launching your business. In any field of business, in order to carry out a business idea, you need a good advisor and a good team to support and guide you through the steps to follow. For this reason, in the heliciculture sector, it is important to know and know well the field in which you are going to work and experts in the field so that they can advise you.

Practical information that will help readers gain deeper understanding of your module.

https://agric4profits.com/benefits-of-snail-farming-heliculture/: This site provides easy-to-understand listings of the benefits and limitations of snail farming.

https://barrazacarlos.com/entrepreneurial-process-stages/ : This site offers valuable information about the entrepreneurial process, its stages, and various entrepreneurial process models with figures and videos that are easy to follow.

https://www.masterclass.com/articles/how-to-succeed-in-business-5-strategies-for-entrepreneurs#5-strategies-for-success-as-an-entrepreneur: This site explains the different types of entrepreneurship, as well as basic strategies to implement for success.

https://agric4profits.com/processes-involved-in-snail-farming-business/: “6 processes involved in successful snail farming business”

2.3 Success stories, case studies, examples & more…

Snails House Farm, Ukraine https://snails-house.com/

Snails House Farm is a Ukrainian company that has turned into one of the largest snail breeders and suppliers in the world, delivering wholesale bulks of snail-products to the globe and collaborating with big restaurants and companies. In a vast and ecologically clean area, ***Snails House Farm*** has established itself as an ecologically responsible company offering high-quality products.

Thanks to its growth rates, ***Snails House Farm*** has invested in advanced, modern equipment and a big team of professional employees to collect huge crops and deliver a multitude of snail-based products to its extensive network of collaborators and distributors. Apart from its great product variety, the company also shares its expertise with aspiring snail farmers by offering consultation and marketing snail-farming equipment (snail shelters, tables for reproduction, etc.) and nutrition. Through its collaboration with professional chefs, the company promotes traditional and original snail-based dishes staying true to its commitment to natural and high-quality standards.

A very clear example that serves as a best practice example of starting a business in the heliciculture sector is that of the company CSC Heliculture.

Christiaan Jooste, Stephan Pretorius and Coenie Espach are three friends who launched their snail business during the pandemic. In 2020 they started a snail farm in a garage. For this reason, they decided to choose an indoor system for snail farming. This ensured that they could produce more snails in a smaller space. They started with 500 snails imported from Lithuania and they quickly reproduced, forming 70,000 babies in just two months. So, the CSC team had to move to a larger space to continue the business.

Despite having no experience in the sector, the team spent a lot of time learning about the heliciculture sector to offer the best conditions. And after expanding their snail capacity on the farm, they saw that thanks to the indoor system the snails grew much faster than with the traditional rearing system.

So far, the CSC System produces around 10 tonnes of snails from the first cycle to the rearing of hatchlings. For that reason, Jooste believes they will be able to produce around 30 tonnes as the quality of the eggs improves.

"At the moment, we're using 14 tables housing a total of 630 000 snails in the first cycle, and when running at full capacity with more grower tables, we have space for three million snails," says Jooste for the Farmers Weekly Magazine.

Furthermore, as we have seen in module 6, there are several risks when it comes to snail farming. In the case of CSC, they claim that they do not have to fight against diseases or pests as they do not need to look for snails in the grass or nets. This can show a clear example of analysis before setting up a company in order to see what the strengths of the company can be.

Knowing what you are going to do from the beginning can make your business a success. That is why CSC decided to simply focus on snail farming and processing. Other activities such as the extraction of snail slime are therefore carried out by other companies, in this case in the cosmetics industry.

https://www.farmersweekly.co.za/agri-business/agribusinesses/snails-an-industry-filled-to-the-brim-with-opportunities/

2.4 Further reading

Add extra resources (links, articles, videos, etc.).

https://www.theguardian.com/world/2021/jan/01/french-snail-farmers-lament-sluggish-year-as-covid-crisis-dents-sales : French snail farmers suffer COVID-19-related crisis and designate representatives to ask for help from the ministry of agriculture, due to lack of an organized snail-farming federation at a national level.

https://bit.ly/3omx32A , p. 79: “Heliciculture and Snail Caviar: New Trends in the Food Sector”

https://www.youtube.com/watch?v=T28t9gZiURk “Amazing Snail Farm Technology”

https://www.youtube.com/watch?v=EvYGctoSCcA “Snail farming in Australia –slow, small and sustainable”

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjOxOr_lIv0AhUQkhQKHVjrDTkQFnoECAQQAQ&url=http%3A%2F%2Fwww.usa-journals.com%2Fwp-content%2Fuploads%2F2016%2F01%2FObinaju_Vol42.pdf&usg=AOvVaw2FykCxUC6BhQWO6ALYAH2w “A Case study of Snail Farming from the American Journal of Research Communication”

3. Assessment

3.1 Multiple choice questions

1. During which stages does the entrepreneurial process require networking?

□ Answer A During the idea generation and the market research
□ Answer B During business planning and implementation
□ Answer C During all stages

2. In snail farming, you must take into account:

□ Answer A Geography and climate conditions
□ Answer B Politics and legislation
□ Answer C Monetary currency

3. Which of the following stages can add value to heliciculture products?

□ Answer A Breeding
□ Answer B Processing
□ Answer C Distribution

4. How can other people's expertise help an aspiring snail farmer?

□ Answer A By offering information on farming practices
□ Answer B By minimising risks
□ Answer C By doing all of the above

5. The entrepreneurial process is:

□ Answer A Static
□ Answer B Dynamic
□ Answer C Irrelevant

3.2 True/False questions

1. Heliciculture is the same as snail farming

□ True
□ False

2. Identifying your market is irrelevant in snail farming

□ True
□ False

3. Networking hinders a snail farmer's success

□ True
□ False

4. There are several snail farming methods

□ True
□ False

5. You do not need any equipment in snail farming

□ True
□ False

3.3 Assignment

Add a real-life scenario that will work as an exercise to your readers. It can be an essay or anything that can make them think and practice their knowledge themselves.
Paul wants to start a snail-farming business but hesitates per the steps to follow. Should he first buy breeding species and set up a farming area?

Indicators for correct answers

Multiple choice questions

Question 1: C
Question 2: A
Question 3: B
Question 4 : C
Question 5 : B

True/False questions

Question 1: True
Question 2: False
Question 3: False
Question 4 : True
Question 5 : False

Assignment

Write an indicative answer to your scenario.
No, Paul should first identify the market, research the competition and seek expert advice per heliciculture.

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Obinaju, L. C., & Asa, U. A. (2016). ECONOMICS OF RURAL LIVELIHOODS: A CASE STUDY OF SNAIL FARMING IN ITU LOCAL GOVERNMENT AREA, AKWA IBOM STATE, NIGERIA. American Journal of Research Communication, 4(2)

Module VIII : Starting and growing a business in Heliciculture

Deliverable: A4

SnailVille

Authored by: AKNOW
Project Number: **2020-1-UK01-KA204-079017**

Co-funded by the Erasmus+ Programme of the European Union

1. Introduction

1.1 Description

This module will discuss the first steps needed to be taken when starting a snail-farming business, as well as offer insight into the possible ways to grow in this particular sector. Insisting on the importance of networking during all the stages of the entrepreneurial endeavour, this module will show how a snail-farming business can establish itself in a competitive market.

1.2 Duration

3 hours

1.3 Aim

Within this module, you will learn:

- The first steps to take when starting a snail-farming business
- Ways to grow through networking
- Ulterior development stages for further establishment in the sector
- Reasons to stay updated with the sector's developments

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
Starting a business	Basic cognitive and practical skills for business planning and implementation	Materialize an idea aftermeaningful research
The importance of networking	Maturity and open-mindedness per other people's expertise	Create and maintain valuable networks
The importance of keeping a business up-to-date	Understanding the dynamic nature of entrepreneurship	Adjust to new conditions, evolve, grow

2. Main content

2.1 Learn about [Starting and growing a business in Heliciculture]

Theoretical information that will help readers gain knowledge of your module.

