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MANUAL

Entrepreneurship in Rural Areas

through the production
and exploitation of medicinal and
aromatic plants

AUTHORS:

Dana Maria Bobiț, Mariana Ciufu,
Viorica Ghinea, Lāsma Līcīte, Aina
Muška, Līga Paula, Dina Popluga,
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Foreword

Rural entrepreneurship is the most sustainable solution for growth, employment and social integration in rural communities.

In studies, as well as in life, entrepreneurship is seen as the ability to initiate and realize something new in a legally organized framework and to find creative solutions for the purpose of obtaining production, selling it and, implicitly, making profit.

Sectors with a high potential for strengthening rural entrepreneurship are: agriculture, processing of agricultural products, basic services and tourism. In rural areas, entrepreneurship focuses on the development of agriculture. Soil is a very important way of living.

- ▶ If you want to work for yourself and your family;
- ▶ If you want to work in a profitable field;
- ▶ If you want things to better change and have a better life;

Then it's time to become your own boss, get started in the field of rural entrepreneurship

to secure a safe job and income for you and your family.

For many of us, setting up a business is associated with innate features of the entrepreneur/trader, and we often consider the lack of courage to start a small business because we were not born with the necessary skills.

And yet, it is not enough to be born with entrepreneurial skills to set up a business. In reality, it takes a lot of work, information and education.

Entrepreneurs can belong to any professional group. There are no „fated“ professions to produce entrepreneurs.

Unlike traditional cereals farming, cultivation of medicinal and aromatic plants is an increasingly profitable activity. Stores of herbal products are growing, consumers, especially those in the urban area, are consuming more and more medicinal and aromatic herbs. People have begun to understand the benefits of these products and to

focus on both the consumption of herbal teas and herbal products and homeopaths, as well as the use of cosmetics or food supplements.

It is the right time to start your own business in the field of medicinal and aromatic plants. You can start from the small free field in your own household, or in extended fields, or you can rent lands in your community! All you need is just to desire to work!

Through the training that you participate, and also in this manual, you will learn how to start your own business in the field of medicinal and aromatic plants. You will learn about the legal framework of organization for rural entrepreneurship so that you can choose what form fits you the most. You will find relevant information about organic agriculture in case that you will consider to certificate your products and maximize your profit. We present you 20 case studies of herbs from spontaneous flora that are in danger of disappearance, so that you can choose to start your business by cultivating these herbs in organized cultures and

you will know exactly what to do in order to obtain good quality products. In the end, we will teach you how to prepare your business plan in order to finance your business and to learn how to establish your goals and how to reach great results. Also, you will get your inspiration from successful case studies and business ideas in the domain of medicinal and aromatic plant production.

This manual and training course curriculum that ensures practical application of this manual were developed with the support of the Erasmus+ Strategic Partnerships Key Action 2 programme project “Education in rural entrepreneurship through producing and valorising of medicinal and aromatic plants”, 2016-1-RO01-KA204-024635.



PART I:

Basic Rules for Rural Entrepreneurship

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Basic Rules for Initiating a Business

1. DETECT THE CLEAR MOTIVATION FOR WHICH YOU WANT TO START AND DEVELOP A BUSINESS.

Whether you want to set up a farm or micro-farm plant to create a job, implement an activity that you passionately do or simply to earn money, it's important that everyone know their motivation;

2. TRAIN YOUR WILLINGNESS TO WORK ON YOUR OWN,

be prepared to assume your ideas and actions. In entrepreneurship you can not blame someone else in case of failure;

3. ORGANIZE A FLEXIBLE WORK SCHEDULE,

but be prepared to work longer than if you were an employee;

4. CREATE A VERY CLEAR IDEA OF YOUR CUSTOMERS,

who they are, what you can sell if they pay for your goods on delivery or at a payment deadline. It is also very important to understand **your customers needs:**

- ▶ what quantity can you sell?
- ▶ which is the quality criteria required by the client: vegetal products obtained by traditional or ecological agriculture, plant size at harvest, level of conditioning - percentage imposed by impurities (soil, vegetal debris, weeds etc.), maturation degree of the plant, level of primary processing: dry or green plants?
- ▶ Sign a contract with your customers to make sure you have a safe sale market. Check that

this contract contains information about the payment method and the quantity and quality criteria requested by the customer. Carefully analyze customer requirements and correctly evaluate the ability to meet customer requirements. If you do not obtain the agricultural products to the customer's standards, you risk not accepting your goods or be paid at a lower price than you expect, and the customer will no longer continue to work with you.

5. CORRECTLY EVALUATE YOUR FINANCIAL RESOURCES, EQUIPMENT, WORKFORCE AND TIME

- so that you have a clear vision of:
- ▶ what do you have before you start your business: land, workforce, seeds, agricultural equipment, including tractors, storage space for agricultural crops, certified space for production or crop primary processing – solarium for drying or for culture?
 - ▶ the community infrastructure supports the proposed activity: there are irrigation systems, what is the soil quality?
 - ▶ how much money do you need to invest initially in equipment, seed or planting material, land rent, land taxes or taxes for farm income?
 - ▶ how many people do you need to hire, how much daily work do you need, is there a workforce available in your community?

If you need to invest a considerable amount of money to start a business, set up a farm / micro-farm, then you have to be prepared to involve your own savings or financial resources

from credits or other forms of financing. In these cases, take into account that profit does not show up immediately.

Choice of the Proper Legal Framework

Rural entrepreneurship can be initiated both as a natural person (as individual) and as a legal person. Below we will present the legal framework for each form of organization.

AGRICULTURAL PRODUCER – INDIVIDUAL

If you choose to work as an individual and sell the obtained agricultural products, you must register as an agricultural producer by obtaining the Producer Certificate and the Agricultural Products Marketing Card (at least in Romania).

The Producer Certificate is a document issued to an individual carrying out economic activity in the agricultural sector, valid for the holder, and attesting the quality of the agricultural producer. The document shall be issued to individuals on request, after the authorities have verified, both on the basis of farm records and field data, whether there are any land areas or livestock for which the production certificate is required.

In order to be able to sell the products obtained on their farm / household either in the market or in other traders, the farmers who are individuals will also have to have an

Agricultural Product Marketing Card. This Marketing Card is the document used by the individual who holds the attestation of the producer as well as the spouse, relatives/ first-degree relatives, as the case may be, for carrying out the act of wholesale or retail trade of agricultural products obtained on the farm/ own household.

The marketing card shall be used exclusively for plant products, livestock products, and for bee products.

The book has a number of 40 cards, each card in 3 identical copies + another 5 non-removable cards. The first card of this booklet will contain data on the identity of the farmer as the holder and, as the case may be, of the spouse, relatives/first degree affiliates. Also included will be information on cultivated areas and corresponding structures on vegetable species, fruit trees, potatoes, cereals, oilseeds, wine grapes/grapes, other crops, respectively animal species, reflecting the production expected to be marketed. This card will be signed by the mayor and will remain unattached.

The product marketing card works virtually like a receipt. Specifically, when the producer sells agricultural products to both natural or

legal persons, the farmer will use the cards in this book as follows:

- ▶ the first copy is handed to the buyer;
- ▶ the second copy is kept by the seller;
- ▶ the third copy shall be kept in the carnet.

The exception to these provisions is the sale in agri-food markets, fairs and ambulance

markets, in which case agricultural producers are required to record in a card at the end of each day the agricultural products and the total quantities sold on that day.

Income on the Agricultural Product Marketing Card is not taxable!

Legal forms of Organization for Rural Entrepreneurship

If you want to produce and sell products in large quantities from areas over 2 hectares of land and if you want to grow your business through various forms of repayable and non-reimbursable financing, then it is recommended to establish a legal form. The forms of organizing an economic activity can be represented by two main categories:

- ▶ those without legal personality: Authorized Person (AP), Family Enterprise (FE) or Individual Enterprise (IE);
- ▶ those with legal personality: called Commercial Companies.

AUTHORIZED PERSON (AP)

Authorized natural persons, individual enterprises and familiar enterprises, natural persons or entrepreneurs holding an individual enterprise are obliged to register

and authorize the operation before starting economic activity.

AP as a form of organization is recommended for those who have a small business and can carry out this activity individually. AP is a simplified form of business and works in cases where only the associate's work is needed and not a very large business expansion. The entrepreneur may be authorized as a AP based on the studies and qualification obtained and may choose for certain fields of activity (Codes according to the Classification of Activities of the National Economy – CAEN).

The conditions to be fulfilled by a person for carrying out economic activities are:

- ▶ Age - must be at least 18 years old;
- ▶ Health status - must allow him / her to carry out the activity for which the authorization is requested;
- ▶ Qualification / professional training - evidence

must be provided that it has the necessary expertise to carry out the economic activity for which the authorization is requested;

- ▶ Criminal record - The person has not been convicted by a court decision that is final for committing deeds sanctioned by financial, customs laws and those relating to financial-fiscal discipline of the nature of those which pertains to this criminal record.

The training or professional experience shall be certified, as appropriate, by one of the following documents:

- ▶ Diploma;
- ▶ Certificate or attestation proving the graduation of an educational institution;
- ▶ Certificate of professional qualification or graduation of a vocational training, organized according to the law in force at the date of its issuance;
- ▶ Certificate of professional competence;
- ▶ Attestation of recognition and / or equivalence for individuals who have acquired the qualification abroad;
- ▶ Attestation of recognition of the qualification acquired abroad, outside the education system;
- ▶ Any other evidence of professional experience.
- ▶ The file to be submitted to the Commercial Register for authorization shall contain the following documents:
- ▶ Registration request;
- ▶ Proof of availability verification and name reservation;

- ▶ Identity card or passport;
- ▶ Proof of the head office.

INDIVIDUAL ENTERPRISE (IE)

The entrepreneur carries out activities as an economic enterprise without legal personality, organized by an individual. Unlike AP or FE, IE may have employees for the work for which it is authorized. Otherwise, AP or FE are subject to the same regulations.

FAMILY ENTERPRISE (FE)

The entrepreneur carries out activities as an economic enterprise, without legal personality, organized by an individual. The difference between AP and FE is given by family association, where entrepreneurs can also have family members. Family members within the meaning of this law are considered to be husband/wife and their children aged 16 years on the date of authorization of the family association and their relatives up to the fourth degree inclusive.

LIMITED LIABILITY COMPANY (LLC)

The entrepreneur can carry out any form of activity by employing himself personally. LLC may be constituted by natural or legal persons who, individually or in association with other authorized natural persons or legal persons, intend to carry out trade acts.

Legal forms of organization for rural entrepreneurship

The steps you need to go through to register a Limited Liability Company in the Commercial Register are described below.

→ DETERMINATION OF ACTIVITY OBJECT

Once you have decided which business idea you want to develop, it is necessary to prepare the documents for starting it. This involves putting your idea into an area of economic activity and encompassing the activities to be carried out by the firm in the categories included in the National Economic Activities Classification Code (CAEN).

Thus, you will have an object of main activity, and if you wish, you can select, even from this stage, an unlimited number of secondary objects.

→ SELECTING AND RESERVING THE NAME

The name chosen should allow customers to easily associate the firm with the products / services they offer. Also, must be taken into account the possibility of expanding business to other areas.

Once you have gone through these steps, you must reserve and register the name of your future business at the Commercial Register.

→ ESTABLISHING COMPANY'S HEAD OFFICE

It is necessary to sign a contract of a head office (rental / sub-lease or commodity) between the owner of the real estate and the future company. Headquarters can be set up at their own home.

→ SIGNING THE ARTICLES OF ASSOCIATION

The constitutive act will contain elements specific to each form of legal organization chosen for the company concerned.

→ SIGNATURE OF DECLARATION / SIGNATURE SPECIMENS

It is necessary to complete self-declarations showing that you have no criminal record and that you meet the legal conditions for holding these qualities - it is signed by the associates and the administrator.

Signature Specimen - Signed by the Company's Administrator.

→ DEPOSIT OF SOCIAL CAPITAL

The cash contribution to the social capital is mandatory for the establishment of any form of company, the minimum value is 40-45 EURO in Romania.

Cash deposits are deposited at any bank into a special account opened in the name of the company being established.

→ COMPANY REGISTRATION AT THE COMMERCIAL REGISTER

Registration of the company will be made at the Unique Office of the Trade Registry Office attached to the Tribunal in which the company's registered office will be located.

→ ISSUING THE COMPANY'S REGISTRATION CERTIFICATE

Once the documents filed with the

Legal forms of organization for rural entrepreneurship

Commercial Register have been analyzed and verified, the company's fiscal registration certificate will be issued. This certificate must be obtained from the Trade Registry.

→ NOTICES AND AUTHORIZATIONS OF OPERATION

If for the carrying out of certain activities it is necessary to obtain authorizations or approvals, they will be obtained after the registration of the company from the competent authorities: sanitary authorization, veterinary authorization, environmental authorization act, authorization from the labor protection.

The steps to be taken after registration with the Trade Registry until the effective start of the activity:

A. If the start-up phase of the company requires only obtaining documentation that provides the status of associate of a firm, there are immediately STARTING STEPS to be done to initiate the activity:

- ▶ Obtaining the stamp – for doing this are required: copies of company documents, delegation for the company's representative and a copy of his / her identity card;
- ▶ Opening the bank account - even if the social capital has been paid to a bank and an account is open, it is temporary and is open for the sole purpose of starting the business, it is not a current account, so payments or receipts can not be made through of this account. Therefore, it is necessary to confirm

the opening of the bank account with the original receipts (issued by the bank) and with the company document's;

- ▶ Obtaining the documents necessary for the legal establishment of the business (invoice, receipt, sales log, purchases, logbook, fiscal register, sole control register, etc.);
 - ▶ In case of starting a company without activity at the declared registered office, it is necessary to open a working place in another location, for which a declaration of commencement of the activity, a modifying document, the articles of association and the ownership or rental contract for the space where the working point is desired;
 - ▶ Engage an accountant to relate financially and lawfully to state structures;
 - ▶ Obtain specialized legal assistance for company contracts, for business meetings or for permanent legal assistance.
- B.** Enterprises without legal personality (AP; FE and IE) can carry out their activity from the moment they complete the following steps, after their registration at the Trade Registry:
- ▶ opening a bank account;
 - ▶ ordering and using a stamp;
 - ▶ filling in and submitting to the Tax Administration the Estimated Income Statement, a document available at the fiscal unit, within 15 days from the start of the activity together with a copy of the Identity Card and the certificate issued by the Trade Registry;
 - ▶ The following standardized documents

Legal forms of organization for rural entrepreneurship

must be purchased from specialized units for carrying out the activity under legal conditions: receipts and payments register, inventory register, receipts, invoices (if applicable) and other documents specific to each type of activity, according to the accounting law. If services are provided or they are selling goods to individuals then a cash register must also be purchased.

- ▶ **important to know:** the invoice will be issued when there is a service provided / good sold, and the receipt is issued when the money are received. Revenue is considered

to be the total of incomings and costs total of payments;

- ▶ registration with the County Health Insurance House, County Pensions Houses for taking into account as insured.

Each of the above scenarios has advantages and disadvantages identifiable from the level of constitution in terms of: costs, documentation and time requested, the level of taxes and duties owed to the state, the possibilities for highlighting and control of the activity, legal liability, material and financial needs.

Legal forms of organization for rural entrepreneurship

COMPARISON OF THE FOUR LEGAL FORMS:¹

	AP, IE AND FE	LLC
START-UP COSTS	Small (about 100 euro)	Relatively high (about 250 euro)
POTENTIAL FOR DEVELOPMENT	Reduced, no credits can be obtained. There are very few offers of grants with European funds.	Greater, high creditworthiness offered by the banking system, multiple programs for European grant funding.
EVIDENCE OF COMPETENCE IN THE FIELD OF ACTIVITY	It is necessary.	It is not necessary.
BOOKKEEPING	Simple Accounting. There is no need for an accountant, but due to frequent changes in legislation, it is advisable to consult an accountant.	Mandatory double-entry bookkeeping (monthly cost for bookkeeping starts at a minimum of 50 euro).
ACCESS TO MONEY	You have access to money anytime.	The money in the firm can be accessed only in the form of dividends after the annual balance sheet has been deposited.
BILLING	You can issue an invoice.	
VAT PAYMENT	You can choose to be a VAT payer (it is preferred in the trade, but not as a service provider). Beyond the € 35,000 turnover you become a VAT payer and you must register as a VAT payer at the tax office within 10 days of the date of your turnover.	Companies can choose for VAT at their inception, or they may be non-paying for VAT up to a turnover of 47 000 euro.
TAXATION	At start up, you can choose for: <ul style="list-style-type: none"> ▶ taxation based on the income rule - the rule is not lower than the minimum guaranteed monthly income. There is no keeping simple accounting; ▶ taxation on a real basis. Simple accounting (Gross income - Gross income - deductible expenses) = Net income. Net income tax = 16%. 	<ul style="list-style-type: none"> a) profit tax 16% b) gross income tax 3% of the turnover - CA - provided CA is less than 100,000 € and the company has between min. 1 and max. 9 employees. In addition, dividend tax is payable.

¹ Data available in Romania

Legal forms of organization for rural entrepreneurship

	AP, IE AND FE			LLC
EMPLOYEES	AP - you are not allowed to have employees	IE - An individual entrepreneur can hire up to 10 employees	FE – you can hire family members - up to 10 people, relatives up to fourth degree	Can have employees. The right to be an employer entails the obligation to pay social security contributions (about 29%) to the gross salary fund, which requires additional resources for the firm;
CAN YOU BE HIRED AT THE SAME TIME ELSEWHERE?	Yes			
RETIREMENT HOME	The person holding AP, FE, IE or PLC is obliged to sign an insurance contract with the Retirement Home.			
EMPLOYEES	AP - you are not allowed to have employees	IE - An individual entrepreneur can hire up to 10 employees	FE – you can hire family members - up to 10 people, relatives up to fourth degree	Can have employees. The right to be an employer entails the obligation to pay social security contributions (about 29%) to the gross salary fund, which requires additional resources for the firm;
CONTRIBUTION TO THE RETIREMENT FUND	It is calculated on the basis of the statutory minimum income and adjusted annually.			
NATIONAL HEALTH	The person holding AP, FE, IE or PLC is obliged to sign an insurance contract with the National Health.			
CONTRIBUTION TO THE NATIONAL HEALTH	5,5% of the income made as AP.			

Legal forms of organization for rural entrepreneurship

ASSOCIATION

The Association is the subject of law constituted by 3 or more persons who, on the basis of an agreement, share (and without the right of restitution) their material contribution, knowledge or contribution to work for the performance of activities in the general interest, of some collectives or, after case, in their personal non-patrimonial interest. The Association acquires legal personality by registering in the Register of Associations and Foundations at the Registry of the Court in whose territorial jurisdiction it is based.

The steps that are going on in order to register the Association in the Register of Associations and Foundations are:

- ▶ Obtaining the name reservation from the Ministry of Justice;
- ▶ Drawing up the constitutive act (statute), which includes the identification data of the associates and the proof of the headquarters - with a lease agreement / commodity contract;
- ▶ Establishment of the patrimony worth at least one gross minimum salary in the economy, at the date of establishment of the Association;
- ▶ Payment of different fees;
- ▶ Submission of the file to the Court in whose territorial jurisdiction the Association's headquarter is located;
- ▶ Issuing the act of setting up the Association.

Agricultural Farm

This is the basic production unit in agriculture. It consists of land and other items used for production such as buildings, machinery and tools. It has its own workforce. All activities and production are managed by a farmer. The farm differs from other production units because land is the most important factor and also produces certain natural goods that are used in later farm production.

The farm usually deals with plant or animal production and sometimes owns a kind of company that also manages the food

production. The farm may be a farmer's property, may be leased, may also be part of a company, cooperative or Association.

The farm has two spheres. The first is a technical and productive one, and it involves processing natural products in order to obtain other goods. The second sphere is an economic one and deals with the production process by establishing a relationship between products and prices as well as financial and value participation in production.

Legal forms of organization for rural entrepreneurship

ORGANIC AGRICULTURE

Organic farming is a system designed to produce fresh, tasty and authentic food that at the same time respects the natural life cycle of the systems. Due to natural fertilizer resources and insect control solutions, the countryside offers exceptional opportunities for organic farming.

For rural entrepreneurship to be sustainable, all the involved resources should be handled with responsibility so that your work meets the needs of the current generation without compromising on the future. All your actions have long-term effects. If you want your children to benefit from a healthy and fertile soil, then you must use certain chemicals to fertilize or to control pests or plant diseases. The desire to achieve a rich culture and quick revenue, significantly compromises the chances of creating a lasting activity with long-term material effects.