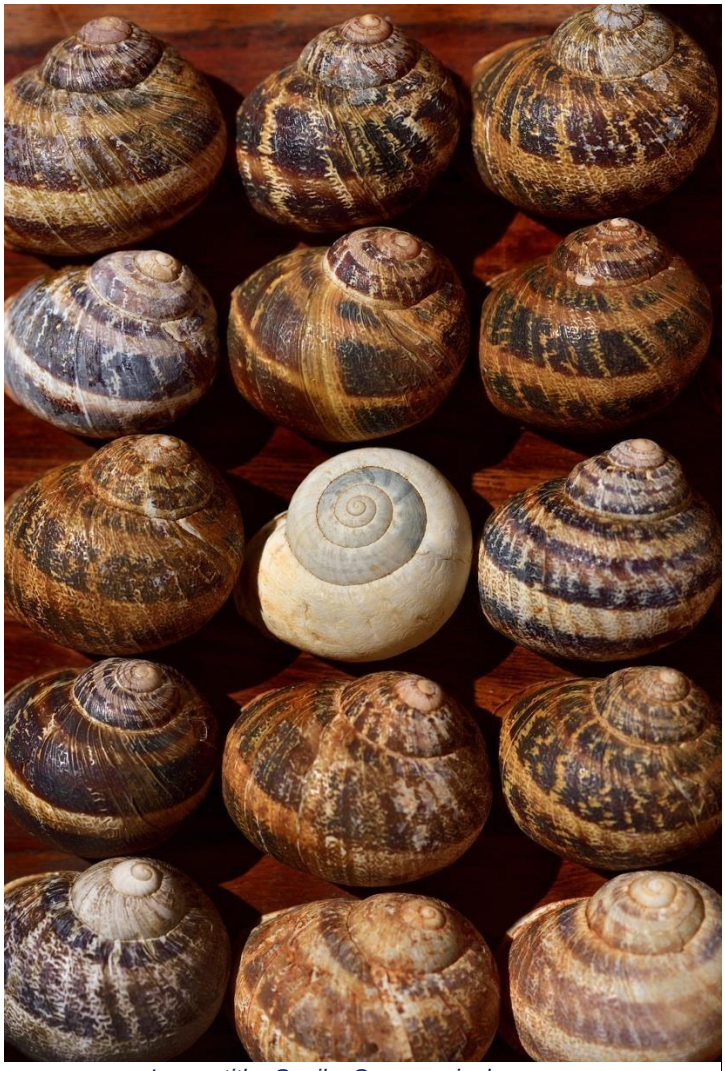

Image title: Snails, Source: pixabay.com

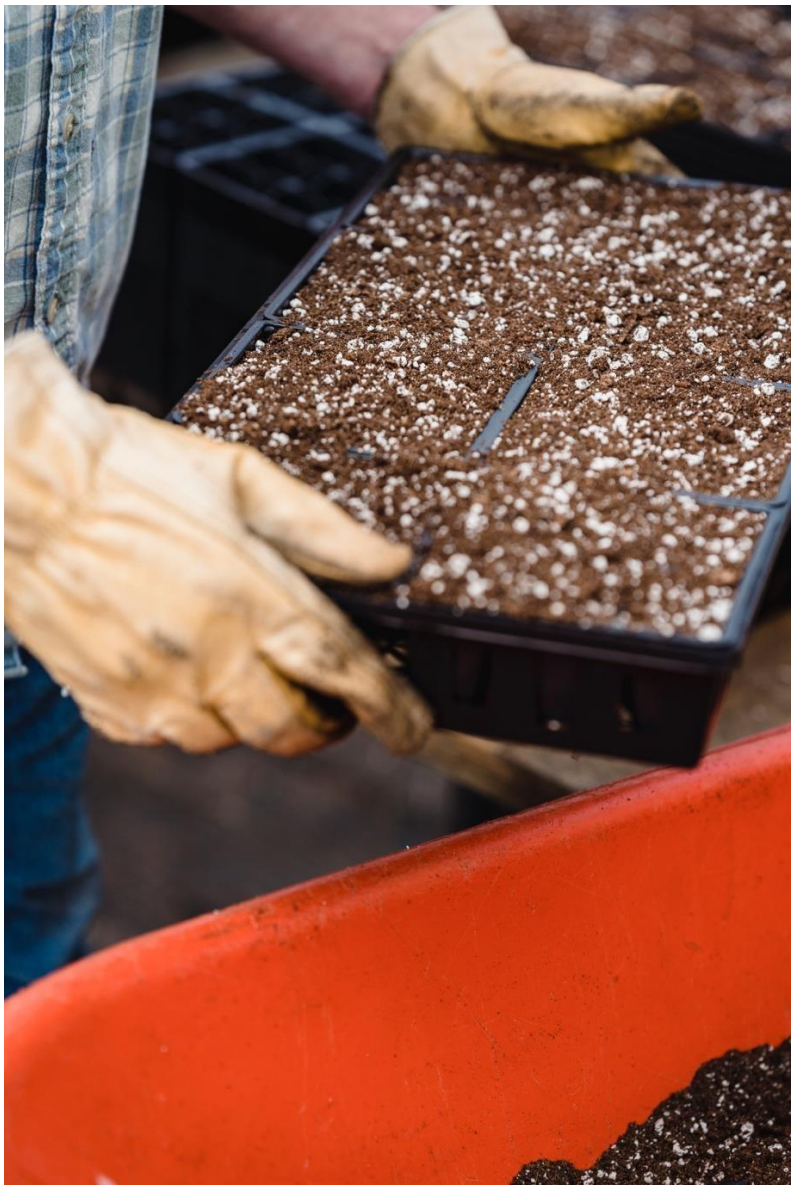

Image title: pexels-greta-hoffman Source: pixabay.com

The breeding of snails in respective farms is a relatively new productive activity. However, it has been developing during the last decades and, today, it is considered an increasingly popular domain. The increasing demand for food, the advancements in the field of cosmetics, and the fact the use of snails as food is linked to low carbon emission, all are factors that make snail farming “a valuable source of income” (Massari & Pastore, 2014, p. 88).

Establishing a snail farm does not require a major investment. However, it requires skills and knowledge that can be acquired only through networking. To be able to succeed in heliciculture, one must either follow proper training or receive the advice and expertise of people who are experienced in the particular domain and its particularities. There are a lot of things that one has to take under

consideration before launching a snail farming business and many practical details that they have to familiarise with. For instance, while the land requirement is minimal, the following parameters may create significant concerns:

- the manpower needed to tend to this business is significant;
- snail farming techniques vary and must be carefully chosen (intensive, extensive, mixed);
- climate affects snail production;
- combined methods may be needed in farming (e.g. for maximising the size of the snails);
- snail breeds have different characteristics and different mortality rates;
- processing premises will eventually be needed to add value to the product;

Networks can help aspiring snail farmers understand all the benefits and limitations of snail farming (Nonye, 2020). During the market research phase, networking can speed up the process of identifying the field and the suppliers; it can also lead to the organization of effective lists with necessities and expenses. Subsequently, proper communication with the right stakeholders will help the aspiring farmer establish a financial plan. With a well-organised business plan, one can also seek funding (e.g. at their local Chamber of Agriculture). By developing the proper communication tools, the entrepreneur will eventually launch a promising production.

However, the communication needs are not reserved solely for the pre-launching and the launching periods. Snail farming requires constant networking with other breeders, suppliers and distributors, depending on the scale of the investment and the processing needs for ultimately adding value (Teagasc, 2021).

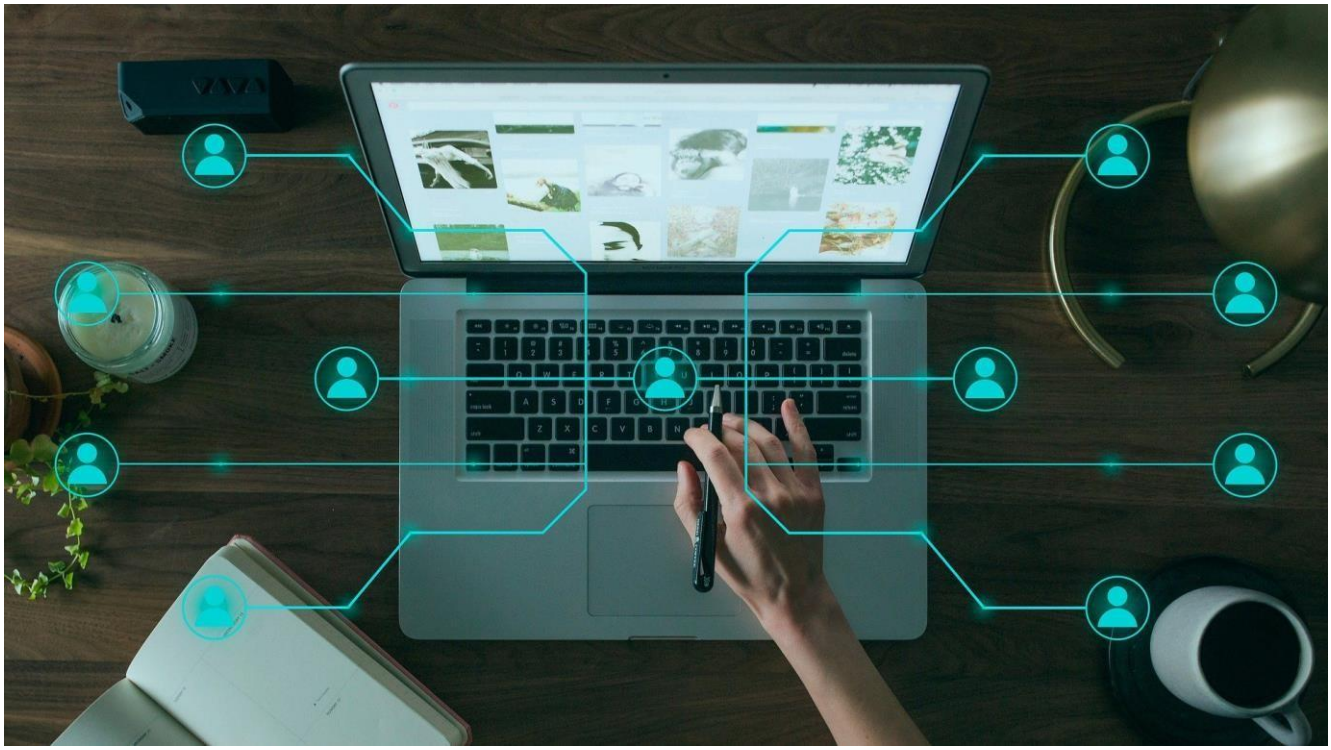

Image title: business Source: pixabay.com

2.2 Good practices & Pitfalls to avoid

Practical information that will help readers gain a deeper understanding of your module.

- The European Union occasionally funds diversifying agricultural ventures. This is the case with the NEWBIE project, which seeks to facilitate “innovation, entrepreneurship and resilience in the European farming sector” (NEWBIE, 2021, CORDIS, 2020):

http://www.newbie-academy.eu/about-newbie/
https://cordis.europa.eu/article/id/415433-on-the-snail-trail-helping-newcomers-to-the-agricultural-sector

- Snail farming guides may be found online; see, for example:

https://escargot-world.com/buy-snail-farming-guide/

- An overview of the global snail market (imports/exports/trends/suppliers, etc.) can be found on:

https://www.tridge.com/intelligences/snail

2.3 Success stories, case studies, examples & more…

La Perouse Escargot, Tasmania

A retired couple in Australia (Alistair Primrose and Linda McDavitt) identified an increasing demand for snails on the market. Subsequently, they started networking to find out more

about this business venture and the respective market.

- First, they put out a survey to restaurants at their locality (Tasmania) and received great responses filled with valuable information and plenty of orders;
- after investigating sustainability methods, the couple set up a farming system that suited Australian standards for the green economy;
- soon, the farmers started getting feedback from chefs and began studying this feedback to improve their products (namely to maximise the size of the snails);
- to that end, they expanded their network toward the online community, with the scope to buy more snails and enhance breeding (ABC Australia, 2020, 0:37'-3:12').

As a result of these careful networking steps and the farmers' never-ending quest for updates in their domain, '*La Perouse Escargot*' at Sandford ended up growing more than 100,000 snails for food (Hanson, 2018).

Gugumuck Vienna Snail Farm, Austria

https://gugumuck.com/en/vienna-snail-farm/

Andreas Gugumuck decided to revive the appetite for snails in Austria, by establishing a *farm-to-fork* system and re-inventing himself and the snail business in his country (Maceacheran,2021). With green and sustainable practices, the **Vienna Snail Farm** has obtained a large network of faithful chefs and restaurants. Andreas Gugumuck also hosts a biannual snail festival, breeds over 300,000 snails of different varieties and invests in updated processing methods for snail by-products.

Success stories like the aforementioned prove the fact that snail farming is a dynamic process and, as such, it requires careful choices of strategies and constant updates with the sector's developments.

2.4 Further reading

https://escargot-world.com/what-you-need-to-know-about-starting-snail-farming-2021/
https://www.youtube.com/watch?v=T28t9gZiURk
https://snails-house.com/#about
https://www.youtube.com/watch?v=EvYGctoSCcA

3. Assessment

3.1 Multiple choice questions

1. When do you need networking in Heliciculture?

- Answer A When starting a snail-farming business
- Answer B When trying to grow your snail farm
- Answer C During all the stages of your business venture

2. Snail farming has

- Answer A benefits and limitations
- Answer B static presence in the market
- Answer C fixed requirements in all the countries

3. The proper communication channels can

- Answer A advertise your products
- Answer B save you time in investigating the sector
- Answer C ensure breeding rates growth

4. During the development stages of your snails, you may need to

- Answer A Augment nutrition rates
- Answer B Combine different farming techniques
- Answer C Sell old equipment

5. The entrepreneurial process requires communication with:

- Answer A Other breeders
- Answer B Suppliers and distributors
- Answer C All of the above

3.2 True/False questions

1. There is only one snail farming technique.

- True
- False

2. Climate affects snail production

- True
- False

3. Networking is bad, as it exposes trade secrets

□ True
□ False

4. You do not need any significant manpower in snail farming

□ True
□ False

5. After establishing a snail farm, you do not need to stay informed per the sector's developments

□ True
□ False

3.3 Assignment

Add a real-life scenario that will work as an exercise to your readers. It can be an essay or anything that can make them think and practice their knowledge themselves.
Stan wants to launch a snail farming venture but ignores the state of the respective market in his country. He also wonders whether or not he should seek any financial aid, but has no idea as to where one should start looking or the amount that one might need. He owns a small piece of land, but, other than that his investing capacity is limited. What steps should he follow?

Indicators for correct answers

Multiple choice questions

Question 1: C
Question 2: A
Question 3: C
Question 4 : B
Question 5 : C

True/False questions

Question 1: False
Question 2: True
Question 3: False
Question 4 : False

Question 5 : False

Assignment

Write an indicative answer to your scenario.
Stan should identify the market, research snail farming in general, seek advice from experts and then, after, acquiring an initial idea per possible expenses start to ponder over funding.

4. References

ABC Australia. (2020, May 23). *Snail farming in Australia - slow, small and sustainable*. YouTube. Retrieved November 8, 2021, from https://www.youtube.com/watch?v=EvYGctoSCcA.

CORDIS. (2020). *On the Snail Trail? helping newcomers to the agricultural sector*. European Commission - CORDIS. Retrieved November 8, 2021, from https://cordis.europa.eu/article/id/415433-on-the-snail-trail-helping-newcomers-to-the-agricultural-sector.

Hanson, R. (2018). *Snail farming: Size matters when it comes to breeding potential*. The Weekly Times. Retrieved November 8, 2021, from https://www.weeklytimesnow.com.au/news/tasmanian-country/snail-farming-size-matters-when-it-comes-to-breeding-potential/news-story/f03308e02c3a55c46fafa51698fbb5f9.

Maceacheran, M. (2021, June 15). *Meet the maker: The Farmer Reviving Vienna's passion for snails*. National Geographic. Retrieved November 8, 2021, from https://www.nationalgeographic.co.uk/travel/2021/04/meet-the-maker-the-farmer-reviving-viennas-passion-for-snails.

Massari, S., & Pastore, S. (2014). Heliciculture and snail caviar: new trends in the food sector. In M. Mišniakiewicz & S. Popek (Eds.), *Future trends and challenges in the Food Sector* (pp. 79–90). essay, Polish Society of Commodity Science.

NEWBIE. (2021, February 24). About NEWBIE. NEWBIE. Retrieved November 8, 2021, from http://www.newbie-academy.eu/about-newbie/

Nonye, B. (2020, October 9). Benefits of snail farming (heliculture). Agric4profits.com. Retrieved November 4, 2021, from https://agric4profits.com/benefits-of-snail-farming-heliculture/

Teagasc. (2021). Snail farming. Teagasc. Retrieved November 4, 2021, from https://www.teagasc.ie/rural-economy/rural-development/diversification/snail-farming/

Module IX: Legislative aspects in Europe

Deliverable: A4

SnailVille

EUROCREA MERCHANT
Authored by: Beatrice Del Nero
Project Number: **2020-1-UK01-KA204-079017**

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Erasmus+ Programme
of the European Union

1. Introduction

1.1 Description

This module aims to present the main European standards that you need to follow in your heliciculture business. As snails are mainly bred for food use, the relevant legislation is foodstuff hygiene.

1.2 Duration

4 hours

1.3 Aim

Within this module, you will learn:

- To be familiar with the main European regulations on food hygiene
- To know the Community rules governing food production.
- To be aware of the hygiene and health regulations to be kept in a snail farm

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
To know the reference legislation for snail farms	**To be able to apply the European regulations on heliciculture farming**	**Fully understanding of the legislative framework on snail farming**
Understand what rules apply depending on the type of farm and the production chain	**To be able to run a snail farm in accordance with European standards**	**To have adequate knowledge of European regulations and to be able to pass it on to their staff**
Knowing the risks snail meat could have on humans		

2. Main content

2.1 Learn about Legislative aspects in Europe

In Europe, there are a number of laws and regulations covering some aspects of snail farming. There is not a unique real regulatory reference applicable to snails, but the breeding and production of these animals follow European food hygiene regulations.

Snails are a relatively small industry compared to other breeding such as cattle, but it is a growing sector and in high demand both commercially and in terms of food.

All products of animal origin intended for human consumption must satisfy the requirements of food hygiene legislation (Anonymous, 2014).

Foodstuffs (especially animal foodstuffs) are strictly regulated as they have the potential to be a risk to human health. Snails are mostly animals that are marketed live, and different species of snails have different characteristics, which makes some species more susceptible to environmental contamination. Checks must therefore ensure that the specimens are in good health and that there is no microbiological contamination harmful to humans.

Snail meat must have been produced in accordance with the conditions established in the regulations that we see below. Specimens that cannot be sold must be disposed of in accordance with the Regulation no. 1069/2009. The assessor examining the specimens must therefore have a good knowledge of gastropods in order to be able to assess differences in species, as well as objective criteria such as colour, smell, appearance, etc. (Avagnina et al., 2015).

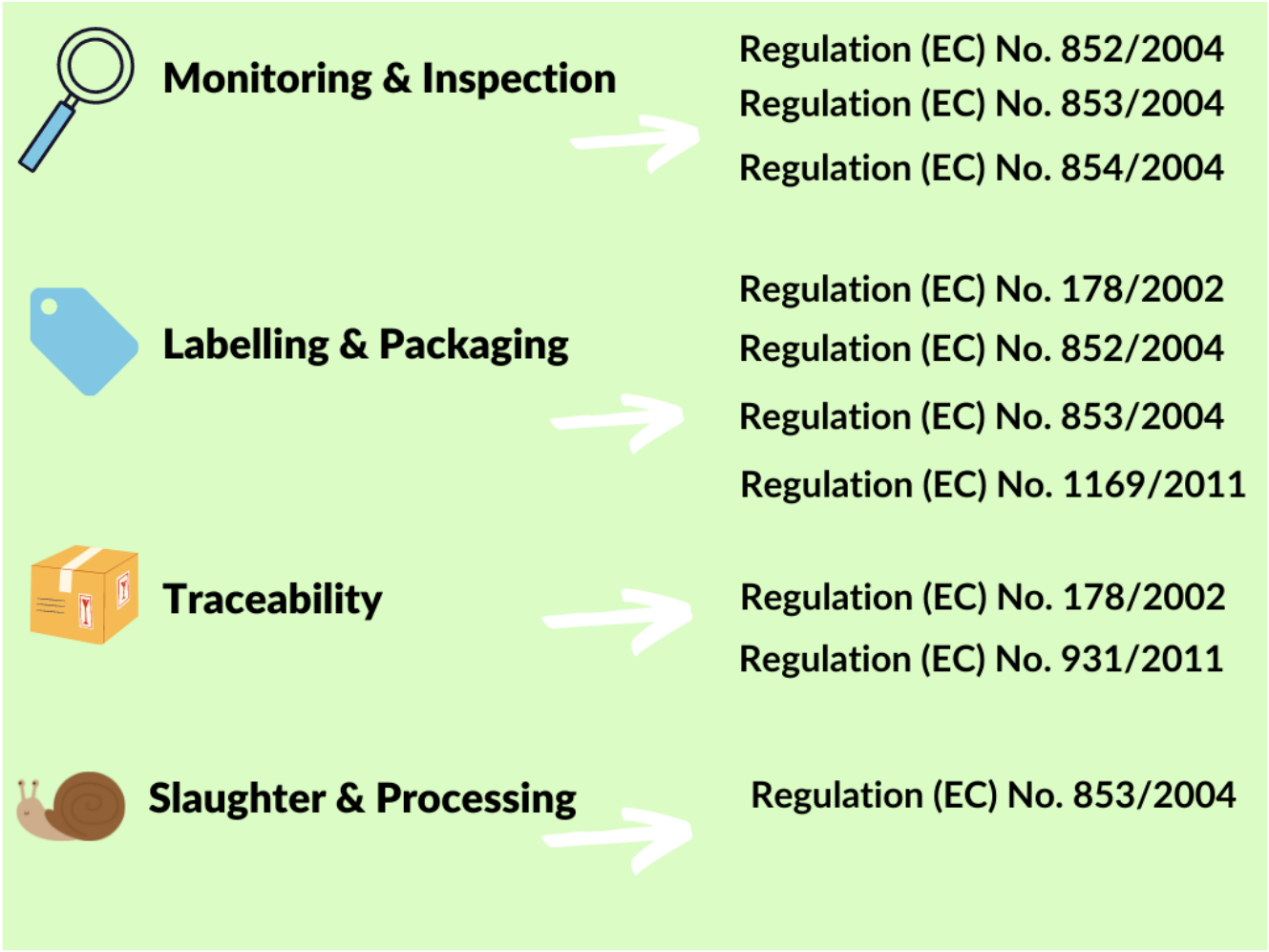
Other fundamental aspects that are dealt with in the European standards that we will see below are those of product control throughout the chain and consumer protection.

So not only must the product be controlled so that it is edible and not harmful to human health, but the final product must also contain all the information necessary for the consumer to decide to buy that product safely.

In the following regulations, therefore, we will have to consider some aspects that are fundamental to heliciculture., such as:

- Monitoring and Inspection
- Labelling and packaging
- Traceability
- Slaughter and processing

Before analysing the regulations, take a look at the following diagram:



In particular, the main laws concerning European food hygiene regulations that were introduced in Europe in the last years are the following:

Regulation (EC) No. 178/2002

The full text of the law is available at the following link (https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32002R0178) and can be downloaded in all the languages of the European Community.

This Regulation “laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety”.

This regulation constitutes the **regulatory basis for food production.** It represents the first basis of EU rules for food and feed production that respect human health. The **European Food Safety Authority** is established, it is a European agency responsible for dealing with risks associated with the food chain.

All stages of production are subject to this legislation: processing and distribution of food and feed.

The legislation is based on the analysis of the risk that can arise from food products, with the ultimate aim of protecting the health of the consumer. Food that is potentially harmful to human health must not be placed on the market.

Regarding trade, the general guidelines for importing and exporting a foodstuff are established.

Imported food must follow food standards that are similar to those in force in the European Community, the same reasoning applies to products exported outside the community, which must follow the rules of the third country.

The regulation specifies that food and feed business operators are obliged to comply with existing legislation at all stages of production processing and distribution. Furthermore, during all these stages, food products must be traceable, so that at the slightest risk the product can be removed from the market.

As already mentioned, through this regulation, the **European Food Safety Authority** (EFSA) is established (CHAPTER III, p. 12). This Authority is responsible for protecting consumer health by providing scientific advice on food and feed risk and collecting and analysing data on food and feed safety. This authority carries out its functions in an independent and transparent manner.

What are EFSA's main activities?

- Providing scientific expertise to the European Community and its member states
- Monitors and assesses risk in relation to food and feed products and their production
- Collects data
- Responds to food safety crisis management
- Protects citizens' health and ensures that they are clearly informed about food products

Regulation (EC) No. 852/2004

The full text of the law is available at the following link (https://eur-lex.europa.eu/eli/reg/2004/852/oj) and can be downloaded in all the languages of the European Community.
This law protects human health by regulating food products and their trade within the European community and found its foundaments in Regulation (EC) No 178/2002 and even before in the Council Directive 93/43/EEC of 14 June 1993 on the hygiene of foodstuffs.
This Regulation (EC) No. 852/2004, replaces Directive 93/43/EEC.

The standards of this Regulation act to respect and protect public health by imposing clear guidelines during production/breeding as well as during transport and trade.
This Regulation covers generically to food products and specifically to products of animal origin.
These norms are intended for food business operators and lay down general rules on foodstuffs. The whole food chain must be controlled and follow specific standards.
In the case of small producers, however, national rules must be checked, given the close relation between producer and final consumer.