→ THE ADVANTAGES OF ORGANIC FARMING

Investments and operational costs of working with organic crops are higher, but the profit is also higher. The market price for organic products is more than 30 to 150% higher than the products for which fertilizers, insecticides and chemical pesticides have been used, because more and more consumers are willing to pay for the quality of their food, animal welfare and environmental protection. Many consumers, because of their desire to

know the evolution of „farm to fork” food, are starting to establish relationships with „their” organic farm. Therefore, many organic farms sell through direct delivery systems, or through agricultural markets and farm stores, or even offer programs for tourists to their farms. Such measures can help small farms to withstand the market, farms that would otherwise not be able to cope with the growing global competition. At the same time, organic products have a high potential to be sold to the export markets at higher prices.

→ BIO CERTIFICATION

In order to obtain and sell organic products printed with specific labels and logos, manufacturers must undergo a strict process that begins with a 3-year conversion period, during which substances considered non-ecological will disappear from the soil. If the soil has not previously been affected by non-ecological substances, the conversion period may be reduced. To reduce the conversion time, additional tests will be performed at additional costs.

Organic products control and certification are ensured by private inspection and certification entities. They are approved by the Ministry of Agriculture and Rural Development, based on the criteria of independence, impartiality and competence. Producers registration in organic farming is mandatory every year by filling in the organic farming registration forms available at the

Organic Agriculture

County Agriculture Directorates.

→ LONG-TERM DECISION

The decision to practice organic farming must be designed in the long run.

Taking into account the conversion phase and the requirements for the registration and certification procedures, the decision must be taken clearly and firmly. The economic benefits will not occur immediately – but only after the conversion phase and if you have developed the necessary relationships to sell products and you can get higher prices than conventional products.

→ ORGANIC FARMING PRACTICES:

- ▶ Crop rotation as a premise for efficient use of farm resources. Crop sequence (cultivation) of the plants is made according to certain criteria, so that each culture can find in the soil the most favorable conditions of growth and development. The rotation period can be 2-6 years. Crop rotation is one of the most important agrotechnical measures to increase production.
- ▶ Strict restrictions using synthetic pesticides and chemical fertilizers, food additives and other complementary substances used for processing agricultural products.
- ▶ Choosing plant species resistant to diseases and pests, adapted to local conditions.
- ▶ Fertilizer management. Soil fertility within the organic farming system must be maintained and improved by a set of measures that

promotes maximum biological soil activity and conservation of its resources. So, fertility and soil health are maintained through biological practices such as crop rotation, manual work, sowing, composting and mulching.

The permanent concern of any agricultural producer must be limited to ensuring a state of health and fertility of the land. It is well known that only healthy, balanced and fertile soil can provide consistent and quality crops.

If the soil is healthy, it will provide a proper environment for the growth of healthy plants that will be less affected. In organic farming, the basis of fertilization are natural mineral fertilizers and natural organic fertilizers, prepared according to a special technique and also certified. For the organic farming success, the organic materials required for the preparation of organic composts should come from agricultural holdings already practicing organic farming.

MANURE is considered to be a complex fertilizer in the organic farming system, and may consist of a mixture of dung and vegetable matter. It contains nitrogen (5 kg / t), phosphorus (2,5 kg / t), potassium (6 kg / t) and calcium (5 kg / t). Manure's quality and quantity depend on several factors: the species and age of the animals from which the garbage is derived, the feed used and the type of litter, the method and the period for storage of the garbage. This type of fertilizer is usually applied in autumn, which is then embedded with a complex effect on the soil, influencing its properties.

Organic Agriculture

Thus, soils containing larger amounts of clay become more permeable, deeper, the sandy ones become more structured, more linked, and the humus content, an important component of fertility, increases. Also, the biological activity of microorganisms and micro-fauna in the soil is improved.

Preparing and storing the manure is done at the garbage platform. It is a specially arranged place, far from stables and fountains, so as no smell or various diseases can be spreaded. The height of the landfill in the platform can be 2.5-3 m and is covered with vegetal remains or soil until the time of administration to avoid ammonia and nitrogen losses.

Transport to the lands and spreading must be correlated with soil work, and manure effect can be observed 2-3 years after application. Doses to be applied are between 10 and 30 tonnes / ha, depending on the cultivated species, climatic conditions and soil natural fertility. In wet and cool areas and heavy soils, doses between 25 and 35 t / ha are recommended, and manure can be used less fermented than in warm areas where drought occurs.

ECOLOGICAL MANURE is very important in organic farming, being an great source of nutrients and mineral elements for most cultures. It represents the soil obtained by the decomposition in approx. 2-4 years of old manure, used a season for seedlings. To prepare it, the manure is placed in piles and

it is occasionally soaked with water so that the decomposition of the organic substances proceeds normally. Do not use it alone, but only in mixture, because it can burn the roots of plants.

COMPOST is another type of organic fertilizer very used in the organic farming system. It can be considered a fertilizer resulting from aerobic fermentation (in the presence of oxygen in the air), a mixture of vegetable and animal wastes (leaves, cobs, straw, other herbs, manure), household waste, urban sludge or zootechnical resulting from the treatment of waste water. Theoretically, everything that has been consumed for plant growing and producing fruits, must be returned to the soil.

In the ordinary practice, compost is obtained by placing successively layers of vegetable matter and manure, on a loose and permeable soil. The resulting platform of at least 2 x 3 m must be laced and slightly damp. Add these layers to a height of about 1.5 m, then cover with a layer of straw and soil.

The decomposition of these components lasts from a few weeks to several months, depending on the nature of the organic matter and the climatic conditions. It is also necessary to wet the pile periodically and to cover it with a layer of soil or straw. When all the processes of natural decomposition have ended, the compost must finally look and smell like forest ripe land.

Organic Agriculture

In order to avoid some nutrient loss, compost should be used as soon as the fermentation process is completed and the application rate will be 10-12 t / ha due to the fact that it is poorer in nitrogen, but richer in elements such

as phosphorus, potassium and calcium. The compost must be applied by spreading on land and can be incorporated into the soil either by plowing or by disc harrow.

10 COMPOSTING RULES

1. Composting material needs air. Do not compact the platform and optimize mixing with coarser debris (cobs, branches, etc.). The platform will be made on the ground rather than in the pit and will not be covered with foil.
2. The platform will be always built on the ground because it must allow access for the living thing involved in the transformation process.
3. Green residues and damp manure should be added in thin layers to prevent any rotting phenomenon.
4. The drying of the materials should be avoided, the composting process requiring humidity. Eventually, light splashes may be applied.
5. Excessive humidity of debris subject to composting should be avoided, which can result in soil compaction and air elimination resulting in rotting.
6. Domestic waste or those that emit unpleasant odors will be mixed with clay dust. The addition of clay dust can be done every 10 cm of layer.
7. When all debris has been placed on the platform, it is covered with a layer of straw and soil to prevent excessive drying or humidity and to stimulate the heating of compostable mass in a first phase.
8. After 1-2 months, the compost stack will be homogenized and reconstituted again. Dry areas will become damp.
9. The more variety composting materials will be, better the quality.
10. Never compost large quantities of the same material.

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The compost resulted can be used after 8-10 months.

In addition to organic fertilizers in organic farming, fertilizers of mineral origin are also accepted. According to the legislation in the field of the organic farming system the following mineral fertilizers are accepted:

- ▶ Mineral nitrogen fertilizers: Chilean nitrate (16% N);
- ▶ Mineral phosphorus fertilizers: natural phosphate containing cadmium – 90 mg/kg P₂O₅ or less; aluminocalcium phosphate containing cadmium - less than or equal to 90 mg / kg of P₂O₅, (limited use on basic soils (pH> 7,5), phosphate slag (Thomas slag), flour of bones;
- ▶ Mineral potassium fertilizers: Potassium salt (kainite, silvinit), potassium sulphate containing magnesium salt (crude potassium salt derivative), ash from coal-free coal, ash from burning of vegetal remains, straw garbage;
- ▶ Fertilizers with calcium and magnesium: calcium carbonate from natural origin (limestone, lime, rock calcium, chalk, chalk phosphate) solution of calcium chloride, calcium carbonate and magnesium of natural origin (chalk, magnesia, rocks calcium and magnesium powders), calcium sulphate (gypsum) only of natural origin, magnesium sulphate (kieserite) only of natural origin;
- ▶ Silicon mineral fertilizers: finely milled silicates (quartz, feldspar, basalt, ortoclas);
- ▶ Other fertilizers: elemental sulfur, sodium

chloride salt only in the mine, rock powder, waste products from the manufacture of sugar, yeast, ammonia distillate from the distillation excluded, trace elements (boron, copper, iron, magnesium, molybdenum, zinc).

SOIL WORKS

These include operations which are executed by different machines and equipments and are practiced with the purpose of loosening, grinding, leveling the ground, incorporating fertilizers and amendments (Ca and Mg), and combating weeds and pests of medicinal and aromatic herbs by preventive methods.

Another significant contribution of these soil works is the fact that sowing or planting will be done in optimal conditions and the plants will have good growth and development conditions and will lead to a good and high quality harvest.

In a crop technology, soil works are an important part and therefore they must be done under the best conditions. Thus, the farmer needs to know some of the particularities of the land, the type of soil, the presence of the weeds, some characteristics of the species cultivated for a proper development of the working methods, the necessary equipment and the execution indices.

On sloping terrains, work will be done along the slope to prevent erosion of the fertile soil layer with water. Also, plant debris should

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be thoroughly chopped prior to cutting with a disc harrow, so as not to make it difficult to perform the ploughing and other work. Soil work should be done as much as possible within the optimum humidity range, in order to have a minimum energy consumption.

Depending on the cultivated species, several soil works are performed. The number of works and the order of their execution represent the soil works system.

The most important work is the plowing, which can be done usually at 15-20 cm deep, and for some species it has to be done deeper at 20-30 cm. The soil works must compulsorily start with cleaning the soil, immediately after harvesting the pre-plant, made with disc harrows, for shredding all vegetal remains and weeds.

The basic plowing, made in summer or autumn, is mandatory, and those during the year necessary for the establishment of successive crops can be replaced by going with the cultivator or the plow to mobilize the soil on a depth of 18-22 cm. When the soil is too dry after harvesting the pre-plant, in the autumn, it is possible to replace the plowing with heavy disc harrow.

Soil maintenance and leveling can be performed immediately after the plowing or the spring while preparing the germinating bed. This is done before the sowing, in order not to create conditions for water loss in the soil. This work can be done with a combiner for the very good ground, especially for the species having

very small seeds (white mustard, marjoram, sage, caraway), as well as with a disc harrow in the aggregate with a ribbed groove. In practice, the combiner is recommended.

Roller can be executed when the soil is too loose before sowing or when the seeds of the cultivated species are too small and optimum moisture conditions for germination have to be created.

Seed and sowing or planting seedlings. The propagating material must be derived from seeds or seedlings produced by organic production methods and must not come from genetically modified organisms or any products derived from such organisms. These seeds or propagating material must meet standards in terms of germination, purity, botanical composition, health status. It also has to come from the harvest of the previous year, because the germination properties are very quickly lost. Organic production methods for seedlings must comply with the following conditions: they shall be treated for sowing only with products which are accepted for organic production and will come from a producer who practiced organic production techniques.

WEED CONTROL IN ORGANIC FARMING SYSTEM

Weeds are plants that we do not want in agricultural crops and can be a serious problem within the organic farming system

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because chemical control is forbidden. They can cause both quantitative and qualitative damage to crops by stealing crop plants for water, nutrients or light. At the same time, weeds are those that can host for various pathogens or for pests present in crops, and some may be even toxic (solanum nigrum = black nightshade).

Weeds control in the organic farming system is achieved through a series of measures that integrate both preventive, curative and biological measures. Preventive measures aim at preventing the occurrence and spread of weeds. Some crop-specific weed species can be rotated, which leads to the development of weeds in a smaller number and thus avoids their exaggerated multiplication, as is the case with monoculture or repeated culture.

→ WEED CONTROL METHODS IN ORGANIC FARMING ARE:

- ▶ Application of fertilizers and amendments (Ca and Mg) can help to reduce the number of weeds. Thus, there are weed species that develop in a reaction to acidic soil (horse tail, Ranunculus repens = creeping buttercup, Rumex acetosella = sheep's sorrel), and others in an acidic reaction (sweet wormwood, dandelion, chicory). Also, manure applied directly to crops contains a large number of weeds seed that have retained their germination capacity, so culture can be further enhanced with weeds. Under these circumstances, it is recommended to apply

amendments (Ca and Mg) that can correct the soil reaction and organic fertilizer or compost.

- ▶ Soil works can also influence the degree of soiling. By performing deep plowing, favorable conditions are created for exhaustion of roots or weed seeds as they are oxygen-free and die. Making soil works after plowing and until sowing can help reduce the number of weeds. They will be destroyed more easily when they are in the early stages of vegetation and are not mature to develop vegetative propagation organs.
- ▶ Certified and conditioned biological material. For sowing and planting it is necessary to use certified biological material. This is a guarantee of biological purity and the fact that the material is conditioned, meaning that it does not contain weed seeds that can become sources of culture infestation.
- ▶ Sowing in the optimal stage. Any deviation from the optimum sowing period can result in unsatisfactory crop densities, at an irregular rise, with gaps, which may favor the appearance of weeds. A well-matured vegetal carpet with vigorous and well-developed plants that can fight weeds for vegetation factors, can cause weeds to be weaned and reduced in number.
- ▶ Destruction of weeds on uncultivated land. This method is very important because uncultivated land can be sources of spreading and occurrence of weeds. The edges of the fields, the roads, the slopes,

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the irrigation channels, the places near the protection areas or the forests can be real sources of weeds. These are also places to ensure biodiversity and areas for useful fauna species. Therefore, according to the requirements of organic agriculture, these aspects must also be taken into account, and it is advisable to destroy only the problem weed species.

- ▶ Cleaning of agricultural machinery before changing the plot. This is necessary in order not to impregnate culture seed with weed seeds, as well as to avoid transporting them from one plot to another.
- ▶ One of the measures commonly used in the cultivation technologies of medicinal and aromatic plants is manual weed cleaning. This involves removing weeds by pulling out of the crop with root to avoid locking them back. Cleaning with weed hook is a work that can be used especially for crops sown in frequent rows and where manual work is no longer possible. The weeds are cut at 1-3 cm from the ground level, and removed, avoiding injury or trampling as much as possible.
- ▶ Hoeing (manually) is a work commonly found in medicinal and aromatic crops. This is done with the help of a hoe that cuts and destroys the weeds, but it also contributes to the loosening of the soil, the destruction of the crust, the improvement of the aeration conditions, temperature and humidity at the ground level. Usually the number of this

work can be 1-3, but can be done whenever necessary, depending on plant species or climatic conditions.

- ▶ Mowing is also a work by which weeds are removed before forming seeds, with the help of a scythe. It is recommended to be used to control weeds at the edges of fields, roads, meadows, or crop gaps.
- ▶ Mechanical weed destroying is usually done with a cropped or rotating grapple harrow, at the time the plants have formed the root system, the soil is loose, and the weeds are rising.
- ▶ Mechanical hoeing can be done with a cultivator or animal trapping thruster that acts between the rows of plants. The work can be done 2-3 times in a row, depending on the degree of weeding, the pedoclimatic conditions.
- ▶ Thermic control is used by farmers on small surfaces and is based on the use of the flame given by a burner of a gas bottle. Weeds that have risen or are emerging are destroyed from the superficial soil layer. This practice is total different from the burning of stubble which is banned according to the principles of organic farming.
- ▶ Soil mulching. Due to the weed's properties to remain inactive in the absence of light, one of the methods used to control weeds is soil mulching. This practice uses: straw, vegetable debris, leaves, sawdust, compost etc to cover the soil. Sometimes it is also used to wrap with a dark plastic foil. Without

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light the weeds disappear and water is better preserved in the soil and microorganisms are protected.

- ▶ Ground preparation in the dark or with covered machinery. Some specialists recommend that the preparation of the sowing field should be done at night, because some weed seeds are inhibited by the absence of light and no longer germinate. It is also recommended to cover the plowing and preparation of the germinative bed machinery with dark tarpaulins so that the weeds do not come into contact with the light.
- ▶ Challenge method (forcing seed germination). This method, recommended by the literature, refers to the fact that weed seeds are stimulated to germinate and rise and then are destroyed with a superficial work with a disc harrow, then embedded underneath the plow. It runs out of the growing season of crops and it is also known as stubble-turning.
- ▶ Method of exhaustion. The principle of this method consists in the destruction of perennial weeds, which are multiplied by vegetative seeds or organisms and which resume their vegetation on the basis of the reserves of organic matter in the soil, and through repeated soil works the reserve substances are exhausted and weeds vegetation can not be initiated.
- ▶ Biological methods. Insect fighting is based on the use of insect species to destroy

weeds. This method is less used because ecological imbalances may occur. Fighting with phytopathogenic fungi is based on the ability of some weeds to be destroyed by some pathogens. For example: fighting *Cirsium Arvense* with the help of rust *Puccinia punctiformis*, as well as the control of *Senecio Vulgaris* with the help of *Puccinia lagenophorae*.

- ▶ Biodynamic methods. These methods are based on the principles of the biodynamic agriculture concept that the occurrence of weeds is inhibited by the introduction into the soil of the ashes obtained from the burning of their own seeds. Other practical techniques are also recommended, such as: obtaining ash by burning seeds and diluting them with sand or dry soil in equal parts and then scattering uniformly into the areas where the seeds were harvested.

COMBATING DISEASES (PATHOGENS) IN THE ORGANIC FARMING SYSTEM

As well as controlling weeds, disease control is closely related to crop rotation, soil selection, early planting time, fertilizer use, certified seed material, seed sowing, optimal density and harvesting time and in good conditions. Methods of disease control can be: preventive methods, curative methods and biological methods.

- ▶ Phytosanitary quarantine. Phytosanitary quarantine measures are mandatory for any

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commercial transaction with agricultural products, seed or planting material. Also, for the import and export of products from medicinal and aromatic plants, a phytosanitary certificate stating that they are free of pathogens is required.

- ▶ Concentration of seed and planting material, meaning carefully examination of the biological material used to establish a new crop and elimination the one exhibiting different attack symptoms (spots, yellowing, necrosis, brunification). Due to the fact that pathogens are of microscopic size, it is sometimes very difficult to detect them. These can be seen more easily in crops that can be set up by seedlings, such as mint, lavender, thyme or basil.
- ▶ The destruction of spontaneous floral weeds that can host pathogens should be carried out immediately.
- ▶ Forecasting and warning. In the case of plant protection, the Specialist Services release the forecast and warning bulletins that help farmers prevent or counteract the emergence of various pathogens. These warnings occur depending on climatic conditions and refer to the imminent occurrence of diseases in medicinal and aromatic herbs.
- ▶ Curative measures for combating diseases in medicinal and aromatic plants: burning of plant debris infested with diseases, removal of parts of the plant (leaves, flowers, fruits) attacked by the various pathogens; solariuming for disinfecting attacked seeds

and fruits, consisting in their exposure to the sun and then shaking periodically.

- ▶ Biological combat is one of the important measures and is based on spraying plants with various preparations made from fungi and bacteria and destroying phytopathogenic fungi that cause damage. An example of this is the Trichodermin preparation containing spores of the *Trichoderma lignorum* fungus, and is used to combat some fungi such as: *Phyitium sp.* (fall of small plants), *Fusarium sp.* (*fusariosis*), *Rhizoctonia solani* (*rhizocyttonia*).
- ▶ Genetic methods aim at obtaining by genetic improvement of plant species showing tolerance or some resistance to the attack of various pathogens.
- ▶ Biochemical methods. According to legislation, in case of disease control, the following are admitted for use:
- ▶ Copper-based products: bordelae, Copper as copper hydroxide, Copper oxychloride, Copper sulphate (tribasic) or Cuprous oxide to combat mash, fusariosis, rot.
- ▶ Sulfur-based products: mucilable sulfur or sulfocalcicide.
- ▶ Sodium silicate is a liquid product used to combat rot, sclerotin and plant fall.
- ▶ Compost extract is used to combat mildew.

PEST CONTROL IN THE ORGANIC FARMING SYSTEM

As pests (animal organisms attacking plants and plant products), the following may

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be exemplified: mites, nematodes, insects, molluscs, birds and mammals. To control these pests as well as to pathogens, preventive, curative and biological measures are recommended. In addition, the installation of nets and fences to protect crops from possible rabbits, rodents or birds attacks. In the case of preventive measures, the same methods could be applied as in the case of weed control and disease.

- ▶ As curative measures, it is possible to practice mechanical combat by collecting and destroying harmful insects by using ditches, plants and trapping girdles, splashing cold water to combat aphids. The general conditions for their use include the following: traps and / or dispensers must prevent the spread of substances to the environment and direct contact between substances and crops, and after use they are collected and removed to eliminate any risk of pollution. The products admitted for making traps are: pheromones, natural pyrethroids, metaldehyde and diammonium phosphate. It may also be remembered the repellent effect of peas for some pests.
- ▶ Among the recommended chemical measures are the use of alum (sour stone) or potassium soap for combating leaf lice, basalt flour for direct, mechanical action on the eyes, body and trachea of insects. Other products used to control pests include: vegetable oils (mint, cumin, in), paraffin oil or mineral oils.

- ▶ Biological measures include a number of methods of control based on the use of predatory insects and micro-organisms, as well as some plant species that can control pests. Also, microorganisms such as viruses, bacteria, fungi, protozoa and nematodes may also be used. Insect control refers to the use of predators (species that feed with other species) and parasites (species that develop in larval stage feeding on other individuals of other species). Example of predators: ladybug (*Coccinella septempunctata*) for combating leaf lice. Viral bioproducts have viruses (Baculovirus genus) that kill insect pests, acting in particular on lepidopteran (butterflies). Bacterial preparations (*Bacillus thuringiensis*) are used to control lepidopterans. There are also preparations based on entomopathogenic fungi (*Verticilium genus*) for the control of aphids.

In conclusion, the control of weeds, diseases and pests has some common measures used in agricultural practice and the idea to be supported by the principles of organic farming is that of integrated protection by combining the following measures: the choice of tolerant or resistant species and varieties; a proper cropping and rotation; mechanical, physical, biological and chemical methods of control; protection of useful entomofauna by providing favorable conditions - live hedges, launching of predators, flaming burning of weeds

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→ IRRIGATION

This work is obligatory for drought areas and for some medicinal herbs that require ecological wetlands and cool areas, but due to their importance they grow in dry steppe or sands. An example is mint, marjoram or thymus. Optimum watering times are different depending on the cultivated species, but also on climatic conditions. Thus, the watering on the months: April, June or July, which are usually dry in the conditions of most of the countries, must be considered.

Frequent watering methods are used for wetting on furrows or by sprinkling. One of the more modern methods is dripping. This method has the advantage that the distribution of water is done in the root area of plants, thus preventing the soil compaction and washing, as well as leads to reducing the amount of water consumed, the watering being correlated with the evolution of the biological factors of the plant and the climatic ones.

→ SEED AND SOWING OR PLANTING THE PLANTING MATERIAL

The propagating material must be derived from seed or seedlings produced by organic production methods and must not come from genetically modified organisms or any products derived from such organisms. These seeds or propagating material must meet standards in terms of germination, purity, botanical composition, health status. It also has to come from the harvest of the previous year, because

the germination faculty is very quickly lost. Methods of organic production for seedlings must comply with the following conditions: they must be treated for sowing only with products admitted for organic production and come from a producer who has practiced organic production techniques.

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PART II:

How to Grow?

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Justification of Introducing Species of Medicinal Plants into Organized Cultures in Romania

Because of intensive exploitation of natural plant resources, at the people disposal from the nature (which most of the times he exploited it irrationally), appeared the danger of species disappearance, a phenomenon that led to the emergence, in most of the developed countries, of strategies for the nature conservation and germoplasm resources in medicinal and aromatic plants.

Cultivation of medicinal and aromatic plants is part of the long-term human program for its protection and nature, but also as an alternative to phytotherapy treatment for both developing countries (due to lack of financial resources) and for those strongly developed (stressed, polluted and intensely healed by the synthetic drug).

Through this presentation we intend to show the context in which, in Romania, the practice regarding the use of medicinal plants in the therapy of diseases has evolved, what meant this for the floral patrimony of the mountain and the plain and what measures have been taken and taken further to protect it, as well as to support the phytotherapy activity, without affecting the spreading of the species in the spontaneous flora.

Regarding the research activity from an agronomic point of view, Romania was the first country in the world to start research on the possibilities of cultivating medicinal plants, by establishing the world premiere in Cluj Napoca

City in 1919 by Bella Pater, of the first Research Station for Medicinal Plants (where the scopolamine from *Datura tatula* was isolated) (RACZ, 1983).

In 1927 Professor Dr. Chirițescu-Arva wrote: „This Station has been given the role of directing the cultivation of medicinal plants throughout the country, so that in time, we will get rid of the important tribute that we pay to foreigners.”

In 1950, the Research Laboratory of Medicinal Plants was created in Braşov City, and in 1975 was established at Fundulea City (Călăraşi County), the Research Center for Medicinal and Aromatic Plants, whose main task was the creation of new varieties, the development and improvement of cultivation technologies, producing the propagation material from the superior biological categories to the medicinal and aromatic plants and protecting the flora patrimony of our country by introducing into the culture of new species and preserving the genetic resources within the natural collections organized by the Research Center and profile Universities.

The Station at Fundulea City was mainly concerned with the species characteristic of the lowlands and plains. Here over 20 species of medicinal and aromatic herbs have been introduced into culture; are included in the program for improvement and seeds production over 25 species and have developed

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the culture technologies for about 52 species.

Within the Research Laboratory of Medicinal Plants from Braşov, over 200 taxons of medicinal and aromatic plants originating from the native or foreign spontaneous flora, characteristic of the mountainous and submontane area, have been preserved within a collection of live animals; 5 populations have been improved and selected and 5 new varieties have been approved; 10 culture technologies have been developed and improved; biologic propagation material was produced for 7 species; more than 5 mountain species have been introduced into culture from 1980 to 2006.

In the field of valorization by processing of medicinal plants in the form of pharmaceuticals and medicines, the first researches were initiated in Romania by the renowned pharmacist Constantin Vorel (1825-1848), whose name is related to “Vorel Laboratories” and many preparations and recipes developed here.

The trade activity with medicinal plants has been particularly striking since 1989, when, alongside the PLAFAR Autonomous Direction, a number of private companies emerged, initially specialized in commerce, but which later improved their activity through plant processing in the form of medicinal products, cosmetics, extracts, tinctures, syrups, etc.

This has the effect of returning to long-forgotten jobs, such as the cultivation

of medicinal plants as well as their use according to traditional medicine. Particular phytotherapy cabinets or cabinets where healing methods are bioenergy, acupuncture, massage, sacrotherapy, aromatherapy, etc. have appeared.

Everything is based on reconsidering our position, to ourselves and all that surrounds us: our peers, nature, psihic, relationship with Divinity, nourishment, attitude towards our body and soul. It is a return to our roots with the stated intention of correcting the previous mistakes.

However, Romania's fundamental problem in this field remains the protection of the floral heritage, which can be achieved starting from the following objectives (BOBIT, 1997, 2001):

- 1. Protecting species from spontaneous flora against the extreme actions of the collectors to harvest certain species without discernment and in inappropriate periods, contributing to their disappearance from the ecosystem.**

This goal can be achieved by:

-
- ▶ elaboration of norms and regulations for the spontaneous flora exploitation and by the establishment of an authority to control the activity of harvesting from the spontaneous flora;
- ▶ organizing courses, presentations and field trips together with these collectors;

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informing them of the need to know the biological characteristics of the species, on the basis of which they can be able to comply with the rules for the identification and harvesting of species in such a way that their subsequent development is not affected.

The benefits resulting from this measures are:

- ▶ harvesting the raw material in full knowledge concerning the part of the plant to be harvested, the optimum time of harvesting, the maximum accumulation time of the active principles and the harvesting conditions so as not to eliminate the basin in which the species are concentrated;
- ▶ training of locals, young people or retirees and setting up specialized teams of collectors;
- ▶ organizing centers for collecting the raw material from the spontaneous flora and processing it in order to obtain bio products, which have altogether another authorization and marketing regime;

2. **Protection of the species of great interest by introducing them into organized cultures and ensuring the necessary raw material for the medicine industry from the production of this fields.**

This goal can be achieved by:

- ▶ identification of areas of natural spread of the species of interest;
- ▶ harvesting of these areas of the propagation

material (grains, whole plants or plant fragments that can be used to clone vegetative propagation, by cuttings, layering) without affecting the continued existence of the species in the zone;

- ▶ multiplying this material within a specialized center and also studying the biological characteristics of the species;
- ▶ the realization of micro-cultures within the experimental fields in order to develop the culture technology.
- ▶ cultivation technology transfer to small farmers in order to realize crops for exploitation and capitalization for the medicinal plant processing industry

The benefits resulting from this measures are:

- ▶ ensuring a controlled exploitation of these crops by obtaining a homogeneous raw material that facilitates the process of extracting active principles;
- ▶ providing new jobs for the population in the mountain area where the only occupation is animal husbandry, by setting up specialized farms for the cultivation of medicinal plants;
- ▶ diversifying the supply of medicinal herbs and rearranging the supply-demand ratio;
- ▶ occurrence, or more correct re-discovery, of some old occupations practiced by the hill and mountain population: beekeeping, cultivation of medicinal plants.

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→ **THE PLANT LIST WHOSE CULTURE TECHNOLOGY WE PROPOSE TO ELABORATE IN THIS PROJECT IS:**

- ▶ *Angelica archangelica* (Garden angelica);
- ▶ *Alchemilla vulgaris* (Lady's mantle);
- ▶ *Artemisia vulgaris* (Mugwort);
- ▶ *Alchemilla millefolium* (Yarrow);
- ▶ *Althaea officinalis* (Marshmallow);
- ▶ *Borago officinalis* (Borage);
- ▶ *Chelidonium majus* (Greater celandine);
- ▶ *Cichorium intybus* (Chicory);
- ▶ *Eupatorium cannabinum* (Hemp agrimony);
- ▶ *Eryngium planum* (Blue eryngo);
- ▶ *Hypericum perforatum* (Perforate St. John's-wort);
- ▶ *Inula helenium* (Elecampane);
- ▶ *Lythrum salicaria* (Purple loosestrife);
- ▶ *Leonurus cardiaca* (Motherwort);
- ▶ *Melilotus officinalis* (Yellow sweet clover);
- ▶ *Nepeta cataria* (Catnip);
- ▶ *Stachys betonica* (Common hedgenettle);
- ▶ *Sanguisorba officinalis* (Great burnet);
- ▶ *Taraxacum officinalis* (Dandelion);
- ▶ *Urtica dioica* (Common nettle);

→ **WORKING METHOD:**

- ▶ species acclimatization within the collection of medicinal plants;
- ▶ determination of biological features and requirements for climate and soil factors;
- ▶ initiating the experiment to determine the optimal moment and the multiplication method;

- ▶ determining the plant's response to its introduction into culture by assessing the production capacity and biosynthesis of active principles;
- ▶ technology transfer of results from experimental plot to the pilot station and then in production.

→ **RESULTS:**

- ▶ improving production potential by achieving morphological characteristics superior to spontaneous forms;
- ▶ obtaining a homogeneous raw material in terms of content in active principles;
- ▶ enriching content of active principles;
- ▶ increased yield on the extraction of active principles;
- ▶ decreasing resistance to disease and pest attack;
- ▶ increasing the tendency of weed growth of culture.

→ **CONCLUSIONS AND RECOMMENDATIONS:**

- ▶ most species (85%) responded positively to the introduction into culture;
- ▶ it is necessary to correlate the requirements to the climate and soil factors with the conditions that we can ensure through culture;
- ▶ ensures that for some species will be two crops per year during periods of maximum accumulation;
- ▶ the method of propagation and the period of

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- setting up the culture are conditioned by the biological particularities;
- ▶ at perennial species the production of raw material increases with the vegetation year;
- ▶ drying yield is characteristic of each species and correlates with the part used;
- ▶ cultivation allows harvesting of raw material at the moment of maximum accumulation of active principles

CULTURE TECHNOLOGY FOR SPECIES:

Achillea millefolium L.

SPECIES DESCRIPTION

Yarrow is a perennial herbaceous plant of the *Asteraceae* family, with hairy leaves like feathers and white or rose flowers, originating in Europe and western Asia. It is encountered from the plain to the subalpine regions, due to its ecological plasticity and its availability for adaptation to different climatic conditions. The root is a horizontally or obliquely positioned rhizome, semi-hardwood root with underground stools that allows to multiply the plant by dividing the bush.

In the first year of vegetation, the plant forms a rosette of simple deep sects leaves; starting with the second year of vegetation, the plant emits flowering stems of 30-50 cm high, which have inserted leaves alternately arranged on the length. The stem ends with a corimb type inflorescence, consisting of over 100 simple flowers. The fruit is an elongated achen (about 2 mm). It blooms between June and September, with 2 possible crops. The entire plant has a pubescence which during processing can give the appearance of fluffy agglomerations.



Fig. 1. Morphological Features

RAW MATERIAL

- It is represented by:
- ▶ *herba millefoliae* - the aerial part of the plant harvested during the bloom when the content of active principles is maximum by cutting the plant over a length of 30-40 cm;
 - ▶ *flos millefoliae* - flowers with maximum 10 cm stem.

Achillea millefolium L.

Photo 2 *Achillea millefolium* —
year II — vegetative phase



Photo 3 *Achillea millefolium* —
2nd round of the buttoning phase
(experimental field in Călărași)

CLIMATE AND SOIL REQUIREMENTS

With a high ecological plasticity, the plant is not pretentious, making it very good both on the sunny places in the plain and in the area of grassland and mountain pastures and meadows, at the edge of forests, forest roads and on the railways, especially on sandy soils.

CULTURE LOCATION

It is recommended to harvest the crops from the plain area because the amount of volatile oil synthesized there is increased. Taking this into account, in Romania, the cultivation is recommended in Bărăgan, Dobrogea, Oltenia and Timiș Plains.

CULTURE DURATION

Cultivation is 4-5 years old and it is not recommended to return to the same area until 4-5 years, due to diseases and pests that diminish production.

ACTIVITIES FOR SETTING UP THE CULTURE**→ PREPARING THE LAND**

The pre-plant is recommended to be a spear-like species which leaves the weed's clean ground and releases it early, so that germinating bed preparation (plowing, natural or chemical fertilizers) is possible.

The soil is prepared as for a garden and before the sowing is made land compaction, so that the seeds are not getting too deep into the ground.

The most suitable multiplication method is sowing directly in the field, on the winter's edge, at a distance of 50 - 70 cm between the rows, using the SUP 21 or SUP-29 seed drills with

Achillea millefolium L.

Photos 4, 5 *Achillea millefolium*
— year II (flowering phase —
experimental field in Brașov
County)

depth limiters. Given the small seed size (MMB = 0,135 g), the depth of sowing should not exceed 0,5 cm; the seed standard is 3-4 kg/ha (seed purity = 90%, germination 70%).

→ RISING

It occurs 45-60 days after sowing, and the first leaves occur 7-9 days after emergence. At this stage, planting should be done (if the plant density is higher than 12-16 plants/m²).

For small plots, or where the degree of weeds is too high, it is possible to set up the crop by dividing the bushes from the spontaneous flora or by producing seedlings obtained in solariums and then multiplied and potted.

→ MAINTENANCE WORK

It is recommended:

- ▶ Shortage of plants in the true leaf stage (7 to 9 days after rising);
- ▶ Performing mechanical drills whenever necessary so that the crop does not become weedy; In the case of rising prolongation, it is advisable to make digging operation (before rising).

HARVESTING

Harvesting crop (Photos 4, 5) — is done in the early phase of flowering when the inflorescence color begins to be white and the flowers in the inflorescence begin to open. Harvesting consists of cutting the floral stems, manually with a sickle or mechanically, 30-40 cm under the inflorescence (*herba millefoliae*), or by cutting the floral stem to 10 cm under inflorescence (*flos millefoliae*).

After the first harvest (June-July), the plants are restored and in August-September the second wave of flowering takes place. In some areas of Romania, in the long autumn, there is a possibility that the plants might flourish in a third wave (September-October).

Achillea millefolium L.

Photos 5, 6, 7 *Achillea millefolium* — harvest and reception (2nd year of vegetation — experimental field in Călărași)

The production obtained at the first harvest can reach 600-700 kg of dried flowers or 1000-1500kg of dry herb, while at the second scythe the production decreases by almost 50%, respectively 300-350 kg of dried flowers or 500-700 dry herb.

The harvesting of plants from the spontaneous flora is done in the flowering phase, with the sickle, the reception conditions are the same as in the culture.

For selling of the raw material, certain technical conditions for reception the raw material are required by the large processors:

- ▶ For *flos millefoliae* - white creamy flowers are accepted at the reception, with bracts from the insertion point of the stem branches of the green stem not brown. 5% of the brown flowers are admitted (this is an indication that the flowering phase has passed). Organic foreign bodies are allowed up to 0.5%, mineral alloys (earth) maximum 0.5%, moisture maximum 13%.
- ▶ For *herba millefoliae* - floral stems with a length of 20-30 cm from the top, with maximum 2% brown flowers and fructifications, maximum 0.5% organic foreign bodies and maximum 1% foreign minerals, moisture maximum 13%.

DRYING AND STORAGE OF RAW MATERIAL

Drying is done naturally in special spaces designed for this activity (attics, solariums, bowers), with the possibility of ventilation, in a thin layer, at a temperature of 18-20 °C, without exceeding in the summer months the temperature of 35 - 40 °C. The drying efficiency is 3.4-4:1. After drying, the plants are packaged in raffia bags, stored in special warehouses, in dark and dry conditions.

Alchemilla vulgaris L.

SPECIES DESCRIPTION

Popularly known as *Lady's Mantle*, *Alchemilla vulgaris* L. species is a perennial grass that is part of the Rosaceae family, being a faithful representation of all morphological characteristics specific to this family.

Throughout the growing season has a rich rosette of long petiolate leaves with reniform limb, pleated. The small flowers, greenish yellow are grouped in inflorescences as "cime corimbiforme" type. In the ground it forms a strong rhizome with many dormant buds in vegetative state situated all over it. The perennality of species is based on the existence of these buds as well as its readiness to multiply itself by cloning.

At the top of the vegetative it forms a rosette of leaves having an elongated petiole and a round leaf limb folded along the ribs in which the morning dew is collected. According to the principle "similia similibus" (which refers to the principle that the similarity of plants with an anatomical organ of man indicates

that certain diseases can be treated with this plant, dew drops lie in leaf folds like ovules inside the ovaries – this plant is recommended for genital ailments and for combating sterility.

The plant blooms twice in a year, a phase that coincides with the period when it must be harvested; harvesting is done by cutting off the aerial part, during the bloom, with everything on the plant at that time (leaves, flowers).



Fig. 1 Morphological Features

RAW MATERIAL

Herba alchemillae — is represented by the aerial part of the plant that is harvested during the flowering period (so there are two crops per year: the first harvest at the end of May and the second in mid-September).

CLIMATE AND SOIL REQUIREMENTS

This plant loves moisture, it is spread in the hilly area, in the meadows, at the edges of the woods and bushes, on steep slopes, which makes it hardly accessible and difficult to harvest. It develops very well under the

Alchemilla vulgaris L.

conditions provided by the grassland where it is spread, taking full advantage of the moisture provided by the dew of the herbs.

There are no *Alchemilla vulgaris L.* cultures in Romania, but during the period 1996-1999 there were researches for the introduction into culture of this species, which only remained at the stage of research results.

CULTURE LOCATION

Observing the pedoclimatic characteristics of the places where *Alchemilla vulgaris L.* is spread, it can be stated that the location of the crop should be made where the conditions (humidity in the soil and air) can be ensured in the hilly and subcolinal area.

Cultivation must be done using biological material harvested from the natural spreading areas, ensuring the realization of plots with a minimum area of several square meters where maintenance operations must be carried out so that the plants develop ensuring the application of breeding technology.

CULTURE DURATION

Being a perennial species by definition, culture can last under normal vegetation conditions, 7-8 years on the condition of being properly maintained and regular manual and mechanical maintenance work is applied without application of chemicals weed control.

ACTIVITIES FOR SETTING UP THE CULTURE

Several stages of preparation must be undertaken in order to set up the culture:

- ▶ Identifying the favorable area and possibly identify the presence of *Alchemilla vulgaris* species in the spontaneous flora in the area;
- ▶ Carrying out the deep plowing work for removing and mobilizing the field in the deep because we are dealing with a perennial plant that will remain on the ground for at least 5-6 years, during which only superficial works will be done between the rows;
- ▶ If the field has been previously cultivated, it is possible to set up the culture by following the usual steps for any crop (plowed, minced, worked with milling or combine, open gutters, planted);
- ▶ If the land has not been cultivated, then the herbicide should be done in order to reduce the weeds and to make a suitable germination bed for the next operations;
- ▶ Modeling the land by opening the canals with the potato planting machine.

→ CULTURE ESTABLISHMENT

Due to the biological features, it can be vegetatively propagated by dividing the bushes and planting these plant pieces (having root, stem, leaves), but also by producing seedling and planting it in the final place when this seedling is quite vigorous. Planting can be done during the two periods already well known to

Alchemilla vulgaris L.

the success of the work:

- ▶ spring planting (March-April) with plants from spontaneous flora that are in the phase of 3-5 well-formed leaves.
- ▶ autumn planting (September-October) using well-developed, healthy plants that form roots in order to assure rooting resistance to the freezing and thawing.
- ▶ the planting scheme is 30 x 70 (plant spacing x line spacing) resulting in a density of 42080 plants/ha.