A specific section concerns **FOOD BUSINESS OPERATORS' OBLIGATIONS** with the following definition: “Food business operators shall ensure that all stages of production, processing and distribution of food under their control satisfy the relevant hygiene requirements laid down in this Regulation” (Regulation (EC) No. 852/2004, p. 13).
This article lists the obligations for operators depending on which point of production they are dealing with. They have to make sure that the food product follows the food chain by complying with all standards, checking its quality and edibility.

The application of hygiene rules should be combined with the application of HACCP (Hazard analysis and critical control points) rules.
HACCP system is a scientific system for identifying and controlling hazards to ensure food safety (FAO, 1997).
The **HCCP system** is based on a set of rules (explained in article 5) as:

- Identify and contain possible hazards
- Establishing control points to prevent risks and the corrective actions to be taken

In addition to the relevant European and national legislation, the use of national and European guides to good practice is also encouraged. These guides are not binding for operators.
These manuals must first be approved by the Community.

The references for exporting or importing foodstuffs are given in order to protect the health of the consumer.

ANNEX I concerns the application of the Regulation to PRIMARY PRODUCTION in the following areas: transport, storage and handling of products and all related hygiene and health rules (risk of disease/contamination/cleanliness/feeding of animals etc.).
Foodstuffs must be protected from contamination throughout the food chain (from production to final transport). Establishments where animals are reared must be in good hygienic condition, maintaining a good standard of cleanliness. It is necessary to check that the animals are healthy and bred so that their condition is not altered, also checking the quality of the water and the food they eat. Food business operators must be careful to contain any risk of disease and outbreaks among animals, which could be transmitted to humans.

ANNEX II concerns the GENERAL REQUIREMENTS FOR FOOD PREMISES and explains the rules concerning the premises where the products are produced and processed and the regulations relating to their transport. The rooms where meat is processed must have certain characteristics, such as being easy to clean and sanitise. The same applies to the means of transport, which must be of an appropriate standard so that the meat does not deteriorate or become contaminated.

Regulation (EC) No. 853/2004

The full text of the law is available at the following link (**https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32004R0853**) and can be downloaded in all the languages of the European Community.

This Regulation establishing specific **hygiene rules for the hygiene of foodstuffs.**
The legislation applies both to operators in the sector and to establishments where products are produced, processed, and manufactured.
Establishments that are part of the food sector must be registered and respect the
relevant standards.
Food products produced and processed must have a **health mark** from the authorities certifying that they are fit to be placed on the market.
The import of products from outside the European Union is also strictly regulated and must follow well-established standards.

In this Regulation, snails are mentioned in Annex I (DEFINITIONS) in sub-paragraph 6 (FROGS' LEGS AND SNAILS). The definition is as follows: "Snails means terrestrial gastropods of the species Helix pomatia Linné, Helix aspersa Muller, Helix lucorum and species of the family Achatinidae".
Most of this Regulation deals with the slaughter sector and how operators working in it should behave during all stages of animal treatment. It therefore also refers to the post-slaughter treatment of meat.
The interesting thing is that in this legislation there is a section entirely dedicated to **FROGS' LEGS AND SNAILS** (SECTION XI). It concerns specifically the slaughter of snail meat. Same for other types of meat, snail meat must be slaughtered in an establishment designed for this purpose. Meat that is not slaughtered in the slaughterhouse cannot be sold as human food.
Meat from these specimens must be subjected to control procedures to verify that it does not pose a health risk to the consumer.

Regulation (EC) No. 854/2004

The full text of the law is available at the following link (https://eur-lex.europa.eu/eli/reg/2004/854/oj) and can be downloaded in all the languages of the European Community.
This regulation contains indications for **specific controls on products of animal origin.**
Some establishments have to be approved by the authorities and inspected to verify that they meet all legal requirements.
Controls cover hygiene standards and compliance with HACCP procedures. Food business operators are required to follow certain maintenance and hygiene standards. While audits will control the operations of food business operators, controls on product quality, i.e., meat, will be regulated by national legislation and controlled by veterinarians. This Regulation also provides for corrective actions to be applied in case verification and control find any inconsistencies. In the annexes to this regulation the tasks of official veterinarians are explained, so all the specific checks it makes on the meat and the health authorisations to use the product.

Regulation (EC) No. 2073/2005

The full text of the law is available at the following link (https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005R2073) and can be downloaded in all the languages of the European Community.
This regulation concerns the microbiological criteria for foodstuffs which food business operators must follow, and which are used to monitor quality standards. Using these criteria, it is possible to determine whether a foodstuff is marketable or not. Food business operators follow quality standards that comply with the HACCP system and guarantee the food safety of products and the production chain.

At line 1.17 and 1.24 are set out food safety criteria for “Live bivalve molluscs and live echinoderms, tunicates and gastropods”.

Regulation (EC) No. 931/2011

The full text of the law is available at the following link (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011R0931) and can be downloaded in all the languages of the European Community.

This Regulation concerns the traceability of food of animal origin, which were already present in the Regulation no. 178/2002. This document specifies all the information that a food business operator must have and provide when a product enters the food chain or is subject to controls by the authorities.

Regulation (EC) No. 1169/2011

The full text of the law is available at the following link (https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32011R1169) and can be downloaded in all the languages of the European Community.

This Regulation amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council.

This Regulation concerns consumer protection through the provision of appropriate food information.

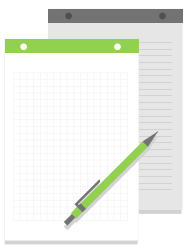
Defines what information a product must have in order to be placed on the market. Many pieces of information are required, while others may or may not be indicated. The origin and properties of the foodstuff, as well as its durability, must be specified. The most important information includes the ingredients and any allergens that may be contained in the product.

2.2 Good practices & Pitfalls to avoid

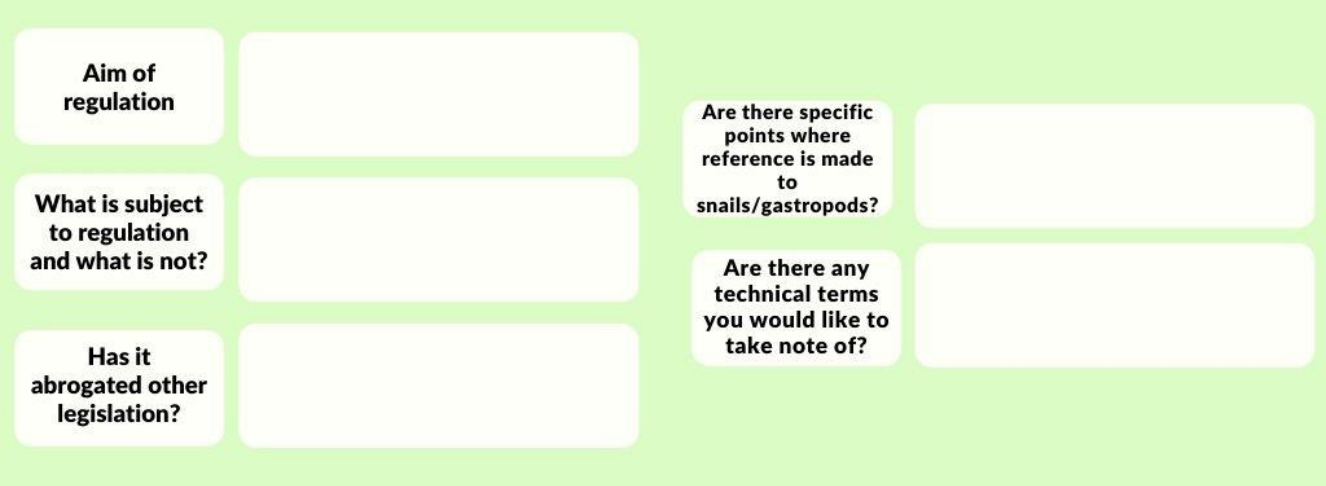
We propose an exercise to test and consolidate the knowledge acquired in this module.

PROPOSED ACTIVITY

1. Try to download the regulations we have examined in this module. Underline the main parts of the regulation and make a list with the most important rules to keep in mind.



2. Try to do research on the national heliciculture regulations in your country. Which national regulations apply in addition to the European ones? Follow the scheme below to help you visualise the first exercise:



2.3 Success stories, case studies, examples & more…

Many experts in the heliciculture field ask for new regulations about heliciculture, concerning more specific to this type of animal and more strictly regulating the marketing of snail slime.

In Italy (2020), a draft legislation has been presented to the Senate with this purpose. The proposed regulation should have validity into European Community.
https://www.senato.it/service/PDF/PDFServer/BGT/01157550.pdf#page=2
https://riviste.unimi.it/index.php/RDLV/article/view/3184/3382

2.4 Further reading

Additional resources can be proposed to learners in terms of continuing to learn:
http://apha.defra.gov.uk/documents/bip/iin/bal-3.pdf
https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009R1069
https://www.fao.org/3/i3253e/i3253e.pdf
https://www.foodstandards.gov.scot/downloads/Guidance_Document_1.pdf
https://www.fao.org/fao-who-codexalimentarius/about-codex/en/#c453333
https://www.gov.ie/en/publication/76707-products-of-animal-origin-for-human-consumption-snail-meat/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6452099/

3. Assessment

In the light of the regulations examined, some discussion questions will be proposed to the participants:

- Why are hygiene regulations so important?
- What diseases have been transported from animals to humans over time? Reflect with the class on the risk of this situation
- What is the relevance of the consumer within the regulations examined?
- What aspects did we cover that you did not expect in these European regulations?

4. References

Anonymous, 2014 Guidance on producing, harvesting and importing terrestrial edible snails for human consumption. Available online https://www.foodstandards.gov.scot/downloads/Guidance_Document_1.pdf

Avagnina G. et al. (2015). Manuale Di Corretta Prassi Operativa In Materia Di Elicicoltura. *Istituto Internazionale di Elicicoltura di Cherasco*. Available online https://www.salute.gov.it/imgs/C_17_pagineAree_1187_listaFile_itemName_2_file.pdf

FAO (1997) Hazard Analysis And Critical Control Point (Haccp) System And Guidelines For Its Application. Available online https://www.fao.org/3/y1579e/y1579e03.htm

Regulation (EC) No. 178/2002 Available online https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32002R0178

Regulation (EC) No. 852/2004 Available online https://eur-lex.europa.eu/eli/reg/2004/852/oj

Regulation (EC) No. 853/2004 Available online https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32004R0853

Regulation (EC) No. 854/2004 Available online https://eur-lex.europa.eu/eli/reg/2004/854/oj

Regulation (EC) No. 2073/2005 Available online https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32005R2073

Regulation (EC) No. 931/2011 Available online https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011R0931

Regulation (EC) No. 1169/2011 Available online https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32011R1169

Module X: Financial & technical aspects for setting up and operating a snail farm

Deliverable: A4

SnailVille

CIVIC Computing
Authored by: Silas McGilvray
Project Number: **2020-1-UK01-KA204-079017**

Co-funded by the Erasmus+ Programme of the European Union

1. Introduction

1.1 Description

Even if you're already familiar with agriculture, rearing snails is quite a particular and different sort of business. This module aims to explain the financial and technical aspects, both good and bad, of starting and operating a snail business. This will aim to include covering setup costs, setup procedures, running costs, and ongoing technical necessities.