→ MAINTENANCE WORK

This type of work is either manual work that aims to combat the weeds on plant rows or either mechanical work that aims to combat weeds on the space between rows while ensuring soil loosening and preventing crust formation.

HARVESTING

At *Alchemilla vulgaris* harvesting consists of cutting with the sickle or with special equipment intended for mowing and collecting the vegetable raw material, the entire aerial part of the flowering plant with all that it contains at that time (flowers, leaves). Immediately the plants have to be taken to the drying areas where it is made a first selection by removing browning leaves, rhizome fragments, parts or plant residues that are considered organic

impurities. Drying is done naturally in clean, airy, warm rooms equipped with ventilation systems (eliminating the outdoors wet air that could cause the entire mass of plants to become brown) or artificially in controlled temperature driers. The drying rate is 3-4: 1.

The grass production is directly influenced by the age of the crop and the harvest period.

Under experimental conditions there is expected production:

- ▶ - Year II since its establishment a production of 10.7 to/ha of green herb, respectively 3.68 to/ha of dried herb;
- ▶ Year III - 12.7 to/ha green herb, respectively 3.63 to/ha dry herb;
- ▶ Year IV - 20.35 to/ha green herb, respectively 6.7 to/ha dry herb;
- ▶ under experimental conditions the drying efficiency is of 3.5:1.

For selling of the raw material, certain technical conditions for reception the raw material are required by the large processors:

- ▶ It is harvested after morning dew or rainwater has dried;
- ▶ at the dry plant is allowed: maximum 5% brown or discolored parts of the plant; maximum 2% foreign bodies; maximum 13% humidity.

STORAGE OF PRODUCTION is done in raffia or paper packaging in clean, dry, hygienic areas without foreign odorous.

Althaea officinalis L.

SPECIES DESCRIPTION

Culture mallow (*Althaea officinalis* L.), also known as marshmallow, white mallow, good mallow, field mallow, meadow mallow is a biennial or perennial species of the family is a species of family, originated and widespread in Europe. In Romania, due to ecological plasticity (high capacity to adapt to different environmental conditions) can be found all over the country, from mountains to Dobrogea and even in Danube Delta. It grows along the waters, on sandy, alkaline soils. It is cultivated also in Germany, France, Italy, the Balkan countries, Russia.

During its development, the plant forms, in the first year of vegetation, a rosette of long petiolate leaves with a rounded limb, approximately reniform (kidney-shaped) without pubescence, and in the next stages of development the plant has a fluffy appearance on all its organs (leaves, stems, floral pedicles). In the stage of rosette (first year of vegetation), it is recommended to harvest the leaves as a raw material especially appreciated for the soothing and anti-inflammatory effect, being recommended in the cataract, bronchitis, gastritis.

In the second year of vegetation, the plant develops a fleshy, branched root with

many sleeping buds at the level of the parcel. These buds ensure the species' perennality, representing the most important raw material. At this stage of development, the plant forms a floral stem, which can reach the height of 70-100 cm and which is the flowers carrier (flores althaeae). Flowering takes place from June to September, silver pink flowers, which then form fruit called mericarp radially arranged around the persistent calyx. Each mericarp contains a seed, 4 mm long, 1-2 mm width, and 0.5-1 mm thick. The mass of one thousand grains is 3-5 g.



Fig. 1 Morphological Features

Althaea officinalis L.

RAW MATERIAL

- ▶ **ROOT** (*Althaeae radix*) with a high content of starch, mucilage, carbohydrates and lipids, tannins, flavonoids, mineral salts;
- ▶ **LEAVES** (*Althaeae folium*), contain mucilage, carbohydrates, volatile oil, and the flowers contain mucilage, flavonoids, flavonoids flavonols, saponosides, tannins, volatile oils, anthocyanosides, fatty acids, mineral salts;
- ▶ **THE FLOWERS** (*Althaeae flos*) — contain as leaves, mucilage, volatile oil, which is crystallizing during the storage at room temperature and it is receiving a honey flavor.

CLIMATE AND SOIL REQUIREMENTS

The mallow culture has no high temperature requirements, supporting both the high temperatures in the south of Romania and the lowest temperatures in mountain areas; it is resistant to drought (due to the brush present on the entire plant surface), but it loves moisture from the soil and from the air. The most favorable areas are the meadows of rivers in the counties of Tulcea, Ialomița, Dolj and Timiș.

CULTURE LOCATION

Being a perennial species of extremely high therapeutic value, the mallow is considered one of the most used medicinal plants, but its

extensive use has in time affected its presence in the spontaneous flora being endangered as species. In such conditions, it became necessary to introduce it into culture. The mallow culture has no claims in term of previous plants, can be grown after stubble plants as well as after hoeing. It is not recommended to establish a mallow culture after a species of the same botanical family because they have common diseases and pests. It responds well to the administration of natural fertilizer (manure) provided that it is given to the precursor plants. It prefers light, sandy soils that provide good conditions for root development and optimum conditions for their harvesting. Culture returns to the same land after 4-5 years.

CULTURE DURATION

Being a perennial species, the aerial part can be harvested each year, but the rootstock (*radix althaeae*) it is recommended to be harvested from the second year of vegetation, so the duration of a crop is 2-3 years.

ACTIVITIES FOR SETTING UP THE CULTURE

Autumn plowing — is a depth work that has to be made at a depth of 23-25 cm so that throughout the entire lifetime of the crop, the plants have ensured optimal conditions for the growth and development of the roots in particular and of the leaf mass in general.

Althaea officinalis L.

The preparation of the germinating bed consists of the work of grinding the soil, through repeated passes with machines that dangle without grounding the soil, ensuring optimum conditions of seed germination.

→ **CULTURE ESTABLISHMENT**

can be done in two ways:

- ▶ Planting seedlings produced in hotbeds or solariums (sowing in March - 5g/m² and then subculturing the seedlings - the bouquets - on 7 cm diameter pots); when the plants are well developed and time allows, they are planted in the field at a distance of 70 cm between the rows and 40 cm between the plants per row resulting a density of 3.6 plants/m².
- ▶ Sown directly in the field in the second half of April, using a norm of 4-6 kg/ha.

Seedlings require a post-maturation period, so we recommend using seeds older than 2-3 years of age for this post-maturation period. To facilitate the first weed, we recommend using annual indicator plants (mustard, cress, poppy, salad). The recommended distance between mallow rows is 60-80 cm, and the sowing depth is 0.5-2 cm.

→ **MAINTENANCE WORK**

Regardless of the method of setting up the crop, the maintenance works are those specific to the perennial plants in the

first year of vegetation - more hand-in-hand digging and 2-3 mechanical digging between rows to avoid weeding. In the following years, immediately after the vegetation starting, it is recommended to perform a mechanical digging to destroy the soil crust and weeds remaining from the previous year/years. Weed control can also be done by chemical methods, using one of the following products: LASSO (6 l/ha) - before sowing with incorporation of the product into the soil at a depth of 6-8 cm; AFALON (2 l/ha) - administered immediately after sowing; FURON (2 l/ha) - administered in vegetation.

HARVESTING

- ▶ **LEAVES** - are harvested in the first year of vegetation, or in the following years before the plants emit the floral stem, when the active principles have migrated from the root to the air side and they were accumulated in the leaves; the leaves without petiole are harvested; the leaf drying efficiency is 4:1
- ▶ **FLOWERS** - are harvested during flowering, along with the calyx; the flower-drying efficiency is 4-5:1
- ▶ **ROOTS** - are harvested from the second year of vegetation, autumn at entering on the hibernation phase, or spring before starting the vegetation, when the active principles are concentrated and accumulated in the root. Remove the air side by mowing, then remove the roots with the plow without the

Althaea officinalis L.

hump and gather with the forks;

- ▶ **SEEDS** - are harvested in the seed lots, when 50% of the fructifications are brown; the harvest is done with the sickle, it sits in the sheaves and then it is threshed.

Harvesting of aerial parts is done manually, with a sickle, or mechanically with a moto-mower. Regardless of the method, leaf production must be taken and stretched to dry in the dryers as soon as possible, because the high water content of the leaves can cause, in the presence of heat, the oxidation of the leaves or even their „ignition“.

Harvesting of roots is done in autumn in October. In larger crops it can be done mechanically with a plow without bumper,

and on smaller surfaces, manually with a fork. Shake the roots of the ground, wash them in a jet of water, then drain, let them at sun shine to dry, and then cut down on their length or rings and spread out to dry; the drying rate is 4-5:1.

Natural drying can be done at 35-40°C or artificially at a temperature of 50-60 °C.

The production can be 800-1200 kg / ha of dry leaf, 200-300 kg of dry flower, and the production of dried root is 1500-2000 kg/ha. Mallow seed production is 200-400 kg / ha.

- ▶ **STORAGE OF PRODUCTION** is done in raffia or paper packaging in clean, dry, hygienic areas without odd odorous.

Angelica archangelica L.

SPECIES DESCRIPTION

Angelica is a species of the group of medicinal plants, herbaceous, biennial or perennial herb species, depending on the climatic conditions at its disposal.

In the first year of vegetation it forms a rosette of long petiolate leaves, and in the second year of vegetation emits the floral stem (only if climatic conditions are favorable to the development of a collet diameter of 3-5 cm).

At a height of 100-200 cm, *Angelica* can be found spontaneously on mountain and subalpine floor (500-1500 m altitude), through rocky and wet places, on the banks of the brooks or at the edge of the forest on lower places.

It is declared a nature monument and it is forbidden to harvest it from the spontaneous flora. Given the importance of the species as a medicinal herb, *Angelica* grows in climatic

conditions as close as possible to the natural subalpine and mountainous environment. It has an average environmental plasticity.



Fig. 1- *Angelica archangelica* L.

RAW MATERIAL

- ▶ **THE ROOT** (*Radix angelicae*) - is a pivotal root, having a diameter of 3-5 cm and a length of 6-8 cm, harvested in late autumn or early spring from plants that have no fruits or where the fructification process was prevented by removing the floral stem;
- ▶ **THE LEAF** (*Folia angelicae*) - is represented by the leaves mass with petiole, harvested from plants (which did not fructify) in the II or III year of vegetation in the period

July-September;

- ▶ **SEEDS** (*Semen angelicae*) - harvested from unmaturing or matured umbels, depending on the destination of the plant production.

CULTIVATED VARIETY

The introduction of *Angelica archangelica* L. into the culture was carried out within the Braşov City Research Laboratory (1966-1967) and for the cultivation it was used the biological material produced here in the

Angelica archangelica L.

selected population „De Cristian”.

In the future it is necessary to cultivate this species in order to protect it, but also to provide the necessary raw material for nutritional supplements.

CULTURE LOCATION

For setting up of the crop, those lands in the area of favorability of the species (hilly area, hillside, land on the forests or mountains edges), where the pre-plant (which is cultivated before *Angelica*), should be free as soon as possible.

From the medicinal species, it is recommended to use *Trigonella foenum graecum* (Fenugreek) as a *Angelica* precursor. Culture fits well in high areas, on sheltered lands, with alluvial, deep and rich in humus soil. Moisture of soils is required, but not in excess.

Given the characteristics of the plant species, *Angelica* can be placed in a crop with a "jump" plots (meaning that it could be bypassed during fieldworks and it does not return to the same field until 4-5 years).

Between 2001-2004, the species *Angelica archangelica* L. was included in a program to develop an unconventional technology for the integration into the potato crop of the repellent and insecticide herb species, for the purpose of biological pest control of the main pests. The results of that experiment highlighted the peculiarities of the species to attract aphids as traps, blocking their migration to potato culture.

FERTILIZATION

Recent research has highlighted the beneficial effect of manure fertilization administered to the pre-plant (when manure was handled prior to the establishment of the crop, adverse effects on the rising occurred until it was totally compromised). During the year, the plant's needs are supplemented with 30-40 kg / ha of active nitrogen, phosphorus and potassium as complex fertilizers.

LAND PREPARATION

As soon as the precursor plant has quitted the field (July-September), the plowing is done at 25-30 cm + harrowing, and the preparation of the germinating bed can be done with a combine or milling machine. All these works are set in such a way that the moisture losses in the soil are as low as possible.

SOWING

The crop establishment is carried out by direct sowing in the field, the work being done at the end of August, beginning of September (in wet areas, sowing can be done by October). This requirement is mandatory because the seed loses up to 50% of germination percent in the first 6 months after harvesting.

The universal seed drill SUP-21, SUP-29 is used with the spur distributors with flat side faces, the distribution mechanism is set to

Angelica archangelica L.

position B-16. The seed standard is 10-12 kg per hectare with germination of 60-70%. The distance between the rows can be 50-70 cm and the sowing depth of 2-3 cm. A density of 5-6 plants / m² is recommended.

For years characterized by an abundant pluviometric regime that prevents summer-autumn sowing, it is recommended to perform the sowing in the winter or early spring, in emergency I, so as not to exceed the period of 180-200 days from harvesting the seed, after which there is a germination decrease.

The establishment of *Angelica* culture can also be achieved vegetative by producing seedlings in cold layers or seedlings. For the production of the seedlings on 1-hectare area, 150-200 m² are required. The sowing will be carried out in August and planting the seedling definitively will be done in the spring of the following year at a distance of 50-60 cm between the rows and 15-20 cm between the plants on row. As a new method, crops can be achieved by planting vitro-plants obtained by „in vitro” cultures and acclimated under greenhouse or solarium conditions.

MAINTENANCE WORK

For crops set up by direct sowing in the field, special attention is paid to weed control and crust destruction throughout the first year of vegetation (knowing that *Angelica* has a long seed germination period, respectively a very slow growth rate of plants in the first period

of life). Thus, 2-3 blind hoeing and 1-2 manual weeding by row (depending on the degree of weed infestation). In the case of heavily infested lands with monocotyledonous weeds we recommend herbicide treatment with a total herbicide (Roundup or Glyphosat at a dose of 2-4 l/ha) prior to the crop establishment, after which the other papers are executed according to the previous scheme.

In order to reduce costs and increase the economic efficiency of herbaceous crops, we recommend using the associated crop system of a perennial or biennial species with real rising problems (such as *Angelica*) and a fast-growing annual species that can provide financial rewards in the first year of cultivation. For *angelica archangelica* species, we recommend growing it in association with one of the species *Trigonella foenum graecum* (Fenugreek), *Cassia angustifolia* (Alexandrian senna), *Fagopyrum aesculentum* (Buckwheat), *Dracocephalum moldavica* (Moldavian dragonhead), *Phacelia tanacetifolia* (*Phacelia*). The seed standard for these mixtures and the technology appropriate to each chosen association will be provided to the grower on request.

HARVESTING

▶ **THE ROOTS** are harvested from plants that have not flourished and which have a thickness of 3 to 4 cm. Plants that have formed floral rods are exhausted in the same year, the aged root enters in a process

Angelica archangelica L.

Photo 2 - Morphological features of *Angelica archangelica* root



Photo 3 - Exhaustion of the *Angelica archangelica* plant after fructification (Bobit Dana - Braşov)



Photo 4 - Drying the roots in a shelf dryer (methods of drying - Bobit Dana - Braşov)

of degradation, become woody and rots. The roots harvesting is preceded by the harvest of the aerial part, which can be used for therapeutic purposes, culinary, etc., containing 0.147 ml of volatile oil. *Angelica* is gradually harvested without the disruption of culture, where manual spade harvesting is recommended. On larger surfaces, or when it is desired to destroy the crop, the job is executed with the root plow or the root dislocator.

- ▶ **LEAVES** can be harvested throughout the growing season, but it is advisable to harvest in stages and only the quantity proposed for immediate processing, thus preventing dehydration.
- ▶ **SEEDS** are harvested during the semi-ripening phase (it is not recommended at full ripe because they become brown, they easily shake down and significant production losses occur).

WASHING AND DRYING

After removing and shaking down the roots, they are gathered in the piles and then transported to the platforms where they are cut (it has to be removed the air side up to the collet, thin roots, earth debris and debris of diseased or crushed roots).

Washing is done only in special situations and only with cold water jet, to reduce the loss of active principles. Once the roots are dried, they are cut lengthwise or cut into the rings, favoring reduction of the drying time.

Drying is done either naturally in well-ventilated and clean sheds and attics, or artificially in dryers at 35-40 °C. The drying rate is 4,5 : 1.

The average productions are 6000-9000 kg/ha of fresh roots, respectively 1500-2000 kg/ha dried roots.

▶ **STORAGE OF PRODUCTION** is done in raffia or paper packaging in clean, dry, hygienic areas without foreign odorous.

Artemisia vulgaris L.

SPECIES DESCRIPTION

Known with the popular name as black wormwood, the species *Artemisia vulgaris* L. belongs to the *Asteraceae* family being a perennial plant that can reach a height of 2 m; it blooms in the summer months (June-August). In the first year of vegetation, the plant forms a leaf rosette and in the second year it forms numerous shoots followed by the flowering.

Flowers are grouped in inflorescences typical of the *Asteraceae* family, and the fruits are achenes grouped in inflorescences. Its leaves are deeply sect, green on the upper face, silver on the dorsal face, with red shoots all along their length. The flowers are yellow and have a pleasant smell; taste is hard, bitter. The plant is widespread as a weed in the areas on the outskirts of the cities.

The perenniality of the species is based on

the existence of dormant vegetal buds from the parcel.



Fig. 1 Morphological Features

RAW MATERIAL

Aerial (*herba artemisiae*) — harvested during the blooming stage by cutting the shoots at a length of 30-40 cm.

CLIMATE AND SOIL REQUIREMENTS

It is a plant that is less demanding in term of climatic conditions, it does well on deserted terrain, ruins, wet and shady places, on

roadsides and at the edge of less maintained crops where the propagation rate is very high due to the possibility of self-seeding.

CULTURE LOCATION

The culture can be initiated on less generous lands, the plant being not very demanding in term of the soil type and at the same time being very adaptable and resilient against the competition of other plants.

Artemisia vulgaris L.

CULTURE DURATION

Being a perennial species but with a great chance of exhaustion due to the fact that it develops a large vegetal mass, has a prolonged vegetation period and is exhausted, which shortens the life of a plant. In culture conditions, these shortcomings could be solved and the cultivation period could be extended due to the fact that work can be done to improve its biological features.

ACTIVITIES FOR SETTING UP THE CULTURE

The works are characteristic of any species that has its vivacity. They are: a profound preparation of germination beds combined with herbicidal works (to remove the competition of the other weeds) so that could distinguish between the plant grown in the spontaneous flora or in culture.

→ FOR THE CULTURE ESTABLISHMENT, WE PROPOSE THE FOLLOWING METHODS:

- ▶ Sowing directly into the field, at a time when seeds are normally and naturally spreading. The seed standard is 2.5-3 kg/ha in mixture with 3-4 kg of inert material (to increase the amount of germinating material in the sowing machine) to which can be added 50-60 g of salad (as an indicator plant). The harvesting and the selecting of the seed must be done so that it can be used for

sowing pure seed from genetic point of view;

- ▶ Multiplication by planting rooted cuttings - cuttings can be obtained from either 2-year (autumn) wood shoots or 1-year-old shoots, or from young shoots with lignified base (from summer) where the multiplication factor is the highest large (about 200);
- ▶ Multiplication by splitting bushes - using 3-year-old mature sprouts, to which spring moss was made to favor the rooting of each shoot (the propagation rate is 5-10 plants per bush);
- ▶ Multiplication by planting pre-rooted branches.

For experimental plots or for places where the land cannot be prepared, the seedling can be produced and the crop will be established by planting the seedlings according to the 30 x 70 pattern.

MAINTENANCE WORK

This type of work is either manual work aimed at combating weeds on row or mechanical work to combat weeds between rows, while ensuring soil loosening and preventing crust formation.

HARVESTING

The active organ of the black wormwood can be made from the second year when the floral stem appears by cutting the floral stems to 30-40 cm. The harvested raw material is stretched

Artemisia vulgaris L.

into the drying areas shortly after harvesting, preventing qualitative depreciation.

Drying is done naturally in clean, airy, warm rooms equipped with ventilation systems which will externally eliminate the wet air that could cause the entire mass of plants to become brown or artificially in controlled temperature driers. The drying rate is 3-4:1. Grass production is directly influenced by the age of the crop and the harvest period.

For selling of the raw material, certain technical conditions for reception the raw material are required by the large processors:

- ▶ for the fresh product: maximum 2% yellowish leaves and maximum 2% thicker stems than

2mm; organic foreign bodies 0.1%, foreign mineral bodies maximum 0.25%; the normal humidity of the product harvested without traces of water; it is harvested in the sun;

- ▶ maximum 2% impurities are allowed for the dried product: brownish or yellowish leaves; maximum 2% strains thicker than 2 mm; maximum 1% strains without leaves and flowers; maximum 0.5% organic foreign matter and maximum 1% foreign mineral bodies; maximum 13% humidity.

STORAGE OF PRODUCTION is done in raffia or paper packaging in clean, dry, hygienic areas without odd odorous.

*Borago officinalis***SPECIES DESCRIPTION**

Borago officinalis - also known as the lamb's tongue, bear honey, the tongue of the ox, is an annual species that belongs to the botanical family *Boraginaceae* originating from Syria, naturalized in Mediterranean regions in almost all of Europe, North Africa and Iran.

The name of the plant seems to come from the Arabic language, probably from abu buraq, which translates to "the father of harshness" (referring to the little brushes covering the whole plant giving it a special harshness). The root is strong, branched, well placed in the soil, which gives increased resistance to rooting or falling under the weight of leaves and stems well developed and branched.

The stems reach the height of 60-100 cm and are covered with white, hard brushes, they are branched, empty inside and succulent. The leaves are large, with the embossed limb and protruding ribs of green, metallic, with oval and sharp tip, about 5-15 cm long and 5 cm wide. The flowers are well-developed of 1-5 cm in diameter, bright blue in the beginning, and then after fecundation, they become pinkish stars form with five triangular petals. It differs from any other species of the *Boraginaceae* family through the black, prominent stamens that are embedded in the center of the flower.

Flowering takes place from June to July; the fruit contains 4 walnut seeds type, black color

at maturity. It slightly shudders contributing to the self-seedliness of the species and the emergence of real clusters of plants in the years to come. Seeds have the ability to germinate if they are placed in favorable humidity and temperature conditions (in late autumn). In places with a gentle climate, the lamb's tongue blooms throughout the year, due to the plant's specificity of forming new flower floors on the young branches. When the first hoar occurs, the plant ends its vegetation period.



Fig. 1 *Morphological Features*

*Borago officinalis***RAW MATERIAL**

It is represented by the leaf and flower air side and has several uses:

- ▶ The leaves are a good spice for various salads, sauces, beet soups, as a spice in meat, fish and vegetable dishes (in which cucumber can be replaced with the leaves of this plant);
- ▶ Flavored flowers are rich in vitamins, candied and used as a flavoring of confectionery products, but also for decorating confectionery and cocktails;
- ▶ The leaves contain carotene, vitamin C and ascorbic acid, mineral salts, fatty acids, tannin, resin, essential oil, saponins and routine;
- ▶ For animals, the lamb's tongue herb, is a very good food because of its vitamin, resin, tannin, salicylic acid, essential minerals and oils.

USE OF THE PLANT

In popular medicine, the infusion of the lamb's tongue herbage was used to improve cardiac function, as a sedative for people with nerve disorders, to improve metabolism in various stomach, kidney and skin diseases (due to the regenerative effect on the epidermis). Infusion has diuretic, laxative, diaphoretic, anti-inflammatory, analgesic, expectorant, antirheumatic and antibacterial properties. Therefore, it is also used in the treatment of rheumatism, fever, various diseases of the

gastrointestinal tract and respiratory tract. This plant has been used since Antiquity and the Middle Ages to remove depressive and melancholic states.

There are contraindications regarding the use of the plant during pregnant women and children, due to its content in pyrrolizidine alkaloids which have hepatotoxic, tumorigenic and carcinogenic activity.

In external use, the lamb's tongue is recommended in the form of cataplasms, local cleansers and compresses to treat abscesses, burns and skin conditions.

These applications and therapeutic virtues that recommend the plant in phytotherapy, have lately increased interest in it. Not being a common species in the spontaneous flora it is needed to be introduced into culture.

CLIMATE AND SOIL REQUIREMENTS

In Romania the plant has been acclimatized, it has no special climate and soil requirements, but because there are no previous studies and we took care of this species for short term we can not provide more information. As a medicinal plant it was not cultivated and we propose that after we provide enough propagation material to set up crops in different areas of the country in order to establish possible areas of favorability or areas where the establishment of the *Borago officinalis* culture is not recommended.

*Borago officinalis***CULTURE LOCATION**

As an annual species, it is recommended to place the crop in a area with other medicinal plants, and we intend to carry out an agrotechnical experiment in which we have studied the behavior of the *Borago officinalis* species as a precursor plant, to establish some methods of setting up the culture, sowing rules and cultivation distances, the behavior of weeding, and also to make observations about vegetation phases and the establishment of a production potential. Last but not least, we aim to achieve the amount of needed seed to carry out the research. Several conclusions about its behavior in culture can already be formulated:

In a crop planted at a distance of 30 cm x 50 cm, the lamb's tongue develops a rich leaf rosette (Photo 1) 15 days after planting. After 30 days forms numerous branches and basal leaves covering the interval between rows, preventing the growth of weeds, the plants being in the flowering phase (Photo 2).

CULTURE DURATION

Being an annual species, the duration of the crop is 1 year, but we will make observations on the possibility and the reaction of the species to the monoculture (given the tendency of the species of self-fertilization).

ACTIVITIES FOR SETTING UP THE CULTURE

If the land where the crop will be set up is very weedy, there is recommended to apply a total herbicide at the end of the summer. After allowing time for action, the autumn plowing could be done - it is a depth work that must be done at a depth of 23-25 cm so that for the entire duration of the crop, the plants could have the optimal conditions for growth and development of the roots especially and also the leaf mass in general.



Photo 2 - Culture *Borago officinalis*
- 15 days after planting (orig. Bobiț Dana)



Photo 3 - Culture *Borago officinalis*
- 30 days after planting
(orig. Bobiț Dana)

Borago officinalis

The preparation of the germinating bed consists of the work of grinding the soil, through repeated passes with machines that dangle without grounding the soil, ensuring optimum conditions of seed germination.

→ **CULTURE ESTABLISHMENT CAN BE DONE IN TWO WAYS:**

1. **Planting seedlings** produced in hotbeds or multiplier solariums (sowing in March and then subculturing the seedlings with 1 plant/pot of 7 cm diameter); when plants are sufficiently well developed and time allowed, they are planted in the field at a distance of 50-70 cm between the rows (depending on the crop maintenance equipment) and 30 cm between the plants per row, resulting in a density of 6-4, 2 pl/m²;
2. **Sowing directly in the field**, either prior to the low temperature setting (October - November) or in the first emergency (February - March), depending on the climatic zone. Seeds need a short postmaturation period, so we recommend using seeds older than 2-3 years. To facilitate the first weeds destroying, we recommend using annual indicator plants (mustard, cress, poppy, salad). The recommended distance between rows is 50-70 cm and the sowing depth is 0.5-2 cm (given the seed size), the seed norm being 8-10 kg.

MAINTENANCE WORK

Regardless of the method of setting up the crop, the maintenance works are those specific to the annual plants (ie more manual hand holes per row and 2-3 mechanical blasts per interval to avoid weeding). After the plant has covered the interval between the rows, the weeds can no longer grow and the crop is kept clean until the end of the growing season. Based on the observations made in 2017, we determined the germination time for each of the recommended methods:

- ▶ Sown immediately after their harvest (July), the lamb's tongue seeds have very good germination, which allows the emergence of very high-density areas that may reach the flowering stage in the first decade of September;
- ▶ When sowing directly in the field at the end of the fall - the sprouting takes place in the next spring within 10 days - 14 days with daytime temperatures above 18oC;
- ▶ When sowing directly in the field in the first stage - the sprouting takes place within 8-10 days after sowing, if the temperature is maintained at 15 -18oC;
- ▶ In the production of seedlings in multiplier solariums -; the sprouting takes place in 26 days (counted from sowing - 06.03.2017 to 02.04.2017), and the planting in culture was done on 16.05.2017; the moment of full blossoming and the beginning of fructification that coincides with the time of harvest was

Borago officinalis

06.07.2017.

These conclusions can lead us to the idea that *Borago officinalis* has a great availability for the crop's establishment and it has a period of short vegetation compared to other species.

HARVESTING

It depends on the destination of the crop and the raw material needed:

- ▶ **FLORAL STEMS** are harvested in stages throughout the entire flowering period, in the morning after the dew is lifted. Then, they are spread out in the specially arranged place for drying. Harvesting is done by cutting the main stem (crop 1) (Photo 3) with an average yield of 5.45 kg of green herb/m² plant at first harvest. From the evaluations made in the experimental stage, there is an average green herb yield of 54.5 to/ha, respectively 6.98 to/ha of dry herb, the drying yield being 7.8:1.
- ▶ **THE LEAVES** are harvested during the blooming period by collecting them after the dew is lifted and placing them in a specially arranged place for drying. Leaf harvesting is a possible work only in individual gardens, due to the plant's biological characteristics. For large-scale use as a medicinal plant, we recommend to harvest the whole plant in the second part of the flowering phase and the beginning of fructification. In this way, the seed can also be preserved (the plant presenting floral buds, fresh flowers, flowers already fertilized, immature fruits and fruits ready to shake).
- ▶ **SEEDS** are harvested prior to technological maturity by cutting the entire plant and placing it on canvas where seed can be harvested. It is recommended that they be conditioned by selection and keeping in appropriate packages and in dry areas, away from rodent (which are particularly attractive for seeds).

STORAGE OF PRODUCTION is done in raffia or paper packaging in clean, dry, hygienic areas without other smells.



Photo 4 - *Borago officinalis* — Flower phase



Photo 5 - *Borago officinalis* — at full blossom (end of June)



Photo 6 - *Borago officinalis* — entomophilous pollination (end of June)

Chelidonium majus

SPECIES DESCRIPTION

The species *Chelidonium majus*, known as celandine, wilderness grass (from bothanical point of view) is part of the family *Papaveraceae*, genus *Chelidonium*, being an annual species easily recognizable due to the yellow-orange latex that appears in a section on any plant organ. Perennial plant, very resistant to cold weather, is wintering in the form of a rosette and starts in vegetation as soon as the snow melts, facing the late winters.

Originally from Europe, Asia and North Africa, celandine is widespread in places near abandoned buildings and in the shadow of forest. The leaves are simple, alternate, unstriped. Flowers are actinomorphic (with radial symmetry), bisexual, yellow, grouped in simple shrouds. It blooms from April to September. The fruit is a dehiscent capsule

(which opens at maturity by releasing the seeds). The seeds are black on the maturity and have a light color spur-shaped macula.



Fig. 1 Morphological Features

RAW MATERIAL

It is represented by the aerial part with unwoody sprouts (*herba chelidoniae*) harvested during the flowering by cutting to 10-15 cm above the ground. By making a correct harvest, the plant can be regenerated being possible the second harvest at the beginning of September when the second wave of flowering occurs.

→ THERAPEUTIC EFFECTS

The herbal preparations have vasodilatory, antispasmodic, analgesic effects and stimulate digestive secretions. Externally it has an antiseptic, antibacterial, regenerative, healing, antitumoral action. Being a species known and used in ethnopharmacology and traditional phytotherapy, it was often incorrectly harvested and too intensively exploited, which has led to the loss of natural areas. There has been a need for studying biological features to be introduced into culture.

Chelidonium majus

CLIMATE AND SOIL REQUIREMENTS

Celandine is a species with a particularly high ecological plasticity, being present in ruderal places in North America, throughout Europe to Siberia, from the plain to the altitude of 1000 m on the mountain areas. In Romania it is common in the plains of Banat, Oltenia, Dobrogea, Muntenia, but also in the Transylvanian Plateau and Moldavian hills. This plasticity is due to the fact that it does not have any particular requirements in term of temperature, requiring seed germination of 4-6°C. For the development on the following phases, it prefers moderate temperatures in the hidden shaded places around the walls or the shade of forests. The soil moisture requirements are somewhat higher, the amount of water being a limiting factor of species spreading, preferring water permanence and not its excess. Light is a factor that influences positively when it is a diffused one. As for the soil, it prefers light soils, rich in organic elements, but also grows well on soiled soils, scree or even on sandy soils.

CULTURE LOCATION

It must be cultivated after plants that are leaving the soil early. The soil must be free of any species of weeds.

CULTURE DURATION

It is directly influenced by the choice of a

favorable area and a field that responds to few claims regarding humidity and soil type.

ACTIVITIES FOR SETTING UP THE CULTURE

They are the classic ones regarding the way of preparing the germinative bed (basic plowing, shredding, soiling, sowing, etc.), but closely related to the precursor plant. If the precursor plant releases the field early (peas, cereals) leaving it without weeds and enriched in nitrogen, the preparation of the land consists of a plowing, shredding of the land, compaction, sowing with the seed drill adjusted with the seed distribution tubes at the distance of 50-70 cm.

If the crop will be set up on a weedy land, it is mandatory to clean the land by repeated herbicides or, in the organic version, must be established a precursor culture with species that inhibits the development of weeds (peas, and bark bean).

→ THE CULTURE ESTABLISHMENT CAN BE DONE IN TWO WAYS:

1. **Establishment by direct sowing** in the field at the end of the summer (August to September) or on the beginning of the winter, using a 4-5 kg seed/ha norm, a work that can be done using the SUP 21 or SUP-29 seed drill with small seed drills and depth limiters. To make it possible to apply digging

Chelidonium majus

as early as possible to reduce the risk of weeding, it is recommended to use a seed indicator plant (salad, poppy seed) that rises faster, marking the row.

2. **Seedling propagation** from spontaneous flora or product (in warm layers or cold layers), a method used to set up experimental lots or to initiate an organic crop of celandine on a large weedy land. This method allows to short the establishment period of a celandine crop and to reduce the financial effort in the first year of vegetation (on a land with plenty weeds, there is danger for not being able to remove the weeds 2-3 times on growing season, or they cost too much).

MAINTENANCE WORK

In the first year of vegetation, the works consist in removing the weeds on the row and between rows. After the rows look clean, it can be used a cultivator to maintain the interval between the rows.

In the second year of vegetation and onwards, the maintenance works begin in the spring with removing the weeds mechanically between the rows (it is known that the celandine is wintering in the vegetative phase and that starting in vegetation takes place very early).

HARVESTING

It is done twice a year (May and September), in the full blooming phase, by cutting the aerial part of the plant to 10-15 cm above the ground. Harvesting is done with the sickle and the cut plant is placed on the ground and then it is placed in large bags and transported to dryers (natural – solar type or artificial type). Pull-up harvesting is a wrong method because it's leading, on one hand, to the reduction of the celandine natural areas and, on the other hand, to the increasing of the costs and prolonging drying times.

Average production is influenced by climatic conditions and the year of vegetation. The average production of fresh grass is 2.5 to / ha at the first harvesting and 5.6 to / ha at the second harvesting. The drying rate is 5:1 (for the first harvesting) - 7:1 (for the second round of harvesting), so the average of the dried herba is 0.5 to / ha (for the first harvesting) and 0.7 to/ha (for the second round of harvesting).

For selling of the raw material, certain quality and technical conditions for reception the raw material are required by the large processors:

Celandine is harvested during the full blooming period by cutting the whole plant at a height of 10 cm above the ground; brown stems and leaves, mature stems or plant debris from other plant species are removed. For drying, the celandine spreads in a thin layer, and daily it is recommended to move

Chelidonium majus

the plants, turn them and intensify the ventilation so that the drying takes place in a shorter time, thus avoiding the yellowing of the leaves.

The drying rate varies between 6,7-7-8,5- 9:1 in plants harvested from spontaneous flora in May (Braşov area) and 5-7:1 in crops harvested in September (Braşov area).

STORAGE OF PRODUCTION is done in raffia or paper packaging in clean, dry, hygienic areas without odd odorous.



Photo 4 - *Chelidonium majus* (celandine)



Photo 2 (left) - *Chelidonium majus* (flowering) - full flowering phase - Optimal harvesting time for raw material - herba chelidonium



Photo 3 (right) - *Chelidonium majus* (fructose) - Fructuring phase / Optimum harvesting time for seed production

Cichorium intybus

SPECIES IMPORTANCE

Chicory is a biennial species that belongs to the *Cichorium* genus within the *Asteraceae* family. Although it is often found in spontaneous flora as a wild species, it was cultivated in ancient Egypt as a medicinal herb with therapeutic effect in hepatobiliary and renal diseases.

Nowadays, the root is used as a coffee substitute, as an important source of inulin, but also for producing of fructose. The leaves are used in salads, but also for therapeutic purposes due to bitter principles in digestive disorders and even in nutrition diseases. The compounds extracted from chicory (tannins, bitter substances, pectin, organic nitrogenous bases, mineral compounds rich in phosphorus and potassium) give it the therapeutic properties.

SPECIES DESCRIPTION

The origin of the species is North Africa, Asia and Europe and it has extended to North America, showing great ecological plasticity

RAW MATERIAL

- ▶ Airborne parts (*Cichorium Herba*), which are harvested during the period of flowering in July – August, before becoming woody. They are a source of chicorin, arginine,

that allowed it to expand into culture also in temperate areas. In the first phases, the plant forms a rosette of vigorous basal leaves, and in the second year it emits the half-woody stem, having a height of 100-150 cm; it is the carrier of flowers grouped in inflorescences composed of the capitulum type having the ligulate flowers and the blue tubular flowers. The fruit is a capsule with lots of seeds. The tuberous root reaches the technological maturity (at the end of the first year of vegetation), the average weight of 200-300 g/plant, but the limits are 150-450 g/plant.



Fig. 1 Morphological features.

- ▶ choline, insulin, chicoric acid, levulose, iron, phosphorus, calcium.
- ▶ Roots (*Cichorium Radix*) are harvested after low temperatures have been installed in September-October when the active principles migrated to the root, thus

Cichorium intybus

ensuring their therapeutic value: lactulose, bitter triperpenic substances, lactupirein, fructose, alpha and beta lactucerol, tannin, volatile oil.

- ▶ Leaf (*Cichorium folium*) are harvested throughout the summer from the crops that are established for roots – it is appreciated for inulin intake.

Considering this content, chicory is recommended as a remedy in the following diseases: constipation, anemia, fatigue, headache, asthenia, depression, furunculosis, biliary and renal calculi, urinary infections, biliary dyskinesia, chronic hepatitis, chronic rheumatism.

BIOLOGICAL FEATURES AND CLIMATE AND SOIL REQUIREMENTS

The seeds are germinating at 50°C. In the plant phase, the chicory bears low temperatures (-6°C to -8°C), which can lead to vernalization with implications on the formation of the floral stem even from the first year of vegetation. Regarding the plant claims for soil moisture, the requirements are higher in the phase of the germination seeds and in the phase of the intensive tuberous of the root. It needs mild, deep, permeable, pH neutral soils. It is totally unsuitable for 2-3 years fallow land, low land with a tendency to form crust, lands with more than 3% slope.

→ CROP ROTATION

The best precursors are straw cereals and potatoes, which ensure the early release of the soil, leaving it clean of weeds and loose without vegetal debris which could prevents proper sowing and uniform growth. The leguminous fodder is totally unsuitable as precursor crops. After chicory, it is recommended to cultivate fodder species or other hoeing crops that by their technology allow the removal of the chicory roots remaining in the soil after harvesting on the previous year.

→ FERTILIZATION

The chicory reacts very well to fattening manure from previous year, or even 2-3 years after application, due to the solubilization power of the roots. In general, the fertilization is done with mineral fertilizers (NPK). The recommended doses are 90: 60:120, which leads to an increase of roots production of 10% and an increase of 8% of inulin.

Phosphorus and potassium are given in autumn before autumn plowing, and nitrogen is given 50% on sowing and 50% at the beginning of the tuberous root phase (June).

SOIL PREPARATION

It consists of carrying out specific works (autumn plowing, soil shredding and leveling, compaction to achieve intimate contact between the seed and soil particles). The soil preparation works for sowing are determined

Cichorium intybus

according to the pre-plant and to the way it releases the land (without vegetal remains, leveled, loose etc.).

Thus, after the grain cereals, in August, a stubble-turning is made for the destruction of vegetal remains and for the soil mobilization at a depth of 14-16 cm. In September, mineral fertilizers are applied and autumn plowing is made (at a depth of 28-30 cm) with the plow in the aggregate with the star harrow. In autumn or spring, it is recommended a mandatory leveling of the land.

After potatoes, before the autumn plowing, no other work is recommended, since the land remains clean, loose; it is nevertheless necessary to level the autumn plowing with the star harrow.

In the spring, after mineral nitrogen fertilization (50% of the dose), the combiner is working at a depth of 2-3 cm to prepare the germination bed which have to be leveled, shredded and dipped properly.

→ **SEEDS AND SOWING**

At chicory, because of the gradual maturation of the fruit seeds, the germinative faculty has fairly low values, ranging from 60 to 75%. The sowing works must be taken at end of April - early May, to avoid the low spring temperatures leading to the formation of the floral stem and to the decrease of the level and quality of the root crops.