1.2 Duration

1.3 Aim

Within this module, you will learn:

- Costs associated with starting a business generally
- Costs associated with a heliculture business
- Approaches to selling snails as a new heliculture business

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
The financial implications of setting up a snail farm	How to manage your business costs	Planning and budgeting

2. Main content

2.1 Learn about the financial and technical aspects of heliculture business

Snail farming, also known as heliculture, is an agricultural practice that can make for a profitable business under the right circumstance. The financial and technical aspects of setting up and running such a business are in all likelihood somewhat similar to other forms of agricultural practices that involve livestock rearing: proper enclosures must be invested in sufficiently and constructed, initial breeding specimens must be chosen and bought, and ongoing costs and technical work must be undertaken. However that being said, snails are a very particular sort of livestock and as such, it is necessary to enumerate in greater detail some of the financial and technical points to consider when starting your own snail rearing businesses.

2.1.1 General business costs

To start with, as with all businesses, there are a significant number of things to consider before even purchasing your snails themselves. Most initially, it is worth considering the general costs and technical requirements of setting up a business in your country in a general sense. These may be related to fees of various types for registering your business, or else possibly to the costs involved with ensuring you have the right legal status for your business. Doing this incorrectly can be even more costly however, in more ways than merely financial, and so it is highly advisable to do in-depth research into these matters.

Once you have done this research, and are in a position where you have the theoretical knowledge to start preparing the business, heliculture can in fact be much cheaper both in terms of start-up and running costs than similar equivalents, even in agriculture. Snails are not generally large creatures, and consequently do not generally need the space or level of food that other livestock might demand, for example.

That being said, it is still very important to budget before you start buying the materials and goods you need. Indeed, many businesses fail in their first few years precisely because they have not sufficiently planned these costs out. And it’s not even just the known costs that you have to budget for: studies suggest that two-thirds of new businesses face unexpected costs, so it is advisable

to plan for every possible scenario, and particularly the most costly ones.

Costs that you will be able to predict for any business, not just a snail farm, will include any consultants or other support you may use for strategizing and doing initial planning of your business. They may also include any marketing you choose to undertake for your businesses as it starts up and the cost of recruiting any staff that you might find necessary.

But aside from the one-off start-up costs, there will also be recurring costs to running a business. Some of these will follow on naturally from the start-up costs outlined above, others will develop as the business grows – either way, it remains extremely important to budget for these costs.
Recurring costs like this will include the cost of paying your staff and hiring new staff as the business grows, the cost of any repairs necessary to the enclosure or other heliculture tools, the cost of feeding and supporting the snails, as well as any ongoing marketing, promotional, or advertising costs that you might incur.

Many of these costs will be covered in other modules, such as the legal aspects, the promotional aspects, or the initial setup and general entrepreneurship of running a business. As such, this module will refrain from going into excessive detail on these issues, and outline them principally only where there may be particular financial implications for a heliculture business. For example, taking the previously mentioned example of promotion and marketing, this is likely to be a subject of great initial investment, considering that a newly launched business is unlikely to have a large network of contacts and clients. This might include costs of promotion on social media – most likely Facebook, Twitter, or Instagram. Although these websites are ordinarily free, it could be worth investing some money in targeted promotions, which have proven very effective if used strategically and carefully. Other, more traditional forms of advertising may also incur costs, such as buying advertising space in newspapers, billboards, or elsewhere.

2.1.2 Heliculture-specific costs

Delving into the detail of heliculture costs more specifically, consider the enclosure where you aim to keep your snails. Depending on how you aim to proceed with your business, there are a couple of options here, although the most pertinent option is likely to remain the outdoor enclosure. If you have the space and the outdoor climate available, this is likely to be the best option over the indoor or more compact enclosures, which tend to be able to house a considerably more limited number of snails.

Whatever type of enclosure you decide to build, however, there will be costs. Snails can be

reared indoors in greenhouses, or on smaller more domestic scales in stacked tyres, drums (as in empty oil-style drums), or clay pots.

Whatever method you opt for, you will also need tools to allow proper drainage in the habitat in question, as well as wire mesh or other coverings to both prevent escapes and protect the livestock from predators. As noted above, though, these costs are unlikely to be exorbitant, and the labour required to assemble the enclosure could well end up being the harder contribution to make. The exception here is a greenhouse, if you don't already have one.

Choosing an outdoor enclosure is in some ways similar, wire mesh to keep the snails in and predators out is still advisable, though if the idea here is to farm a greater number of snails (even if this is only a long-term aspiration), the amount of space and therefore mesh required may be considerably greater. Having established that, the amount of space required may be an issue if you do not have access to a sufficiently large outdoor space that is suitably for rearing snails. Having to rent or purchase sufficient land in which to farm your snails would in this case be a further, potentially considerable, cost.

Additional costs here will include the cost of feeding the snails. Many sources recommend simply growing the sort of plants and vegetables that snails like to eat in the enclosure, which will incur more costs and labour again. Furthermore, given that this sort of enclosure remains (despite wire mesh) more exposed than its indoor counterparts, it can be advisable to add extra protections – suggestions on this include a gutter around the outside of the enclosure with water and pesticide in order to prevent predatory insects being able to enter and eat your snails.

2.1.3 Making money from your snails

The opposite of costs in this context is of course earnings, and any businesses – snail-based ones included – need to earn money to survive. There are a number of different ways to sell snails, not to mention a number of different people to whom you can sell them. Principal buyers would be expected to be restaurants that serve snails on their menus, so initially it is a good idea to get in touch with restaurants local to your area. This is particularly true as supplying venues close to your business will reduce shipping costs and may well be more attractive to the buyer too, as local produce is generally a very marketable concept for restaurants. With that being said, snail products are also used sometimes in cosmetic products, so it could When you're well-established locally, you can then look further afield for more opportunities to sell your stock, if you haven't started selling outside your local area already.

The other thing to consider when trying to sell your snails is how you want to sell them.
There are three main ways in which you can do this: pre-cooked, raw, or live. The options you choose will depend on both your own business, its capabilities, and your customers. Your customers may choose buy your snails with you having already cooked them, if that is something that you have the skills and the equipment to undertake. Alternatively, on the other end of this spectrum, they may prefer to buy then snails and have them delivered still alive, doing the processing and cooking themselves. Finally, they may prefer that you kill the snails but then deliver them raw, so that the buyer in question can process and cook them in whatever way makes most sense to them. As mentioned, the option you go for will depend not only on your skills and the equipment that you have available to you, but also on the type of clients to whom you are selling: their brand and image, their menu and cuisine style, as well as logistical considerations such as how far away they are and the timescales of their deliveries.

2.2 Good practices & Pitfalls to avoid

In this section, we will explore some of the good practices to try when snail farming, as well as some of the biggest potential pitfalls to avoid as they relate to the financial and technical aspects of heliculture.

2.2.1 Good Practices

As with any type of business there are many good practices that can help sustain your business, improve your efficiency and drive up your profits. Given the sheer range of possibilities to enumerate, this document will not attempt to name them all, but rather give an overview of four of the key good practices:

- Do your research!

This point comes first, and alongside its own exclamation mark, because it is quite possibly the most important good practice to follow. In any start-up business, it is important to understand the industry you are in, and this is no less true for heliculture! Before you even consider spending any money at all on this new business, it is crucial to be familiar with details of the sector that only thorough research (such as with the Snailville materials!) can provide: which snails to get, how to breed them, whether to keep them indoors or out, how to make an enclosure, how to protect them from predators or environmental and climate concerns, and other such issues. This isn't just so that you can start your business either; throughout your time in heliculture, you will come across new challenges and unexpected issues that you will be able to handle much more smoothly if you have done your research!

- Plan everything out

The natural follow-on from doing a deep-dive into researching heliculture and business is planning our your heliculture business. This means deciding on your business approach, including all those things mentioned above like what specific sort of snails and enclosure you want, but also many other things. You'll need a comprehensive budget for your business, including every possible expenditure that you'll need to make, projections as to the income you can reasonably expect, as well as allowing for any miscellaneous expenses that you might incur. You'll also need to consider how long all of this will take you, particularly since that will inform how quickly you can begin actually making sales. This will include decisions about not just your approach to snail farming generally, but whether or not you intend to hire anybody to help you and also the scale of the operation you want to start with. Starting with more snails means more potential sales, but it will also be more work creating larger enclosures and looking after a much larger number of snails.

- Networking can pay off

Another thing that rarely goes amiss is networking. Even if you haven't formally launched your business yet, it can help a great deal to expand your contacts that could be of potential use once it has. Use every relevant opportunity: meet other heliculturists and farmers more broadly, restaurant owners and suppliers, and any other people or organisations that you might end up being involved with as a professional snail farmer. If there aren't any industry events, some sources suggest just going around farmers markets and make contacts there – there are plenty of opportunities to meet people who could be helpful to your business in the future. Even in the present though, it's never too early to get advice from other snail farmers on setting up, nor can you go far wrong listening to potential clients about what it is they need from a business like yours, even before you've started yet.

- Be realistic

This good practice, though perhaps more difficult to quantify, is as important as the others. It is all too easy to assume that everything will go according to plan as you kick your business idea off, only to be faced with delays or unforeseen challenges along the way. This doesn't necessarily mean you've researched or planned poorly though, sometimes things just don't work out the way you'd hoped. Perhaps unexpectedly poor weather or health issues have meant that you can't work outside as efficiently as you'd planned and so the preparing of the enclosure has been delayed. Perhaps, for any variety of reasons, the snails are not breeding quite as quickly as you'd hoped. Whatever it is, be sure to bake in some delays and difficulties to your plans so that you are prepared if and when they do happen. You can't know exactly what challenges you may face in advance, but you can be realistic about giving yourself the time and the money in your plans to deal with them properly.

2.2.2 Pitfalls

On the other hand, there are also plenty of pitfalls that it is advisable for you to avoid if you're looking to start a heliculture businesses. Again, for the sake of brevity, we will boil these down to a handful of the most important:

- Overcrowding

Snails may be extremely small compared to other livestock – that may even be why you chose to start rearing them – but no matter what the advantages may be in financial terms, don't make the mistake of assuming that they don't need space. Snails in enclosures can be overcrowded, a situation which can stunt their growth and even sometimes lead to cannibalism. As such, however tempting it may be to save money by using a smaller piece of land for farming, having fewer enclosure materials to purchase by making the enclosure smaller, or even simply by trying to cram as many snails as possible into a given area, don't do it!

- Overspending at the outset

Spending lots of money to get your new business' launch right is an appealing line of thought, in a way, but it's generally best to avoid following it. You might well think that you want your new business to be as impressive as possible from the outset, and really kick-start sales, but it doesn't often work this way in practice. Start-ups rarely make profits in their opening months, even if their launch is smooth and well-run. Beyond that, start-ups are untried and untested – you can do all of your research properly and make well-founded estimates, but ultimately you can never know for sure how your business will do. It's generally better to keep your costs to a minimum as you launch, treat it like a marathon, not a sprint, so that your business has a better chance of lasting into maturity and generating profit sooner.