Sowing is done in the spring (after 25-27 April) when the soil temperature reaches 8-9°C

at a depth of 0.1-1 cm. The distance between the rows is 45 cm and the quantity of the seeds is 5 kg/ha. After sowing, it is mandatory to run the roller with a smooth roller to ensure the seed cover. The seed is very small, 1.5 to 2.0 g for 1000 seeds, so that must be applied a sowing scheme with a 45 cm spacing between the rows and the 5 kg/ha standard is applied. This standard provides a high density of plants (1,200-1,400 hectares/m²) which is necessary because the seed is very small with low passage power, which would affect the sprouting. This high seed standard ensures the sprouting, after that it is required the thinning work (in the 2-3 leaf stage) to reach the density of 220 harvestable plants/m². The distance between plants should be 9-11 cm.

→ **MAINTENANCE WORK**

When the rows are distinguished, a mechanical digging is required, which must be repeated at 12 to 15 days (at progressive depths), combined with 2-4 hand digging (depending on the degree of weeding). To ease the first digging, a mix of chicory seed with lettuce seed have to be done (it will grow faster). First digging will be done 10 days after sowing.

DISEASES AND PESTS

No strong attacks of pests are highlighted, but the occurrence of earth fleas and aphids is affecting the leaf's development and compromise the plant growth in the

Cichorium intybus

earliest and most critical phases, leading to the production losses. It is recommended to carry out chemical treatments with products to combat these types of pests (application period: May to June).

HARVESTING

It must be done before the of the first autumn brums, as the foliar system does not resist them. The optimal harvesting period is 15-30 of October. The losses due to dehydration are very high and it is necessary that in 48 hours the chicory reach the reception bases. Since the roots break very easily, must be done a plowing to gather the broken parts of roots that would disturb the next crop. After harvest, the roots are washed, allowed to dry, then cut in length or in slices and spread out in the drier (solariums) on drying, turning them to avoid molding.

The level of production obtained by type of raw material is:

- ▶ fresh leaf: 150 kg/100 m², respectively 15 to/ha;
- ▶ dry leaf: 23 kg/100 m², respectively 2,3 to/ha;
- ▶ fresh root: 200-300 kg/100m², respectively 2-3 to/ha.

The drying efficiency for roots is 5-7:1. The roots are collected from dryer when they are strong and break easily. Must be stored in raffia bags, in clean and airy places without moisture. The average production is 30-40 to/ha of fresh root, respectively 6-8 to/ha of dry

root.

Another appreciated product obtained from the chicory root is ANDIVA (the doll) representing the etiolate vegetative bud of chicory (obtained in dark conditions) highly appreciated in the Mediterranean cuisine because of vitamins from the early spring period when the human body came out from winter exhausted and devitaminated.

STORAGE OF PRODUCTION is done in raffia or paper packaging in clean, dry, hygienic areas without foreign smells, with great attention to protect the harvest from pests and rodents.

Eryngium planum L.

SPECIES DESCRIPTION

Eryngium planum L. is a perennial semi-hardwood species belonging to the Apiaceae botanical family. In different parts of Romania it is known as moles weed, thistle, blue thistle, muced spin, wind spin. In the first year of vegetation, the plant forms in the ground a strong fusiform root with numerous branches, which gives the plant, in the following years a very good resistance. Since the first year, it forms a rosette of long petiolate leaves, with an oval, thin and glossy limb. It is wintering in the form of a rich rosette consisting of 8-12 leaves; in the second year the vegetation begins and in the middle of May the floral stem extends (in culture conditions) to the height of 50-100 cm, forming numerous branches.

At the top of each branch, it forms an ovoid or subglobular oval bloom with a diameter of 10-15 mm and it is marked at the base of an involucre formed by spiky, rigid foils. The flower is formed on type 5 with bluish rigid sepals, rigid petals, 5 stamens and bicarpel

ovary. At harvest maturity, the entire stem gets the bright blue color (hence the name). The fruit is an ovoid diach of 3-5 mm in length, which at maturity carries the persistent calyx. The flowering period is July to August.



Fig. 1 *Eryngium planum L.* - harvest maturity

ORIGIN AND SPREAD

The species originates in Asia and Europe, and is often spread in Russia, Ukraine, the Republic of Moldova and also in the hills and mountains of Romania. In spontaneous flora it grows on pastures and meadows, preferring light, warm soils exposed to the sun.

RAW MATERIAL

It is represented by the aerial part (*Eryngii plani herba*) harvested during the blooming stage by cutting the floral stem. The moment of harvesting is established when the floral stem and the branches are colored in bright blue.

Eryngium planum L.

CLIMATE AND SOIL REQUIREMENTS

It prefers light, warm soils with sun exposure on hill area, uncultivated pastures and meadows. It fails in areas where summer temperatures and air dryness are very high.

CULTURE LOCATION

It will be done where the species finds the best conditions for development, meaning in the cool hill area. We initiated the first cultures in the Braşov county (with good results), but in the Arad and Timişoara areas the culture failed.

CULTURE DURATION

Eryngium planum L. is a perennial species, with an important feature given by the ability to multiply by „twinning”, by starting in the buds vegetation from the parcel level, but also by self-fertilization, contributing through this in increasing the number of plants per unit area and in increasing the life duration of the crop. Under these circumstances, the life span of this plant culture is 4-5 years, provided it is not allowed to multiply uncontrollably.

CULTURE ESTABLISHING ACTIVITIES

For the Culture establishment, several stages of preparation must be undertaken.

Identification of the favorable area and

eventual identification of the presence of the species *Eryngium planum L.* in the spontaneous flora in the area;

Carry out the deep plowing work for removing and mobilizing the field in the deep because we are dealing with a perennial plant that will remain on the ground for at least 5-6 years, while only superficial works will be done on the interval between the rows;

If the land has been previously cultivated, it is possible to set up the culture by following the usual steps for any crop (plowing, mincing, working with milling or combine, opening gutters, planting);

If the land has not been cultivated, then the herbicide should be done in order to reduce the large weeds and to make a suitable germinating bed for the following works.

→ METHODS OF MULTIPLICATION

► **The multiplication by direct sowing** in the field is practiced on the lands where the crop rotation has been done, using a pre-planting plant that has left the land without weeds, releasing it early so that it is possible to prepare the land and set up the crop not later than the end of August. Sowing is done with the SUP-29 drill so as to ensure a minimum distance of 70 cm between the rows. The seed standard is 5-6 kg seeds/ha.

Eryngium planum L.► **Multiplication by seedling:**

- a) Seedlings produced in solariums, sown in boxes in August, replanted in pots, the pots will be taken out for wintering, and the planting will finally be done early in the spring as soon as the soil is dry and the preparation work can be carried out. In this case the flowering takes place in the same year. The planting scheme is 0.7 x 0.3 (a density of 42.800 plants/ha)
- b) Seedlings produced in solarium, sown in boxes in March, replanted in pots and the pots will be taken out for acclimatization 30 days after replantation; planting will definitely be done in spring at the beginning of May. In this case, the flowering will take place the following year. The planting scheme is 0.7 x 0.3 (a density of 42.800 plants/ha).

MAINTENANCE WORK

3-4 days after planting, a plants assessment will be performed for avoiding the gaps by replanting new seedlings. Then mechanical (on interval) and manual (on row) works will be done as often as necessary to destroy the weeds.

HARVESTING

It is done during the flowering period (August) when the floral stem is already bright blue, by cutting over the soil, with the sickle

or the motor-mower. The stems are gathered and stretched in the space for drying, where they return twice a day to shorten the drying period.

In culture conditions, the following production is expected to be achieved:

Year of vegetation	Average production (green herba) kg/ha	Average yield (dry herba) kg/ha	Drying efficiency
Year I	1380	405	3,4:1
Year II	4373	1093	4:1
Year III	5893	2249	2,6:1
Year IV	2400	727	3,3:1
Year II	4373	1093	4:1
Year III	5893	2249	2,6:1
Year IV	2400	727	3,3:1

The drying rate varies depending on the climatic conditions of the year.

STORAGE OF PRODUCTION is done in raffia or paper packaging in clean, dry, hygienic areas without foreign smells.

*Eupatorium cannabinum***SPECIES DESCRIPTION**

According to the binary classification system *Eupatorium cannabinum* is part of:

- **CLASS:** *Dicotyledonatae*;
- **DEPARTMENT:** *Angiospermae*;
- **ORDER:** *Asterales*;
- **FAMILIA:** *Asteraceae*;
- **GENUS:** *Eupatorium*;
- **SPECIES:** *Eupatorium cannabinum*.

- Known as *Eupatoire chanvrine* (Fr), Hemp Agrimony (Eng), Wasserdost (Germ) (MUNTEAN LEON SORIN, 2007) *Eupatorium cannabinum* L. is an herbaceous perennial plant, with a rigid, straight stem, composed by 3-5 lobes, toothed on the edge.

The leaves are composed by 3/5 lanceolate follicles with uneven toothed edges, having a thin leaf limb and a prominent rib. Flowers are pinkish roses, grouped into large racemes. Flowering takes place in July/September. The fruits are small achenes with a pappus favoring anemochorous spread (by wind), which is a great advantage for the natural spread of the species (Fig. 1). The root is vigorous, with many sleeping buds at the level of the parcel, but activated during the vegetation period so that at the end of the 2nd – 3rd - vegetation year the sprout plants are distinguished (Fig. 2) and

the bushes split and the plant multiplication can be made. The species multiplication rate by division is 1/7-8 (from a mature plant in 2nd – 3rd - vegetation year, it is possible to obtain 7-8 new plants, which could be planted with root and 1-2 eyes at the parcel level).



Fig. 1 Morphological Features

Eupatorium cannabinum

In a monographic work of the Faculty of Medicine and Pharmacy of Targu Mureş City team, Professor C., CSEDO claims that „eupatorium” comes from the Greek „*eupator*”, which means liver muscle and is synonymous with „*hepateros*”. According to DODONEUS, quoted by BUTURA (1979), „*hepatorium*” derives from the Latin „*hepar*” (liver) and was attributed to this plant due to its favorable action in hepatic diseases. As for the other name „*cannabinum*,” it was attributed to this species due to the similarity of the leaves with those of *Cannabis sativa* L. (hemp).

ORIGIN AND SPREAD

The *Eupatorium* genus, according to Treaty Flora of Romania, contains over 450 species spread mainly in America and a few in Eurasia and Africa, while after ROBINSON and KING (1985) (quoted by CSEDO and collaborators, 1994) contains only 44 species. Of all these, however, only *Eupatorium cannabinum* L. is known to occur in Europe. The species is also known by the synonyms *Hepatorium vulgare*, *Hepatorium adulterinum*, *Hepatorium cannabinum* (WOERDENBAG H.J., 1986 quoted by CSEDO and collaborators, 1994).

It is characterized by PÂRVU CONSTANTIN, (2000) as a hemicryptophyte species, mezohidrophite, mezoterm, pH amphithelium, heliophilus, the species is found in the hilly and mountainous area through wet places and groves.

RAW MATERIAL

From ancient writings as well as from ethnohistory practices, *Eupatorium cannabinum* was known as a healing power plant since antiquity. Thus, the seeds and leaves dipped in wine were used in liver diseases, diarrhea, and against venomous snake bites.

It is also noted that an ointment was prepared from the leaves, which is applied to injuries and ulcerations that are difficult to heal. In the Middle Ages, but also in the following centuries, the aerial part of the plant was used in liver and spleen diseases as emmenagogue, diuretic, anthelmintic and expectorant.

With depurative action, it was recommended in scurvy and feverish conditions, and the roots were also recommended in removal of menstrual flow and chronic eczema (WOERDENBAG H.J., 1986 AND 1991, MADAUS G, 1938. According to WEISS (1985), it has a tonic and immune stimulating effect in flu.

At present, the roots harvested in spring or autumn and the aerial part harvested in the period before flowering are used in liver, biliary, choleric, purgative and diuretic diseases, but also as a remedy in dermatological diseases in the treatment of wounds and rashes (1994, CEDO and collaborators; CONSTANTIN PURVU, 2000) in both human and veterinary medicine.

Beyond the therapeutic virtues, *Eupatorium cannabinum* is also a good honey-like species, being visited by bees. Honey production can reach 150-200 kg / ha.



Photo 2 - *Eupatorium cannabinum* seedling prepared for planting



Photo 3 - *Eupatorium cannabinum* — 2nd year of vegetation

Eupatorium cannabinum

During the implementation of this project for introduction of *Eupatorium cannabinum* L. into the culture, following the agenda of initially established activities, we reached the following conclusions:

- ▶ As a method of multiplication, the most beneficial in terms of economic profitability remains the vegetative propagation (either by seedlings or by the separation of the bushes), and as an optimal time for the culture establishment, we recommend planting in spring or autumn;
- ▶ Density 4 plants / m² respectively 40,000 plants / ha; Planting in rows interleaved between rows of black currant (*Ribes nigrum*), or for exploitation of the interval between rows of any species of fruit trees (especially it has high tolerance to shading conditions).

MAINTENANCE WORK

Specific maintenance works in organic farming are:

- ▶ Mechanical (2x) and manual (2x) hoeing
- ▶ Harvesting 2 times / year during the flowering period (July and September), but beginning with second year.

In ecological system, we expect for next years the following volumes:

We found out that when there is a drought period it is possible just only one harvest to be made, so the plant reacts negatively to the rainfall regime which leads to a production decrease by reducing the growing and the stems number.

Conclusion: under ecologic culture system, at the species *Eupatorium cannabinum* L. there is a variation in the production of fresh grass, depending on the year of vegetation, I or II, but also on the climatic conditions of that year.

Eupatorium cannabinum



Photos 4, 5 - *Eupatorium cannabinum* — harvesting phase

CULTURE LOCATION

Being a perennial species, using herb and root as raw material, hemp crop should be placed outside of a crop rotation.

The exploitation time of a hemp crop is 3 - 4 years, after which the culture begins to decrease as yield.

ACTIVITIES FOR SETTING UP THE CULTURE

The works of setting up the culture are carried out on two levels:

- ▶ Plan I - the propagation material is prepared according to the used method (clones resulting from the separation of the bushes or seedlings to be produced and which also have seedling rules and techniques);
- ▶ Plan II - all the preparatory works for the crop establishment are carried out, which depend on the propagation method.

For spring planting, the preparation of the land consists of performing the autumn plowing and in parallel the seedling activity starts. In the spring, after the soil has thawed, the ground is prepared with a disc or a combiner, so that the ground is crushed and leveled, trenches are opened and planting takes place (by clones or seedlings).

MAINTENANCE WORK

Mechanical works are done between the rows whenever is necessary, so that the culture does not become weedy. 2-3 hoeings are made manually when the crop was established by planting the seedlings, because it is more liable to weeds than a culture created by the separation of the bushes.

Eupatorium cannabinum

HARVESTING AND DRYING

It is possible from the second year of vegetation; two harvests are made during the beginning of flowering (July, September) when the content of active principles is higher.

Drying is done in airy, warm rooms, but without the temperature exceeding 35-40 °C.

→ PRODUCTION STORAGE

It is made in raffia or paper packaging, in salubrious, dry, odorless, sanitized areas. Prior to storing, the raw material can be baled, reducing plant volume and making storage more efficient.

YEAR OF VEGETATION	FRESH GRASS		DRY GRASS		DRYING YIELD
	SCYTHE I	SCYTHE II	SCYTHE I	SCYTHE II	
II	1800	1093	450	273	4:1
III	2400	2000	600	500	4:1
IV	3000	2400	750	600	4:1

Hypericum perforatum L.

SPECIES DESCRIPTION

The species *Hypericum perforatum* L., belongs to the *Hypericaceae* Family, the *Hypericum* Genus, where more than 490 related species are cataloged.

It is a perennial, grassy species which forms a short rhizome in the soil on which a strongly root system is developed in the ground by numerous hypogean stools from, which flower shoots are formed, giving the plant the appearance of bush.

The stem, having a height of 0,4 to 0,7 m, is cylindrical, glabrous, brownish on the wooding area, on which many branches are formed. Some of them develop and on mature phase have inflorescences. The flowering period is from June to September.

The leaves are sessile (without petiole), opposite, oval or elliptical, with the perforated limb (small spots like the stinging of a needle appear in the light), hence the name *perforatum* (this is a strong character of species recognition and elimination of any confusion in terms of species identification).

The flower is on the 5 - five green sepal type, five intense yellow petals ((at the beginning of flowering), which turns to the end of flowering to yellow-orange to reddish) as a result of the accumulation of hypericin in all organs of the plant; it has numerous short stamens.

The fruit, an oval capsule with 3 lodges,

which is dehiscent at maturity, releases seeds that are brown-blackish, spherical and very small (the size of a needle tip), having the value of the Thousand Grain Mass (TOM) (TOM = 0,123 g).



Fig. 1 Morphological Features

Hypericum perforatum L.

RAW MATERIAL

All unwoody aerial part called herba hyperic is harvested. Grass with the green or red-green stem must be 30-35 cm long, it must contain inflorescences in the early phase of flowering, at which time the edges of the leaves, the petals have red dots given the accumulation of hyosciamine (principle of interest in this plant). The freshly harvested grass has a characteristic, balsamic aroma, bitter taste, resins and astringent. Harvesting is done with the sickle.

Often, in spontaneous flora it can be confused with *H. elegans* species (with lanceolate leaf with black and transparent spots and 4 edges stem), or with *H. maculatum* (leaf limb with black dots and NOT transparent) or with *H. hirsutum* (which has pilose leaves).

CLIMATE AND SOIL REQUIREMENTS

It is not a pretentious species in terms of climatic and soil conditions, so it naturally occurs in all areas, from plain to the subalpine area, but is more abundant in the hilly area.

It can be harvested from pastures, from forest glades and less well-groomed perennial crops (orchards, edge of irrigation channels, etc).

Considering the increasing demands of raw material, which can no longer be covered by the spontaneous flora, it has begun to be introduced into culture. The first attempts

in Romania were made at Fundulea Research Station and worked on a St John's Wort population selected from „De Secuieni” spontaneous flora.

CULTURE LOCATION

We established crops in Braşov County and in Călăraşi County (mountain and plain area) and the results obtained were different from one area to another and we were able to draw some conclusions.

CULTURE DURATION

The culture lasts for 3-5 years and is not allowed to return to the same soil earlier than 4-5 years. Being a perennial species, culture is placed outside of the rotation crop and it is advisable not to choose a precursor plant the lucerne (alfalfa), because it transmits the common diseases through the root that remains from the soil after the crop is thrown away.

ACTIVITIES FOR SETTING UP THE CULTURE

→ PREPARING THE LAND

The precursor plant is recommended to be a hoeing plant species, that leaves the ground without weeds and frees it early, so that seedbed preparation is possible (plowing, disking, using natural or chemical fertilizers to

Hypericum perforatum L.

enrich the field).

The ground is prepared as for a garden and before the sowing a land compaction is made, so that the seed does not get too deep in the soil.

→ **FERTILIZATION**

The plant gives great results when the soil is well fertilized. The determination of the fertilizer need is based on the soil natural fertility, the pre-plant and the vegetation year. Phosphorus positively influences the herb production, the optimal dose for the sub-Carpathian area of Moldova being 50-60 kg per hectare. Nitrogen fertilizers also increase the production of herb, in the first and the second year, 120 kg / ha, and in the third year 80 kg / ha. Potassium fertilizer increases wintering resistance and is applied at a dose of 25-35 kg / ha, only on poor soils in this element.

Superphosphate and potassium salt are applied on autumn before sowing and will be incorporated with the last soil disking. Over the next few years, they will be incorporated into the soil at the last hoeing. Ammonium nitrate is applied in the spring and it is incorporated into the soil through hoeing.

CULTURE ESTABLISHMENT

The most suitable propagation method is sowing directly in the field, on the winter threshold, at a distance of 50 - 70 cm between the rows, using the SUP 21 or SUP-29 seed

drills with depth limiters (in Romania). It is recommended to mix the seed with an early seed seedlings (salad), because it will mark the rows, making possible the first hoeing just before the rising. To keep clean weed culture, it is recommended to mix the seed with inert material in a ratio of 1: 2 for a uniform seed distribution.

Given the small size of the seed, the sowing depth must not exceed 0,5 cm. The seed standard is 3-4 kg / ha (seed purity = 90%, germination 80%). Rising occurs 45-60 days after sowing, and the first true leaves occur 7-9 days after emergence. At this stage, thinning or reducing the density of plants should be done (if the plant density is higher than 12-16 plants / m²).

For small plots, or where the weeds degree is too high, it is possible to set up the crop by dividing the bushes from the spontaneous flora or by producing seedlings obtained in the multiplier solar and re-planted in the pots.

MAINTENANCE WORK

Maintenance works are in place to ensure weed control and the harmonious development of the crop; these consist of manual works on the row and mechanical works on the interval between rows.

HARVESTING

The optimum harvest time is at the

Hypericum perforatum L.

Photo 2 –
Hypericum perforatum L.
– the beginning of the flowering



Photo 3 –
Hypericum perforatum L.
–fructification phase

beginning of flowering, when the plants are in the semi-open floral button phase (bud still unopened) and it continues until the harvest of the entire culture, but without overcoming this phase. Conditions of raw material reception mention that harvested stems with fructification are forbidden to be received. Depending on the cultivated area, harvesting can be done manually with the sickle, or mechanized with the lawn mowers or Windrower (is a cropper machine).

The cutting level is adjusted at a height of 30 cm from the ground, eliminating the woody part of the plant. The plants are left for a few hours to wither and then they are collected and transported to the drying place.

DRYING

Can be done in artificial dryers or in solariums or attics, where natural heat can be used. The plants turn from one side to another for 2 times on the first day, so that the air enters among the plants favoring drying in good conditions. The drying yield is 3-4:1. Ventilation helps to remove moist air from the drying space and to shorten the drying time.

It is particularly important to mention that plants should not remain in the solarium after the drying has finished, because in the presence of the sun they will discolor and the plants will become reddish, depreciating their quality.

The raw material production to be obtained is estimated at 1500-2000 kg / ha in the second year and 2000-2500 kg / ha in the 3rd year. Depending on the climatic conditions of the year, 2-3 harvests per year are possible; the most important remains the first mown.

Hypericum perforatum L.

Photo 4 -
Hypericum perforatum L.
— culture year I



Photo 5 -
Hypericum perforatum L.
— crop year II

TECHNICAL RECEPTION CONDITIONS

It is admitted as impurities the following:

- ▶ max. 5% brown flowers;
- ▶ max 5% stems with a diameter of 2-4 mm;
- ▶ max. 1% stems without flowers and leaves;
- ▶ max. 1% organic foreign bodies;
- ▶ max. 0.5% of foreign mineral bodies.

DISEASES AND PESTS CONTROL

The plants can be attacked by fungi of the genus *Fusarium* and *Verticillium*, which cause their total destruction and compromising crops, especially in the third crop year (**Photo 6**). In order to prevent the attack, it is advisable to observe agrotechnical and hygiene measures of culture.

In favorable years at this plant may also appear the flouring (*Erysiphe hyperici*). Only for seed-tree lots, the control of disease is done by applying treatments during the vegetation period with BENLATE 50 WP or with DEROSAL 60 WP in a concentration of 0.1%. The pests reported so far do not cause significant damage to this plant.



Photo 6 - *Hypericum perforatum L.*
— 3rd year culture between Aronia rows



Photo 7 - *Hypericum perforatum L.*
— 3rd year crop compromised due to the fusarium attack

*Inula helenium L.***SPECIES DESCRIPTION**

According to the binary classification system, the species *Inula helenium L.* belongs to the class: Dicotyledonatae; Asteridae Department; *Asterales* Order; *Asteraceae* Family; *Inula* Genus; Species *Inula helenium L.*

Known in Romania under the popular name of big grass or Oman (Banat and Muntenia areas), black grass, bull's eye, Elena's tears, the species *Inula helenium* is common in the UK, south Europe and Asia, being met up to Himalayas and North America.

Other names include: *aunee* (France); *enula campana* (Spain); *etter alant* (Germany); and *enula campana* (Italia), but is also called horse-heal or elfdock.

Being a perennial, herbaceous species of Fam. Compositae, the young plant of the inula presents in the first year of vegetation a long petiolate leaves rosette with a large limb, white, tomentosus (covered with a dead tector hair) on the underside, with an elliptical oval form.

In the second year of vegetation, the plants form the floral stem, 90-120 cm high, robust, wooded at the base towards the end of the vegetation period, hairy and branched at the top.

The basal leaves are petiolate, 60 cm long and 10-20 cm wide, oval and toothed on the edges. The stem leaves (located above the stem) are oval- lanceolate, sessile, amplexicaul (their base surrounds the stem as a collar)

(Nyárády et al., 1964). The leaves are green on the upper side and whitish on the lower side (due to dead tector hair), with uneven toothed edge.

The branched stem in the upper side (**Photo 2**) bears capitulum type inflorescences (characteristic of the *Asteraceae* Family species) grouped in corymb-shaped formations with the marginal feminine ligule yellow flowers, and the central ones are tubular hermaphrodite.



Fig. 1 *Morphological Features*

The involucre with the exterior folioles are spatulated at the top, wide-oval, foliaceous and tomentosus (**Photo 3**). Depending on the meeting of favorable living conditions, the plant may or may not emit the flora stem in the

Inula helenium L.



Photo 2 - *Inula helenium L.*
(corymb floral formations)



Photo 3 - *Inula helenium L.*
(involucre with the exterior folioles)



Photo 4 - *Inula helenium L.*
— flower and fruit

second year of vegetation. If the plant does not grow sufficiently on the collet, it may remain in the rosette phase even 2-3 years.

The fruits are achene with four tetragonal edges, glabrous, showing a pappus that helps to disseminate the seeds (**Photo 4**).

The species is spread through wet meadows, often along the creeks and on the forests edge. It blooms in July - August and the ripening of fruits takes place unevenly in the last decade of August through the end of September.

Confusion is often made between *I. helenium L.* and *Telekia speciosa Baumg.* The difference between the two species is given by several morphological characters: at *Telekia speciosa*, the base of the leaves is cordate, whereas in *Inula helenium*, the lower leaves are attenuated in the petiole; the telekia's involucre has thick, harsh folioles, while at *Inula* they are soft; the flowers and fruits of *Telekia* are bare of pappus, while in *Inula* the pappus is twice long as the fruit (Craciun et al., 1977).

The Legend related to this plant and presented by Simeon Mangiuca in 1874 in the book „On the Importance of the Romanian Botanic” quoted by Zacharia C. Panțu (1906), says that „on the night of Saint Toader, at midnight, the girls go to the forest to the known places where inula grows with bread and salt, approaching and giving the bread and salt to the plant by putting them to its root and disenchanting like this:

„*Inula great Lord,
I give you bread and salt,
But you give me a big hair tail*”.

Then they dig and pull out the root and boil it at home, and at day dawn they wash with this potion on hair. Boiled in wine, the big grass is drunk for cough, but it also has febrifuge and tonic properties and is used as such especially for animals).

The legend says that the name elecamp from the German language, comes from the mythological character Elena of Troy by the likeness of the yellow flowers with her beautiful hair.

Inula helenium L.



Photo 5 - *Inula helenium L.*
— *radix inulae*

Generally all the popular names under which the plant is known, refer to this mythological character.

RAW MATERIAL

Is represented by the hypogean organ, root - *radix inulae* - harvested in the third year of vegetation, at the vegetation end, when the plant prepares to hibernate and to withstand low winter temperatures. On this period all active principles goes down accumulating in the root (**Photo 5**).

CLIMATE AND SOIL REQUIREMENTS

Inula helenium L. has a high ecological plasticity, being met both in the plain and hilly area, but also in the mountains, in the forest edge or along the waterline. It is present even in places where the sun penetrates harder (conditions where its width is lower).

From the soil's point of view, the plant finds favorable conditions on moderately weak acid soils, not very demanding in term of soil structure, which gives it some easiness to adapt to the conditions of introduction into culture.

In Romania's habitats, other species belonging to the Genus *Inula* (Al. Beldie, 1979 - "The flora of Romania") can be found:

- ▶ *Inula spiraeifolia* - originated in southern Europe signaled in Banat and Dobrogea, but whose presence has not been confirmed;
- ▶ *Inula hirta L.* (yellow flower) - frequent in the plain and steppe area, specific to limestone soils;
- ▶ *Inula germanica L.* - characteristic of the steppe area, often encountered in the Panonic Plateau;
- ▶ *Inula britannica L.* - common founded in pastures, water banks, grooves, swamps;
- ▶ *Inula oculus-cristi L.* - (big grass) - spread to the forest edges.

*Inula helenium L.***THERAPEUTIC VALUE**

Of all these species, only *I. helenium L.* is considered to have therapeutic value.

Inulin is a polyglucan obtained industrially from the chicory roots. The literature describes the chemical formula of inulin and natural sources of inulin (*Helianthus tuberosus*, *Cichorium intybus*, *Dahlia variabilis*, *Inula helenium*, *Allium cepa*, *Allium porrum*, *Asparagus officinalis*), their physicochemical properties, methods of determining the concentration of inulin and its benefits. Inulin has a low caloric value, a hypoglycemic action, it reduces the risk of colon cancer, it increases the bioavailability of Ca and Mg ions and it is a source of fiber.

This has led to the reconsideration of this species in recent years and to the great increase in consumption, which has led to the emergence of the need to introduce this species into culture.

CULTURE LOCATION

Given the ecological plasticity of this species, the location of the inula culture should be made in areas characterized by a sandy soil in the plain and hill area, which facilitates harvesting and conditioning for root processing.

Regarding the crop rotation in which *Inula* culture should be integrated, uncultivated plots which have long been abandoned and have a high degree of weeds can be used.

The culture duration is 3-4 years with the recommendation that it returns on the same area of land after 4-5 years.

ACTIVITIES FOR SETTING UP THE CULTURE

The preparation ACTIVITIES FOR SETTING UP THE CULTURE will depend on the land condition:

if it's an unworked land, then herbicide operation will be carried out repeatedly to reduce the weed stock, then the autumn plowing is done.

If the land is included in a crop rotation with a jumping plot, then the type of preparation will be determined by the pre-plant and will consist of the autumn plowing to 25-30 cm deep, then in spring, the *Inula* crop can be established either by planting of seedlings produced according to all the rules for the production of plant material, or (on smaller surfaces) sprouts are rooted from the spontaneous flora obtained by dividing the bush.

Depending on the characteristics of the land and its agrotechnical condition, planting can be done in spring or autumn, with comparable results. The seed required for seedling production will be harvested from spontaneous flora in the area where culture will be established.



Photo 6 - *Inula helenium L.*
— vegetable buds



Photo 7 - *Inula helenium L.*
— Growth of the root

*Inula helenium L.***SEEDLINGS PRODUCING**

It is done in protected areas – seeding is done in spring or autumn in pots, and at 45 days it is multiplied on 9 mm diameter pots and taken out in acclimatization plant shelter. Seedlings produced in spring (April) will definitely fall back in the autumn of the same year. Seedlings produced in the autumn will remain in the plant shelter, for acclimatization, until the next spring (March, April), when they are planted in the final place.

Planting - is done by the 50 x 50 scheme, requiring 40.000 yarns / ha.

MAINTENANCE WORK

10 days after planting, observations are made on the fixing degree of the seedling, we can fill in the gaps, and then the first mechanized hoeing between the rows can be made. During the vegetation period mechanical maintenance works are carried out and, where appropriate, at the end of the growing season, a mechanical scythe is applied to remove vegetal debris and floral stems.

HARVESTING

It's done in autumn, at the end of the growing season, or in spring, before starting in vegetation, to coincide with the moment of maximum accumulation of active principles (**Photos 6 and 7**). At this stage, the roots are dislodged with the dislocator or the plow without mouldboard (to avoid overturning the furrow).

Inula helenium L.

After dislocation, the roots are gathered, shaken and washed in cold water jet. They are allowed to sway and then cut or sliced and go to the drying space; they are stretched in thin layer and it is provided ventilation. The roots are repeatedly rotated so that the air can circulate, thus speeding up drying of roots. The

drying rate is 4: 1.

Storage of production is done in raffia or paper packaging, in clean, dry, hygienic areas without odd odorous.

SPECIES DESCRIPTION

From a botanical point of view, *Leonurus cardiaca L.* belongs to the *Labiales* Order, the *Labiatae* Family, *Leonurus* Genus. Known by the romanian people as goose'foot, the grass to be given, the cock crest, throw-wort, lion's ear and lion's tail etc., it is known by the Greeks and used since antiquity for its therapeutic value and effects on the heart (hence the name "cardiaca").

Its membership in the *Labiatae (Lamiaceae)* botanical family is underlined by all the morphological characteristics typical of this family: a perennial, grassy plant with a short rhizome, stoloniferous, horizontally covered with gray-brown roots, from which many vigorous stems with section in four edges (empty on the inside), covered all over its length by a fine pubescent.

In the first year it forms a leaves rosette with the reniform limb to round, deep sect, corrugated (**Photo 2**), out of which, in the second year of vegetation, the stems bearing the opposite leaves with long petiole are raised, with the palmate-lobate limb with 5 lobes. The upper leaves are trilobed and become more and more simple to the top.

Flowers are grouped into axillary pseudowhorl nodes (10-30/stem), each whorl contains approximate 10- 20 flowers. The flower is made up of a persistent tubular pubescent calyx with 5 green spines and a pink corolla with the upper concave labial and the lower

Leonurus cardiaca L.

labial being trilobate. The flower also has 4 stamens with superior ovary and a stigma split in two (**Photo 3**). It blooms in May-September, during which at least 2 harvests can be made. Fruits are nutlets, grouped four at the base of the persistent calyx.



Fig. 1 Morphological Features

Leonurus cardiaca L.

Photo 2 - *Leonurus cardiaca*
— leaves rosette, 1st year



Photo 3 - *Leonurus cardiaca* — flower



Photo 4 - *Leonurus cardiaca*
— fructifications

RAW MATERIAL

It is represented by the aerial part harvested in the beginning of the blooming, represented by the endings of the stems, on a length of 30-50 cm, containing leaves and flowers, known as *herba leonuri*. Are not allowed: woody stems, portion of stalks other than top stems, debris, brown leaves. The product has a faint smell and a bitter taste.

THERAPEUTIC VALUE

Due to the content of alkaloids and volatile oils, *L. cardiaca* is considered a medicinal plant with antispasmodic and cardiac tonic action, being a sedative, hypnotic, general hyoscyamine, stomachic, indicated in cardiac affections, arrhythmias of nervous origin. It can also be used, due to the tonic effects that it has on the body, as a remedy against depressive states.

CLIMATE AND SOIL REQUIREMENTS

Being a native species in Europe, South Asia and Central Asia, it is considered a moderately therophile plant (with falling leaves, which occurred during the same summer). It is resistant to semi shadow area and has low requirements in terms of humidity and soil but loves the fields near the garbage platforms or the sheep camps. On these kind of lands, height of over 1,5 – 2 m can be obtained (**Photo 5**).

CULTURE DURATION

Being a perennial species, the culture is placed outside the rotation crop, on fields that have previously been cultivated with plants that leave the land without weeds and mineral-enriched, but frees it early, so that it is possible to prepare the land in

Leonurus cardiaca L.

order to establish *Leonorus* culture.

The lands must be located in areas without cold air, the plant being very sensitive. The culture exposed to an area with strong winds that overflow the snow can freeze even from the second year completely compromising the harvest.

CULTURE DURATION

It can last for up to 4-5 years, after which gaps can occur due to plant depletion and due to the effects of winter frosts and lack of snow.

ACTIVITIES FOR SETTING UP THE CULTURE

The fields are cleaned from the vegetal debris from the pre-culture and the autumn plowing is performed at a depth of 25-30 cm, then repeated disks are made (to prevent weeds development), until the moment to establish the crop. If the land is very weedy, a herbicide with a total herbicide is recommended or the cultivation of a plant to preliminary clean the field.

The culture is established by sowing directly in the field, at the autumn end, or early spring, using 3-4 kg seed / ha. The distance between the rows is based on the machine used to maintain the crop (we recommend 60-70 cm) and the sowing depth is 1 – 1,5 cm.

For small crop cultures that have the purpose of producing seeds, it is possible to

set up the culture by seedling or by separating the bushes (in which case these bushes can be taken from the spontaneous flora). Planting in both cases is done by the 30 x 70 cm scheme (30 cm between the plants per row and 70 cm the distance between the rows). These methods shorten the time of having harvest from first year.

MAINTENANCE WORK

Maintenance consists of repeated, manual and mechanical hoeing, which does not allow weeds to settle especially during the first stages of crop development, when the speed of their evolution is slow. Once the rows are visible, only the mechanical hoeing on the interval between rows can be made.

HARVESTING

It can be done manually with a sickle or mechanized with a lawn mower, after which the stems can be collected manually. The harvesting is done during the Leonorus flowering period by cutting the flowering stems 30-50 cm from the top to the ground. Woody stems, brownie leaves or stems without vegetal ends (without peaks) are totally unacceptable.

Leonurus cardiaca L.

Photo 5 - *Leonurus cardiaca L.*
— Example of 3rd year culture

DRYING

Freshly harvested raw material is placed in large bags and transported to the drying place as soon as possible (solarium type dryers, attics, which have previously been cleaned and sanitized and in which the ventilation is obligatory). The raw material is spread out on black raffia material, ensuring proper hygiene and facilitating all the work of turning back, scattering. In this way it is shortened the drying time obtaining a high quality of the raw material, without losing the therapeutically valuable principles.

The drying yield (the amount of fresh raw material required to obtain 1 kg of dry raw material) is 3-4 : 1.

Storage of production is done in raffia or paper packaging in clean, dry, hygienic areas without foreign odors.

*Lythrum salicaria L.***SPECIES DESCRIPTION**

According to the binary classification system, the species *Lythrum salicaria* belongs to: Class: Magnoliopsida; Department: *Spermatophyta*; Order: *Myrthales*; Family *Lythraceae*; Genus: *Lythrum*; Species: *Lythrum salicaria*.

Known by the people under the name of spiked loosestrife, or purple lythrum, the plant is perennial, grassy or semi-woody, moisture-absorbing, which makes it to be frequently encountered in the Danube Delta marshlands and in other parts of the country where there is excess moisture. It originates in Europe and has spread also to America.

A young plant forms in the first year of vegetation a rosette of elliptical, long petiolate leaves. Beginning with second year of vegetation, a mature plant appears in the form of a bush, which presents at the beginning of vegetation a rich rosette of elliptical leaves from which the floral stems of numerous simple flowers (10-15), bisexual, grouped in inflorescences called raceme, begin to elongate.

The calyx consists of 4-8 sepals, a corolla of 4-8 petals, the upper ovary will grow a fruit called capsule with many seeds inside. It blooms between June and September and it is recommended to be harvested at the beginning of the flowering by cutting the vegetal mass above the red stem area (it is a semi wooded area of the stem that should not be present in the raw material).

At the end of the vegetation period, the remaining stems after harvesting will dry and will remain active only through vegetative buds at the level of collet that ensure species perennially. By the end of the vegetation period, the reserve of the active principles descends to the root and under the influence of low winter temperatures, vegetative buds are activated. This is the basis for increasing the number of floral stems/plants from one year to the next year having as result an increased raw material production.



Fig. 1 - Morphological Features

Lythrum salicaria L.**RAW MATERIAL**

Herba lythry salicariae - harvested at the beginning of flowering.

→ THERAPEUTIC VALUE

Specialty literature quotes Lytrum as one of the few plants to treat dysentery during the two world wars due to the very high content of tannins: alo-tannins (5-10%), silymarin, ferric hydroxide, flavonoid substances, heterosides, orientin, maltodeol-diglycoside pigments and cyanidol galactoside, choline, glucose, starches, antibiotics, pectin, carotenoids, minerals and volatile oil taste.

It is recommended to use as an infusion, decoction, powder or liquid extract from the plant, lythrum being indicated in fermentation colitis, diarrhea, dysentery, epistaxis, irregular menstrual flow, hemoptysis, gastrointestinal hemorrhages, metrorrhagia, golden staph infections (*S. aureus*) and dysenteric bacilli.

In external use, it is used as compresses, vaginal irrigation or baths with chopped plant decoction, Lythrum may be effective in treating various dermatoses and gynecological disorders. For irritated, reddened skin, masks made from fresh juice or highly concentrated infusion are recommended, 2 tablespoons of cream and one egg-white. The mixture is applied to the face and left for 30 minutes to act, and then removed with a pad with warm water. Also, Lytrum infusion-based compresses are indicated for dilated pores and acne.

CLIMATE AND SOIL REQUIREMENTS

Lytrum is a species perfectly suited to temperate climatic conditions, but being a great moisture-loving plant, this requirement limits the spreading area, making it more common in marshland, on the water's edge on the floodplain area, the ditches and the forest edge. All these areas of natural spread have made it necessary to introduce into culture.

CULTURE LOCATION

Being a perennial species, it is located outside the crop rotation, in areas and plots that are not suitable for other crops, having an important feature due to the ability to multiply by „twinning”, by starting in the vegetation of the buds at the collet level, but also by self-seeding, thereby contributing to the increase number of plants per unit area, increasing the life of culture.

Under these circumstances, the life's culture is 4-5 years, but it is not allowed to multiply uncontrollably (**Photo 2**), which would make difficult the culture maintenance.



Photo 2 - *Lythrum salicaria*
— planted at mountains area

Lythrum salicaria L.**THE CULTURE DURATION**

It is 4-5 years without the risk of high level of weeds.