- Trying to do it all yourself

Another trap that many new business owners fall into is not getting help. While it can be tempting to save money by not hiring employees and doing everything yourself, this is not a good idea. However multi-talented you might be, you can't do everything. There are only so many hours in the day and you're only human. It is important to strategically hire some expert help when you need to prevent you from over-exhausting yourself and from potentially making mistakes or doing important work over-quickly. This might mean taking on someone to do low-level admin, or it might mean hiring a full-blown accountant; it all depends on what you need.

2.3 Case studies and examples

Under the “Further reading” section below is an extended interview with the founder of a snail farm in England. Notable in this case study are details of the decisions that this business took in its infancy – particularly for the purposes of this module in the area of finance - and how some of these decisions changed as the business matured.

They note, for example, that the setup of their facilities were delayed by poor weather, emphasising the need for proper business and financial planning. This particular point about planning was underlined further by reports of the in-depth research that they did: undertaking a heliculture course in Ireland, starting in a location with a climate particularly suited to rearing snails, having ensured for themselves the opportunity and planning for expansion in the future, looking into food processing as regards snails and how best to sell them. They even called around potential customers to promote their business. Even then, the owners admit that they still had an unexpected amount to learn, not just about the snails themselves and their needs but also about regulations and laws and guidelines around food processing, safety, and other broader concerns.

Overall, there are vital lessons here about starting a business in heliculture: the importance of doing thorough research, of planning realistically and allowing time for unexpected delays, of being adaptable and willing to learn, and of networking with potential clients and suppliers.

2.4 Further reading

https://escargot-world.com/meet-the-snail-farmer-somerset-escargot/
https://www.wikihow.com/Snail-Farm

3. Assessment

3.1 Multiple choice questions

1. Which of these is a cost that you are likely to face as a new business?

□ Marketing and publicity costs
□ Legal fees and advice
□ **Both of these**

2. Which of these is not usually a place in which snails are commercially reared?

- Outdoor enclosure
- Greenhouse
- **Open meadow**

3. Which of these should you try to do before you start your business?

- **Networking with potential suppliers and clients**
- Hiring the staff you think you'll need for your first year
- Buying as many snails as possible

4. Which of the following statement is true?

- Snails are always sold alive
- Snails are always sold dead
- **Snails can be sold alive or dead**

5. Which of these is not a benefit of selling locally?

- Consumers often appreciate local produce
- **Snails do not keep well over more than a very short distance**
- Shipping costs are likely to be lower

3.2 True/False questions

1. Beyond building the enclosure, there are no real costs to snail farming

- True
- **False**

2. Snails must be raised outdoors, free range

- True
- **False**

3. New businesses should spend cautiously as they open to keep them going longer-term

- **True**
- False

4. Heliculture is pretty self-explanatory, so only a little research is needed before starting a business.

- True
- **False**

5. It is important to get as many snails as possible into the smallest possible space to maximise profits

☐ True
☐ **False**

3.3 Assignment

You have a friend who is planning to become a commercial heliculturists. They are pitching their initial business plan to you and hoping to get feedback so they can improve their plan and make their business more successful.

Your friend has their eye on a small plot of land nearby that they will turn into a snail enclosure where they will raise Helix Aspersa and sell it to local restaurants. They are planning to take out a large loan so that they can launch their business well, spending significantly on lots of snails to breed, all the best equipment to feed and raise them with, and lots of high-profile marketing in local areas, maybe even abroad if the first few sales go well. Their aim is to get as many snails as possible into the enclosure now, and then buy more land in a few months with the profits that they plan to make.

They plan to save money in order to allow all this spending by doing all of this work themselves – they have a part time job that should keep them going through the first few months, and then they hope to be able to do heliculture full-time. They've clearly done quite a bit of research on the heliculture side of things, and so seem confident that they will be able to manage all the aspects themselves.

What advice and feedback would you give them?

Indicators for correct answers

Multiple choice questions

Question 1: C
Question 2: C
Question 3: A
Question 4: C
Question 5: B

True/False questions

Question 1: False

Question 2: False
Question 3: True
Question 4: False
Question 5: False

Assignment

One of the first things you should notice about your friend's plan is that they plan to spend heavily at the outset – something young entrepreneurs are not normally encouraged to do. A better plan might be to keep spending low initially, and get yourself a good few reliable clients with whom you can establish strong relationships before you look to expand.

The next thing you might advise them is not to overcrowd the snails, even temporarily. Your friend is relying on profits that may not be enough to buy more land in this area, and if they cannot afford to buy extra land, the snails may suffer from the overcrowding, and have occasionally been known to resort to cannibalism in cases like this.

You should also counsel them to consider bringing someone else on board to help, especially since they are planning to keep a separate part-time job. This could be an employee who helps out quite generally on the snail farm, or a business partner who might be able to handle more of the business side of things, especially since your friend seems to have done more research on the heliculture than the still-important business side of things

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Module XI: Commercial and promotional aspects

Deliverable: A4

SnailVille

EUROCREA MERCHANT & ATERMON
Project Number: **2020-1-UK01-KA204-079017**

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1. Introduction

1.1 Description

This module aims to provide all the essential information and strategies to carry out before building a business in the heliciculture environment and is about explaining the significance of marketing strategies, digital marketing, and e-commerce in establishing a viable business. By understanding the multitude of services and options available in these domains, any business can create and maintain a competitive advantage.

1.2 Duration

6 hours

1.3 Aim

Within this module, you will learn:

- Applying the best strategies to build a successful business in the heliciculture environment
- Selecting the most effective strategies for your business as a snail farmer
- Carrying out a business plan to evaluate internal and external factors for the starting business
- The importance of marketing strategies;
- The importance of communication channels;
- What digital marketing refers to;
- Basic E-commerce principles;
- Basic tools to increase your business' visibility and ensure its sustainability.

1.4 Learning Outcomes

Upon completion of the module, you will achieve:

Knowledge	Skills	Competences
Knowing the main steps of building a business plan	**Be able to use several strategical marketing techniques as marketing analysis**	**Fully understanding the elements that make a snail farm successful**
Knowing the basics for a business in the field of heliciculture	**Being able to do the necessary research to assess one's own competitiveness in the market**	**Fully understanding the steps to test your business**
Marketing strategies	Cognitive and practical skills to understand the complexity of marketing	Grow and develop your business
Digital Marketing	Cognitive and practical skills to utilise new technologies	Increase visibility, ensure sustainability
E-commerce	Basic skills to choose among market segments	Grow your audience and revenue

2. Main content

2.1 Learn about Commercial and promotional aspects

Before starting a snail farm, it is necessary to assess the commercial and promotional aspects that are necessary for the success of our activity.

The commercial aspect concerns the strategy with which a business will get its products to the final consumer. It is therefore necessary to carry out some prior research to understand the environment in which our business operates, the distribution and sales aspect.

If we want to avoid wasting time and money on unproductive activities, we should certainly start with the business plan, which is the tool that allows us to verify that our activity is valid and has a good chance of success.

In the following paraghraphs we would like to present a whole-farm approach proposing the main steps to define a good business plan (Digiacomo, G., King, R., & Nordquist D., 2003).

The business plan is thus designed in several stages:

The business plan is a useful tool not only for those who are starting a new business, but also for those who are already snail farmer. It allows us to understand what the objectives of our activity are, the challenges and possible solutions and the future activities we want to operate in order to be successful in our field.

1. DEFINE YOUR VALUES:

First, we need to think about and focus on the **values behind our business**, which will guide all our actions. Think about what would make your business successful, something that reflects your ideals and the overall goals of your work. For example, do we want to breed snails organically because this is a fundamental value for us? Then all our subsequent actions, our “production system”, will be influenced by this parameter, i.e., that my farm raises animals organically and as environmentally friendly as possible.

2. STARTING POINT:

At this stage the aspiring farmer should focus on **understanding and defining his starting point**.

What were the choices that led me to want to start a snail farm? What aspects of snail farming do I know and what aspects should I explore in more detail?
It is also good to look around to understand the general situation related to snail farming that is present in my environment.
For those who have already started to breed snails, we advise you not to skip this point but to take some time to evaluate the choices you have made so far and understand whether the strategy of your business is suitable and is bringing you the expected results, or whether there are aspects that are not working and that we should change.

3. MARKET ANALYSES

Once we have identified our starting point and thus our starting situation, we can focus on the **product and the outside market**. If we breed and sell snails, we need to know the market and the target users of our product.

The aspects you should pay attention to are the following:

Product and features: If you start a heliciculture business your product will be snails. But as we have in these modules, snails are animals with many different uses: the meat for restaurants, the slime for cosmetics and so on. Try to identify well what your product will be used for and what other services, if any, you offer through your farm.

Try to think about your product. Why should they buy your product? What's different about it? Remember that the more special and unique a product is, the more chance it has of increasing demand. So, ask yourself how you can differentiate yourself from others, with breeding techniques, snail food, particular species etc.

Snail market: What are the market trends at national and international level? Is it a growing market with positive or negative trends? Study the snail markets to understand if your business model has already been tried by other farmers and see how the market has reacted. Is there demand for your product? Does the market already meet all the demand or are there market margins I can enter? This can help you understand whether it is worth investing in this sector and where to invest.

Customers: Have the final consumer in mind, the one to whom we sell our product. The question will be: who buys our snails? Who do I have to convince to buy my product?

Which sales channels should be considered?

- Markets that are organised in the fairs and districts
- Restaurants, agritourisms and the world of gastronomy in general
- Supermarkets
- Direct marketing selling directly to consumers
- Food wholesalers

Depending on where I decide to sell, I will have to modify my product (e.g., fresh or frozen snail meat) to meet the specific demand (Redazione di Intraprendere, 2021).

Selling your product at local markets or food fairs allows you to meet the end consumer directly. You will be able to tell them about the value of your product and your company and receive direct feedback from your target audience. On this occasion the product will be sold fresh and will cost more in terms of time and price than other types of sales. But you will have the advantage of promoting yourself and making yourself known.

Selling to the large-scale retail trade and to the gastronomic sector such as restaurants and agritourisms is certainly a good channel. Once you have made agreements with buyers you are sure to sell your product, and the cost in terms of time or effort is lower than in other types of sales. Our target audience in this case is the restaurateurs and not the end consumers, who are instead the restaurant's customers, with whom we will not have a direct contact.

Selling through a wholesaler or retailer is another good way to lower costs. However, a part of the proceeds of the sale will go to these intermediaries, even if we reduce the time and energy investment compared to, for example, direct selling. Also in this case, we will not come into contact with the final consumer, but we can try to differentiate our product through product packaging, logo and by trying to brand what we sell in order to be recognisable among other snail sellers. Another factor to consider, especially if we are still in the early stages of
our business, is that the price of selling through wholesalers is lower than through
other types of sales. We will have to do a good calculation to see if this is the
right choice for us.
In general, it is a market reserved for experienced breeders and those who breed a lot of specimens, so they can bear this kind of cost.

Competitors: Competitor analysis is necessary to check the attitude of competitors in terms of production/sale in a selected landscape and identify what I need to be

competitive in this marketplace (Qlutch. N.D.) At this stage we will analyse who the other snail breeders are, how they operate in the market, what products they offer and to whom and at what price.

Specifically, if we look at the snail selling sector, our main competitors will be three (Redazione di Intraprendere, 2021).

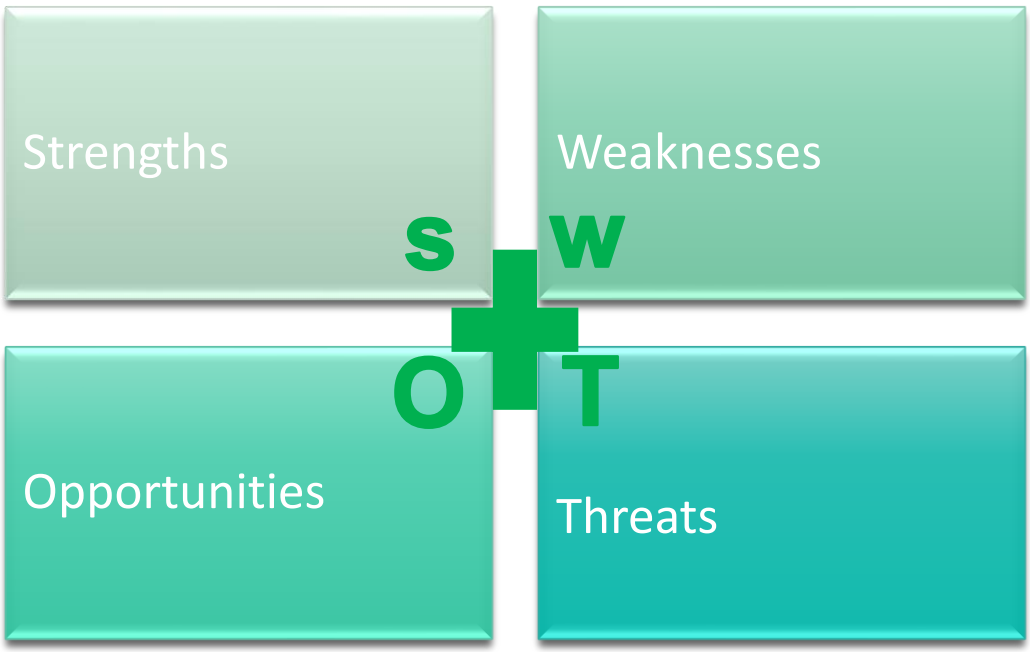
- Another snail farming
- Foreign importers
- Free harvesters

As a first step you should make a list of all competitors operating in your market (local, national and international). Group your potential competitors into three categories (Qlutch. N.D.):

1. **Direct group**: Snail farmers with an activity similar to your business
2. **Indirect group**: Activities that are not direct producers of snails but can still satisfy consumer demand (e.g., intermediaries).
3. **Future group**: Activities that are not yet in competition with yours but may become so in the future.

Now you just should analyse the competitors you have selected.

A useful tool we can use to test the competition and our competitiveness in the snail farming market is the **SWOT analysis**, which allows us to identify four factors of our competitors: Strengths, Weaknesses, Opportunities, and Threats.



In the STRENGTHS section, enter what your competitors' strengths are, why you think they are successful in the market and what makes them so successful.

Then proceed to the WEAKNESS section, where you enter the weaknesses of your competitors.

In the OPPORTUNITIES section you can write down the opportunities and therefore the advantages you can have over your competitors.

Finally, in the THREATS section, you enter the threats from your competitors' competition.

You should now have a clearer picture of how the heliciculture market is moving and should be able to target your strategy more effectively.
Now you have to focus on how to promote and sell your product. Taking into account all the factors analysed above, it will be necessary to consider about an effective marketing strategy.

4. STRATEGY:

Strategy is that series of actions to be carried out in order to reach our goal.

The 4Ps of marketing

“The 4Ps of marketing is a model for enhancing the components of your "marketing mix" – the way in which you take a new product or service to market. It helps you to define your marketing options in terms of price, product, promotion, and place so that your offering meets a specific customer need or demand” (Mind Tools Content Team. N.D.).

The 4Ps are:

PRODUCT:

The product is the fruit of your work, what you will sell and one of the most important aspects of your business. Make sure you are clear about what your product is and why it is special or different from others.

Your product will be snails or their slime, so you should focus on their quality. Your snails will have to be qualitative compared to those of your competitors. To do this, you have to be careful to breed and feed them in the best possible way.

PRICE:

After identifying the value of your product, you will have to price it in order to sell it. This obviously depends on several factors, such as the quality of your product, production costs, market prices, sales channels, etc.

In the case of snails, you will have to take into account the type of snail you have grown. Depending on the species, prices change. Selling to retailers or restaurants will give you a better price than selling through intermediaries or to large retailers, who favour quantity while keeping a lower price.

PLACE:

It is therefore essential to assess where to place your product. The channels, as we have seen, are many. Depending on your needs, you need to look for the right place to sell your snails and make as much profit as possible. Direct sales make it easier to get to know consumers and turn them into regular customers.

PROMOTION:

Promotion is essential to make the value of your product known and ensure that it is known and purchased. There are many different promotional channels (online advertising, brochures, word of mouth, etc.) and different costs. You will need to assess which is the best promotional channel for you and which will give you a good return in terms of revenue and visibility.

5. VISION, MISSION AND OBJECTIVES

Once we have reasoned about the motivations for starting a helicopter business and have prepared a strategy, we can move on to the next step: that is, building an overview of what we would like to achieve. Building a vision for the future helps us to keep in mind the direction in which we want to go and to find new ideas to develop.

The vision statement answers to the following question: “Where are we going?” (Ward. S. 2020).

Another important element to create is the mission statement. Identifying the mission statement is the way we tell others in a few lines why our business exists, our values and what we want to do (Ibidem). In this case the question is “Who are we?”.

Once you have the vision and mission of your business in mind, you need to identify the objectives. This step is necessary to have a clear strategy. Objectives are in fact what I want to achieve in carrying out my activity. Make a list of goals divided into short, medium and long term and highlight those that are most important or crucial for you to achieve.

6. MONITORING

Monitoring is a tool to help us assess whether we are effectively implementing the action strategy we had planned. It is therefore necessary to return cyclically to examine what we have done and see if we need to correct what we had planned. Are the goals I set still valid? Are the actions I wanted to use to achieve my goals still effective? If something has changed, your strategy will also have to change.

2.2 Post-Commercial and Promotional Aspects: Marketing, Communication & Sustainability Practices

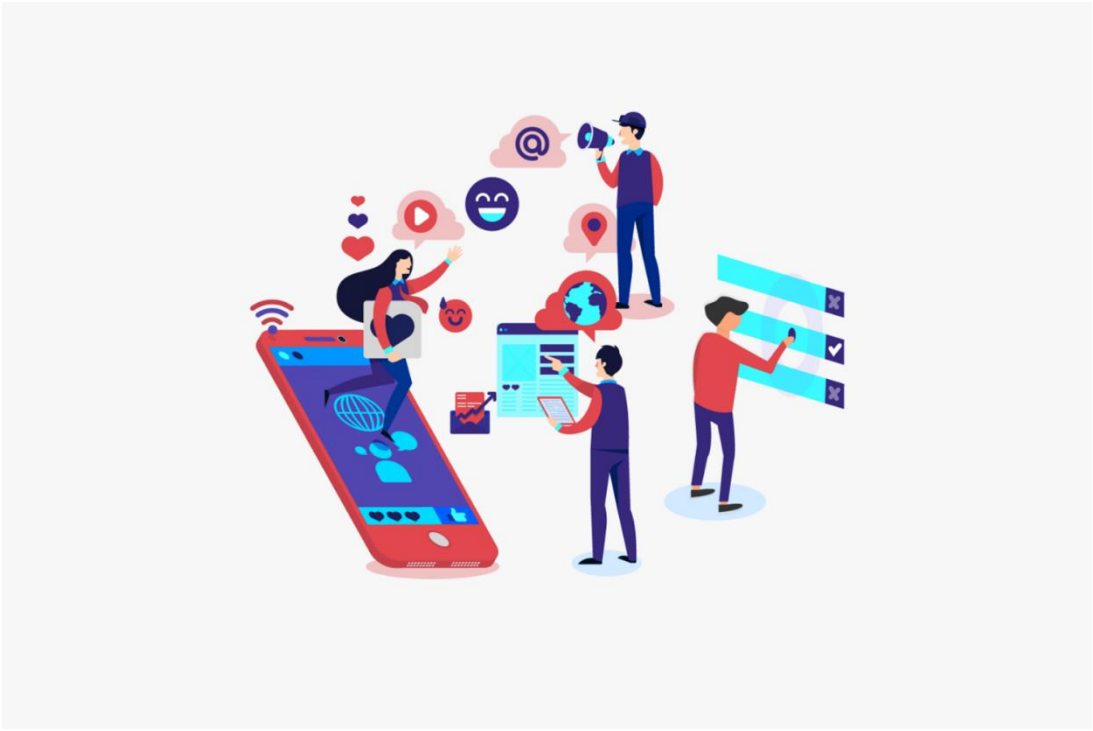


Image title: social media
Source: pixabay.com

Snail farming challenges do not stop with the establishment of the farm itself. Like any other business, snail farming requires post-commercial and promotional efforts in order to become visible to wider audiences and viable in the long run. For that purpose, snail farmers must invest in marketing and communication practices that will enhance their business' sustainability.

To utilise available practices and services, an aspiring snail farmer needs to understand the basics of marketing. Marketing is not just about sales; it includes a complex set of activities such as: "**public relations, sales promotion, advertising, social media, pricing, distribution, and many other functions**" (Study.com, 2021, 0:28'). Subsequently, marketing can be considered as having the *cumulative function* to "**communicate, deliver, and create value to the consumer**" (Study.com, 2021, 0:54'). To successfully do so, marketing must operate under a cohesive and effective plan that includes four elements, otherwise known as the *Four Ps* (Study.com, 2021, 1:29'):

- A physical **product or service**
- A **place (physical or digital)** where the product can be purchased
- A **price** for which the consumer acquires the product
- A **promotional process** using appropriate communication tools to communicate the company's message

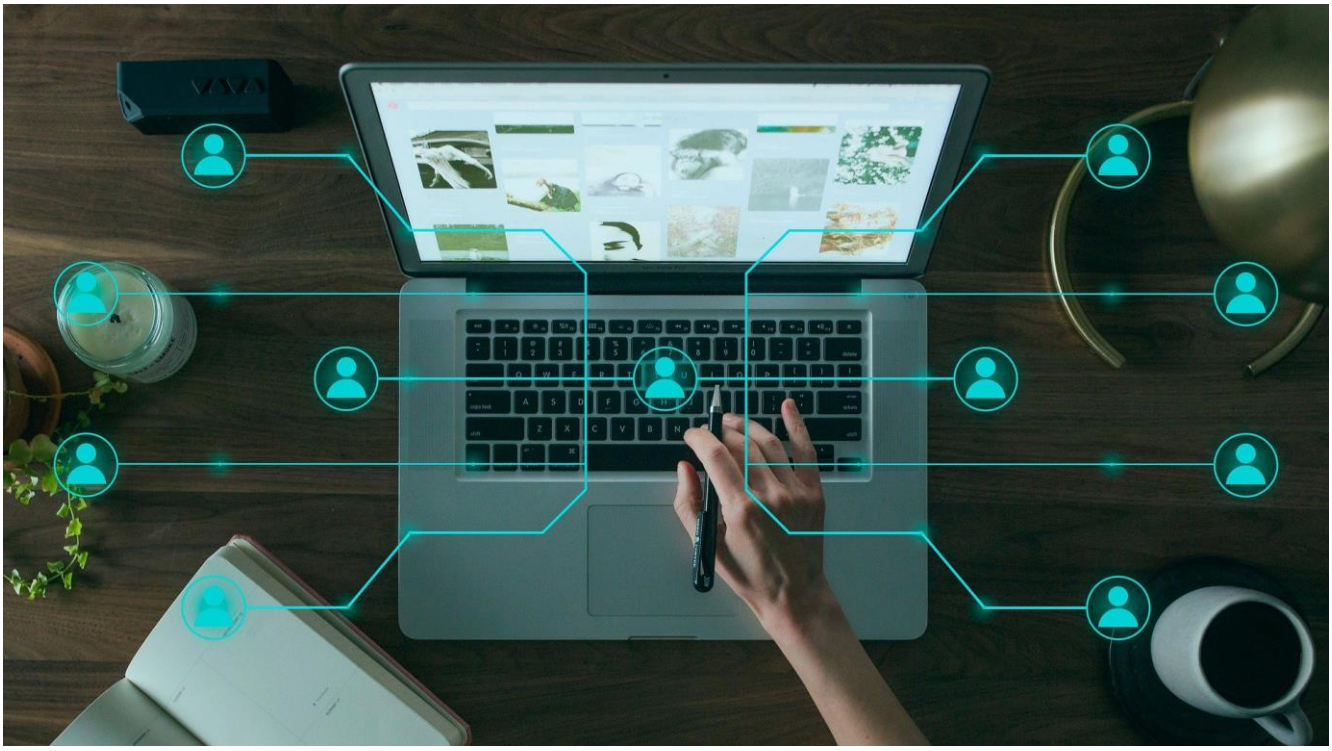


Image title: business
Source: pixabay.com

For strategic marketing to be successful, companies need to designate their competitive advantage to do this they use **S.W.O.T. analysis**, which has already been covered in this chapter, and choose their strategic alternatives accordingly. Usually, companies can choose a strategy for *development* and *growth* among the following four options:

- Market penetration (available product-available market)
- Product development (new product-available market)
- Market development available product-new market)
- Diversification (new product-new market)

(Soltani-Fesaghandis & Pooya, 2018, p.851).

If successfully implemented, these strategies can create and sustain a **competitive advantage** for the respective companies, i.e. the value that a company creates for its customers (Porter, 1985, p.xxii).

Digital Marketing

Digital marketing is "**the use of the Internet, mobile devices, social media, search engines, and other channels to reach consumers**" (Barone, 2021). As such, it includes numerous services and features like email communication, content marketing, search platforms, and many more. As it is digital, this kind of marketing facilitates the interaction with consumers via SEO (Search Engine Optimization) tools, forwarded ads, promotional tweets, and anything else that causes and records consumer feedback.

Digital marketing channels

Depending on a company's needs and budget, various channels can be used (separately or combined) to increase visibility and ensure sustainability. These channels are:

- Website Marketing (a customer-friendly website where the brand/product/service is represented and made memorable)
- Pay-Per-Click (PPC) Advertising (paid-ads-campaigns)
- Content Marketing (blogs, podcasts, ebooks, etc.)
- Email Marketing (creating customer acquisition funnels)
- Social Media Marketing (campaigning and raising brand awareness through social media)
- Affiliate Marketing (influencers promoting other people's products)
- Video Marketing (eg. via YouTube)
- SMS Messaging (SMS with offers and promotions)

(Barone, 2021).

Image title: SEO
Source: pixabay.com

E-commerce

Electronic commerce (E-commerce) is the term that describes "the **business model that allows companies and individuals to buy and sell goods and services over the Internet**" using smart devices (Bloomenthal, 2021). E-commerce operates in four market segments:

- Business to business (B2B)
- Business to consumer (B2C)
- Consumer to consumer (C2C)
- Consumer to business (C2B)

(Bloomenthal, 2021)

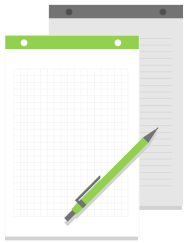
After identifying the market, the target audience, the competition, and possible expenses, the business must set a legal structure under which it will operate. What follows is the creation of an **E-commerce site** that will showcase and promote the company product or service.
At this point, the company must facilitate the payment process for its customers by setting up a **payment gateway** (Bloomenthal, 2021).

A payment gateway is “a technology used by merchants to accept debit or credit card purchases from customers” (Fernando, 2021). Another alternative is payment processing services like PayPal. Payment in cryptocurrencies is also feasible via specific gateways for blockchain technology (like Bitcoin).

Image title: digital marketing
Source: pixabay.com

2.3 Good practices & Pitfalls to avoid

We propose an exercise to test and consolidate the knowledge acquired in this module.



PROPOSED ACTIVITY

Try to imagine starting your own business as a snail breeder.

Think about all the elements seen in this module and outline your business plan by filling in the template below.

NAME AND TYPE OF BUSINESS	
VISION	
MISSION	
GOALS	
CURRENT SITUATION	
MARKET ANALYSISS	
STRATEGY	
MONITORING	

- To avoid misplacing resources, businesses need to conduct **Marketing Opportunity Analysis (MOA).** MOA can offer valuable insight into the market size, the profitability potential, and the competition, following the principles of the *motivation, opportunity, ability theory* (Gruen et al., 2005, p.39). Upon completion of such analyses, companies can choose which **target market strategy** suits them better:

1) targeting an entire market with one marketing mix (e.g. companies who sell necessities like milk),

2) targeting one single market (a specific demographic and specific needs)

3)targeting multiple markets with multiple marketing mixes (e.g. Disney)

- Digital Marketing poses certain challenges, as it revolves around channels and features that are constantly shifting or becoming overloaded with consumer-distracting information. Furthermore, the amounts of data that are transferred on the Internet are vast and, therefore, hard to analyse. For this reason, marketing needs to use solutions

that deepen the **understanding of consumer behaviour,** like, for instance, **website heatmaps** that reveal details about the **customer journey (Barone, 2021)**.

2.4 Success stories, case studies, examples & more…

We would like to introduce you to the “Chiocciola Metodo Cherasco”, a natural snail breeding method that follows very precise rules. This method was established in Italy by the International Institute Of Heliciculture Of Cherasco.
Discover this method: https://www.istitutodielicicoltura.it/en/snail-rules-and-regulations/
https://www.youtube.com/watch?v=tPnTrPpFvi0&ab_channel=IstitutoInternazionalediElicicoltura
In addition, the Presidend of this International Institute, Simone Sampò, invented a machine to extract snail slime without killed snails.
Watch the video:
https://www.youtube.com/watch?v=ac_iW3iA01E&t=15s&ab_channel=GreatBigStory

Snails House Farm, Ukraine
https://snails-house.com/

Snails House Farm is a snail farm company in Ukraine with a global consumer base. Delivering wholesale bulks of snails and by-products to companies and restaurants around the globe, ***Snails House Farm*** has become one of the largest companies that breed and supply snails in an ecologically responsible way.

The company has invested in multiple channels of communication that make its brand visible and sustain it as competitive: with successful marketing campaigns on social media (Instagram, Facebook, Pinterest), promotional videos on YouTube, a ChatBot on their website, physical promotional activities, as well as E-commerce, the company sustains its competitive advantage, fame, and revenue along with its high-quality standards.

https://www.youtube.com/channel/UCPUFAws3hg9QGSCUcv29UlQ

2.5 Further reading

Additional resources can be proposed to learners in terms of continuing to learn:
https://edepot.wur.nl/121824
https://www.gov.mb.ca/agriculture/farm-management/financial-management/pubs/software_farmplan_analyzingafarmbusiness.pdf
https://www.sare.org/wp-content/uploads/Organic-Transition-Planner.pdf

https://tice.agrocampus-ouest.fr/pluginfile.php/55014/mod_resource/content/2/res/u6_article2.pdf
https://web.wpi.edu/Pubs/E-project/Available/E-project-032117-223154/unrestricted/A_Business_Plan_to_Implement_Procedures_and_Operations_of_Snail_Farming_for_Higher_Ground_Farm.pdf
https://web.wpi.edu/Pubs/E-project/Available/E-project-032416-160443/unrestricted/HigherGroundFarmSnailIQP2016.pdf
https://www.youtube.com/watch?v=K6VlyWJiPck "The SME marketing challenge: tips to effectively embrace & invest in Digital Marketing"
https://www.wibbitz.com/blog/martech-stack-sme-marketing/ "4 marketing technologies SMEs need to use in 2021"
https://www.youtube.com/watch?v=136DZrKt6uA SME Challenge – Marketing to Secure New Business
https://www.forbes.com/sites/forbescommunicationscouncil/2019/10/09/four-creative-marketing-ideas-for-small-business-success/?sh=15f4e14e6198 "Four Creative Marketing Ideas for Small Business Success"
https://www.teagasc.ie/rural-economy/rural-development/diversification/snail-farming/ "Snail Farming"

3. Assessment

3.1 Debriefing questions:

In the light of the concepts examinated, some discussion questions will be proposed to the participants:

- What will the main elements to apply in your business to be successful?
- Have you already thought about some of the elements covered in the design of your activity?
- Mission and vision: what should be in your opinion the good concepts to insert in snail farming?
- Are there any strategic elements we have dealt with that you would struggle to implement? Which ones are you confident you can tackle?

3.2 Multiple choice questions

6. Marketing has the cumulative function to:

    Answer A Design, promote and sell high-quality products

- Answer B Meet with suppliers, negotiate with distributors, and collaborate with big chain stores
- Answer C Communicate, deliver, and create value to the consumer

7. An effective marketing plan must include:

- Answer A The four Ps: product, place, price, promotion
- Answer B A product and a price
- Answer C A consumer base already in place

8. To gain a competitive advantage you need:

- Answer A A unique product
- Answer B Strategic marketing
- Answer C A patent

9. S.W.O.T. analysis measures:

- Answer A Potential clientele numbers
- Answer B Company performance
- Answer C Strengths, weaknesses, opportunities and threats

10. A payment gateway is:

- Answer A The same as a payment processing service
- Answer B A technology that allows payments with debit or credit cards
- Answer C A shortcut to cheaper products

3.3 True/False questions

6. Marketing is only about sales.

- True
- False

7. Marketing needs a cohesive plan

- True
- False

8. A snail farming business does not need post-commercial and promotional services

   - ☐ True
   - ☐ False

9. PPC advertising is a digital marketing channel

   - ☐ True
   - ☐ False

10. E-commerce needs a payment gateway

    - ☐ True
    - ☐ False

3.4 Assignment

Add a real-life scenario that will work as an exercise to your readers. It can be an essay or anything that can make them think and practice their knowledge themselves.

Paul wants to check his company's visibility on the internet. He types the company's name in Google.com and takes a look at the results. Much to his dismay, his company does not feature in the first ten pages of the results! What should he do to increase his company's chances to appear at the top of the results (or, at least, on the first couple of pages)?

Indicators for correct answers

Multiple choice questions

Question 1: C
Question 2: A
Question 3: B
Question 4: C
Question 5: B

True/False questions

Question 1: False
Question 2: True
Question 3: False

Question 4: True
Question 5: True

Assignment

Write an indicative answer to your scenario.

Paul's company obviously lacks effective digital marketing. He should invest in SEO tools.

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