→ CULTURE ESTABLISHING ACTIVITIES

- ▶ For the culture establishment, several steps of preparation of this work must be undertaken:
- ▶ Identify the favorable area and eventually identify the presence of the species *Lythrum salicaria* L. in the spontaneous flora in the area;
- ▶ Executing the deep plowing work for removing and mobilizing the field, because we are dealing with a perennial plant that will remain on the ground for at least 5-6 years, during which only superficial works will be done on the interval between the rows;
- ▶ If the land has been previously cultivated, it is possible to set up the culture by following the usual steps for any crop (plowing, harrowing, worked with milling machine or combiner, open gutters, plant);
- ▶ If the land has not been previously cultivated, then the herbicide treatment should be applied in order to reduce the big weeds and to make a suitable germinating bed for the other works.

→ PROPAGATION METHOD

In order to initiate a crop, it is possible to harvest seeds from the spontaneous flora to obtain the first seedlings or to sample portions of mature plants with root (without affecting the natural habitat), from which we can obtain the first plants by dividing the bushes.

- a) The multiplication by direct sowing in the field** - is practiced on the lands where the crop rotation was correctly done before, using a prior hoeing plant that left the weed clear land, freeing it early so that it is possible

Lythrum salicaria L.

to prepare the land and set up the crop not later than the end of August. Sowing is done with the SUP-29 drill so as to ensure a minimum distance of 70 cm between the rows. The seed standard is 5-6 kg seed / ha;

b) Multiplication by seedling:

- ▶ Seedlings produced in the solarium, sown in pots in August, replanted in pots and the pots will be taken out for wintering in special cases. The final planting will be done early in the spring as soon as the ground dries and the preparatory work can be done - in this case the flowering takes place in the same year. The planting scheme is 70 x 30 cm (a density of 42.800 plants / ha is obtained).
- ▶ Seedlings produced in the solarium, sown in pots in March, replanted in pots and the pots will be taken out for acclimatization in special cases 30 days after re-planting. The final planting will be done in spring in early May. In this case, the flowering will take place the following year. The planting scheme is 70 x 30 cm (a density of 42.800 plants / ha is obtained).

MAINTENANCE WORK

3-4 days after planting, an estimation of growth degree is performed and the gaps are completed, then mechanical (on interval)

and manual (on row) work is done as often as necessary to destroy the weeds.

HARVESTING

It is done in the beginning of flowering (June-September), when flowers begin to open on the flowering stem; harvesting can be done manually with the sickle or mechanized with the lawn mower and consists of cutting the aerial part above the area where the stem begins to be brownie.

Freshly harvested raw material is placed in large bags and transported in the drying place as soon as possible (solarium dryers, attics, which have previously been cleaned and sanitized and in which the ventilation is mandatory).

The raw material is spread out on black raffia material, ensuring proper hygiene and relieving all the work of turning back, scattering. In this way it is shortened the drying time, also obtaining a high quality of the raw material, without losing the therapeutically valuable principles.

The drying yield (the amount of fresh raw material required to obtain 1 kg of dry raw material) is 3-4 : 1.

Storage of production is done in raffia or paper packaging in clean, dry, hygienic areas without odd odorous.

Research being at the beginning we cannot provide production data, they can be obtained from the second year since the establishment of the culture.

*Melilotus officinalis***SPECIES DESCRIPTION**

The *Melilotus officinalis* species belongs, from the botanical point of view, to the *Rosidae* Class, to the *Fabales* Order, to the *Fabaceae* Family (*Leguminosae*), the *Melilotus* Genus.

Popularly known as yellow sweet clover, yellow melilot, ribbed melilot and common melilot, it has been used since antiquity for its therapeutic values. It is a biennial plant (it takes 2 years to complete a seed-seed cycle) or perennial. Originating in Western Europe, Asia, India, America, with a high ecological plasticity, the melilot grows through meadows, along roads, along the railroad, at the crops edge, on arid slope and bushes.

It is a herbaceous plant, usually biannual, having a pivotal root with nodules (due to the presence of nitrogen fixing bacteria), a very branched cylindrical stem that can reach up to 2 m.

The leaves are composed, trifoliate and the yellow flowers characteristic of fam. Leguminosae are grouped 30-50 on a stem, in axillary raceme that grow on the leaves armpit.

The fruit is a dark brown obovate pod, which shelters a single seed.

The seeds are very resistant and can survive for many years preserving their germination potential. Most often they spread after heavy rains; initially they have a soft consistency, then as they dehydrate they become harsh and remain viable under this form for up to 20 years; they will germinate when the conditions

of temperature and humidity are met, so the plants rising varies from one year to another, depending on the environment conditions.



Fig. 1 Morphological Features

It blooms from June to September, and for medicinal purposes only the flowers and the top of the lures are used. It is dried in the shade on thin layer, in airy places or in an artificial environment at 35 °C and to the drying process must be given a special attention, because if the plant is inadequately dried and ferments

Melilotus officinalis

Photo 2 - *Melilotus officinalis*
— yellow melilot



Photo 3 - *Melilotus albus Medika*
— white melilot

it can produce side effects when administered (it inhibits the process blood clotting and may induce bleeding).

Due to the content of active principles, melilot is recommended in treatments for the prevention of high blood pressure, thrombosis, gout, panic attacks. As internal treatments, melilot is recommended for treating insomnia, anxiety, cardiovascular disorders on the nervous system, adjuvant to phlebitis and thrombophlebitis, fermentation and bloating colitis, premenstrual syndrome and venous insufficiency, hemorrhoids, intestinal worm adjuvant; it treats diarrhea, biliary dyskinesia, bronchitis, etc. For external use, melilot is recommended for the treatment of conjunctivitis, gingivitis, adjuvant in burns, pain and joint inflammation or the fight against insomnia of children through warm baths before bedtime.

RAW MATERIAL

The inflorescences are harvested — *flores meliloti* — with a characteristic odor of coumarin and salty taste, or herba meliloti formed from the ends of the sprouts over a length of max. 30 cm in the blooming period, which have a characteristic coumarin and a salty-bitter and fad-like flavor.

Several harvests per year can be made. The flowers are harvested by chopping the flowering stems directly from the plant, and the herba is harvested by cutting the top of the branches with the sickle. Not to be confused with white melilot (it has white flowers) (**Photos 2** and **3**), which, although it has the same chemical composition, is not indicated in traditional medicine.

Raw material harvested in rainy weather is fermenting becoming toxic and can no longer be used because it forms coumarin that has an anticoagulant effect.

Melilotus officinalis

Raw material contains:

- ▶ coumarin, to which it owes both the specific smell and the anticoagulant effect;
- ▶ melilotol — a volatile oil with antiseptic properties;
- ▶ bitter substances,
- ▶ tannins with a healing effect;
- ▶ flavonoid derivatives with diuretic and anti-inflammatory properties; uric acid, choline; volatile oils, vitamins C and E.

THERAPEUTIC EFFECT

It lowers blood pressure, regenerates the hepatic cell; flowers are used as expectorant, sedative, hypotensive and diuretic. For external use, it is recommended for the antiseptic, calming, gingival anti-inflammatory effect in the form of local baths and mouthwashes; it is recommended for the treatment of bronchial asthma, bronchitis, chronic hepatitis, etc.

CLIMATE AND SOIL REQUIREMENTS

It is not a pretentious species of climate and soil, adapted even in rocky places, on arid slopes, with a high ecological plasticity. Wide use and therapeutic value have led to the need to introduce this species into culture.

CULTURE LOCATION

Being a perennial species, the crop is placed outside the rotation crop, on fields that have previously been cultivated with plants that leave the weed clear and mineral-enriched ground, releasing the field early so that it is possible to prepare it for melilot culture establishing. The land must be located in areas well exposed to the sun, its absence contributes to a low flowering degree.

CULTURE DURATION

It can last for up to 4-5 years, after which gaps can occur due to plant depletion and due to the effects of winter frosts and lack of snow. Melilot crop leaves an enriched soil due to the presence of nitrogen fixing bacteria, loose and free of weeds. In the last few years of melilot cultivation gaps can occur due to frost, which will lead to culture eradication.

ACTIVITIES FOR SETTING UP THE CULTURE

The land where the crop is to be set is cleaned from the vegetal remains of the pre-culture and the autumn plowing is carried out at a depth of 25-30 cm. The soil is allowed to be exposed to low temperatures which help to obtain a loose germinated bed, proper for the melilot culture.

If the land is very weedy, it is advisable

Melilotus officinalis

to have a herbicidal operation with a total herbicide or to cultivate a plant to clean the field beforehand (pre-culture should not be from the same botanical family as it would promote the transmission of common diseases and infestation with the same type of weeds).

The culture is established by direct sowing in the field, early spring, using 14-18 kg seed/ha. The distance between the rows depends on the machine used to maintain the crop (we recommend 60-70 cm) and the sowing depth 2-3 cm. The seeds are moistened 24 hours before sowing, then the seeds are dried and sown. Germination takes place 14 to 21 days after sowing. A small percentage of herbs may flourish even in the first year, but most of them begin to flourish in the second year of vegetation, from August to September.

For small crop fields for seed production, culture can be established either by seedling or by separation of the bushes (in which case the bushes can be taken from the spontaneous flora). Planting in both cases is done by the 30 cm scheme between the plants per row and 70 cm the distance between the rows. These methods shorten the start of the crop by 1 year.

MAINTENANCE WORK

The first hoeing is recommended when the rows are visible, in order to destroy the weeds in cotyledonous phases, thus avoiding the weeding of interval. Whenever necessary, mechanically hoeing is done between the rows

and manually on row 1-2 times until the rows are visible.

At the end of the first year of vegetation, when the plants are preparing to enter on vegetative rest, it is recommended to make a ridging to protect vegetative buds of the collet level.

In the following years, in the spring, the first hoeing can be done as soon as the land allows using a machine, the crust breaks and the plants start very well in the vegetation. In the favorable years, the plant's height can reach 1,5 - 2 m. The flowering period is July to August, when harvesting takes place.

HARVESTING

It is done manually by chopping the branches (when the raw material required is represented by flowers - melliferous flores) or by hand with the sickle, harvesting the spikes' shoots over a length of 30 cm. The harvesting phase is at the flowering beginning when there are 50% open flowers on the plant.

Drying is done in warm, generous spaces with ventilation facilities, because drying is very important for the quality of the raw material. Mold appearance would lead to the conversion of coumarins into dicumarol which is a toxic substance. The drying rate is 3,5 - 4 : 1.

*Melilotus officinalis***RECEPTION CONDITIONS:****→ TECHNICAL CONDITIONS:**

- ▶ For flowers: - faded flowers max. 5%; - leaf debris max. 1%; foreign bodies max. 0.6%; moisture max. 12%;
- ▶ For herba: - discolored or browned shoots max. 5%; foreign bodies max. 1%; moisture

max. 13%

Storage of production is done in raffia or paper packaging in clean, dry, hygienic areas without odd odorous.

Nepeta cataria L.

SPECIES DESCRIPTION

From the botanical point of view, *Nepeta cataria* belongs to the *Labiiales* Order, the *Labiatae* Family, the *Nepeta* Genus and it presents all the morphological characteristics of this family: a perennial, herbacea plant, with short horizontally rhizom covered by gray brown roots, from which grows many vigorous stems with the four-edged section, fistulous type (empty inside) covered all over her length by a fine pubescence.

The waist and the outer appearance differ from one species of the same genus to the other: reduced waist, dwarf strain with thin shoots and inflorescences with blue flowers (*N. mussini* and *N. fassini*) (Fig. 2) or species of big waist 1,5–2 m high (*N. cataria* var. *Citriodora*, *N. cataria* var. *Melisoides*).

In the first vegetation year, the plant forms a leaf rosette, then in the second year the plant forms floral stems with lemon aroma. Flowers are grouped in whorls and arrange to the armpit of the leaves on the upper third of the

floral stem. The flower is composed of a white-redish-violet bilabiate corolla. The fruit is an ellipsoidal, smooth, brown nutlet, grouped 4 in the persistent calyx (TOM = 0,5 g).

It is known under the popular name of cat grass, Hail Mary's lap (Ro), catmint (E), katzenmelisse (G), catnip, catswort, with reference to the fact that in the presence of this plant, cats show a special pleasure.



Fig. 1 Morphological Features

RAW MATERIAL

Nepetae herba — represented by the aerial part with shoots, flowers and leaves, harvested during the flowering period (Photos 3 and 4).

THERAPEUTIC VALUE

Nepeta Cataria is rich in volatile oil, flavones, triterpene and polyphenols acids, which give it a sedative action, bitter tonic being used in dry cough, spastic as syrup and tincture.

Nepeta cataria



Photo 2 - *Nepeta mussini* ("Cat Grass")



Photo 3 - *Nepetae herba* — fresh



Photo 4 - *Nepetae herba* — dried

For its therapeutic value and its wide use in ethnoiatry, *Nepeta* was introduced into culture for the first time in Romania, at Cluj at Medicinal Herbs Research Station (B. Pater, 1923, quoted by Leon Sorin Munteanu in the Treaty of Medicinal Plants and from spontaneous flora, 2007). In 1977, the local population „De Băneasa” (Photo 5) was selected and used in culture, which after the year 2000 entered on a shadow cone. Today, however, phyto therapist's attention is directed to this species, which it is revived by introducing it into several recipes of natural products.

CLIMATE AND SOIL REQUIREMENTS

Originating in Eastern Europe, Central Asia and part of China, was naturalized in Europe, New Zealand and North America. As a result, it is a strict plant at temperature and light. In the absence of these factors, *Nepeta* produces poor quality raw material, both quantitatively and qualitatively. Low humidity influences the qualitative accumulation in the growth stage, meaning the development of a large mass of raw material, and the excess moisture in the flowering phase, negatively influences the production and accumulation of volatile oil.

→ CULTURE LOCATION

It is recommended to extend the *Nepeta* culture in the favorable areas of Braila, Ialomița and Călărași Counties in Romania (plain area with a lot of sun and light).

Under conditions from Brașov County (mountain area), where the species *Nepeta cataria* is present in the medicinal and aromatic herbs collection (Photos 5 and 6) along with the species belonging to the same genus, *N. fassini* and *N. melisoides*, studies have been made on biological features and observations on the vegetation phases. On this occasion seed was produced in order to multiply it for introduction into culture.

*Nepeta cataria***CULTURE DURATION**

Being a perennial species, *Nepeta* must be cultivated either in a perennial rotation crop or in a rotation crop with „jumping” plot; it has a duration of 5-7 years.

ACTIVITIES FOR SETTING UP THE CULTURE

SOIL WORK — it is recommended to perform a deep plowing at 28- 30 cm; in the spring, germination bed preparation work is done to prevent the growth of weeds.

SEED AND SOWING — *Nepeta* is multiplied by sowing directly into the field, during March 20 to April 10, which is the optimal time for sowing. The seed, according to the rules in force, must have a purity of 95%, germination index 70% and TOM = 0,5 g.

On larger areas, sowing can be done with the SUP -29 drill, with coulters equipped with depth limiters, set at a distance of 50 cm. The seed standard is 2,5 kg; it is recommended to mix the seeds with ballast (sand, ash, cornmeal) and with about 100 g seed from an indicator plant (L.S. Munteanu, 1990). After sowing, the land is rolling down to ensure intimate contact between the seed and the soil particles.

On small areas or when it is desired to start a crop for seed production and the biological material (seed or vegetal) is a few, culture establishment can be done through seedling or rooted cuttings.

For the seedlings production in protected areas as solariums or greenhouses, the seed is sown in tote boxes and then the seedlings are replanted on flower pots, acclimated outside, in shelter plants and they are planted definitively in the field at the optimum time.

For the cuttings rooting, it is assumed that there are some mature plants from which can be harvested semi-woody shoots from which the cuttings can be obtained. They are rooted either



Photos 5 and 6 - *Nepeta cataria* L.
— seed-tree lot

Nepeta cataria

in sand or peat or in perlite so that rooting is favored by a humid environment and a fairly high temperature. After rooting, when the roots go out through the holes of the alveolus where the roots have been initially planted, the plants are transplanted to the pots where they can remain until planting.

If planting cannot be done by September, then it must be postponed until the spring when it can be planted as soon as the soil has woken up and the ground can be prepared. In order to plant, the ditches are open at 70 cm distance between the rows and the planting is done in these ditches.

MAINTENANCE WORKS

If the seeds were sown directly into the field, maintenance work begins as soon as the indicator plant begins to rise; first hoeing between rows is done and it is repeated during the first year whenever necessary to avoid weeding. In the phase of 3-4 leaves a manual hoeing is made, so that plants are left at a distance of 15 cm.

During the vegetation period, maintenance works are carried out so that the culture does not become weedy, regardless of the method by which the culture was established.

In the vegetation first year, on the culture obtained by direct sowing in the field, the plants only pass through the vegetative phase without forming floral rods. In the following years the plants form floral rods with abundant

flowering. In the culture set up with seedling or rooted cuttings, flowering takes place from the first year of vegetation.

HARVESTING

The aerial part is harvested — *nepetae herba* — in the early phase of flowering (the beginning phase of blooming) by cutting with a sickle to 15-20 cm from the ground (Radu Steluța, M. Toma, 1977). After harvesting, a hoeing is made on the interval and after 45-50 days the second hoeing can be done. The plant is harvested in beautiful sunny days, after the dew passed.

The seed lots are harvested when 60% of the plants reach physiological maturity.

Drying is done naturally, in airy, warm, hygiene and ventilated areas or artificially in dryers at a temperature of 35-40 °C. The drying rate is 4-5:1.

RECEPTION CONDITIONS:→ **TECHNICAL CONDITIONS:**

- ▶ for the green product is admitted:
 - impurities max. 2% yellowish leaves, max. 1% stem remnants without leaves (stocks);
 - organic foreign bodies max. 0,5%;
 - foreign mineral impurities max. 0.25%;
 - no fructifications are admitted.
- ▶ for the dry product are admitted
 - impurities max. 3% brown leaves and max. 1% stalk debris without leaves;

Nepeta cataria

- organic foreign bodies max 0.5% and - foreign mineral impurities max. 0.5%;
- humidity 13%;
- no fructifications are admitted.

Storage of production is done in raffia or paper packaging in clean, dry, hygienic areas

without odd odorous. The average yields that can be obtained in compliance with the crop technology are 10 to 12 to/ha of fresh herb, respectively 2,5 to 3 to/ha of dried herb.

*Sanguisorba officinalis L.***SPECIES DESCRIPTION**

Sanguisorba officinalis is a perennial herbaceous medicinal species belonging to the *Rosales* Order, *Rosaceae* Family, *Rosoideae* Subfamily. It is known as the popular name of great burnet, bloodwort, black horehound.

The plant grows 30-90 cm high, with imparipinnate-composite, glossy leaves, and hermaphrodite flowers, corolla-free, with four sepals, dark red or brown calyx.

At the beginning, it forms a rich leaves rosette like a bush, from which start the long and fiery floral stems, reaching almost 30-50 cm, branched in the second third and carrying in their top globular inflorescences as capitulum type or globular cylindrical inflorescences or elliptical, compact, red purple or sometimes brown.

The fruit is a closed nutlet in the receptaculum. The seed stays fixed on the inflorescence axis and over-maturing it shakes down. TOM = 6 g.

There are about 30 similar species spread

in the temperate zone of the northern hemisphere, but it has a very wide range of spread, being found in the northern hemisphere in Europe, Asia and North America.



Fig. 1 Morphological Features

RAW MATERIAL

All parts of the plant and rhizome root are used (herba, *rhizoma cum radicibus*) with a high content of tannins and volatile oils. Specialty literature mentions it as a therapeutically valuable species due to the antioxidant, anthelmintic, comforting effect

used in enterocolitis, kidney disease and as antihemorrhagic due to its tannin content and its diuretic stimulation effect.

The root has anti-inflammatory and anti-dysentery effect. Fresh juice obtained from leaves is a real remedy against insect stings.

Sanguisorba officinalis

Photo 2 - *Sanguisorba officinalis*
— flower

Photo 3 - *Sanguisorba officinalis*
— seeds

Gargle with infusion of *Sanguisorba officinalis* combats dental inflammation, gingivitis, stops oral bleeding. The powder is effective in nasal bleeding. It is often cited as a remedy in Chinese medicine.

Less well known in Romania as a medicinal herb, it is appreciated as an important fodder species existing in the pastures, due to its nutritional value. In spontaneous flora it develops a small waist, while in culture it forms a robust, very rich bush and a strong rhizome in the soil. It is included in our culture introduction program precisely because it is a very valuable species that deserves to be brought in attention and better valued.

CULTURE LOCATION

It is not a pretentious species, it is compatible and vegetates very well in a floral mixture, but it is (in this context) difficult to harvest. Being a perennial species should be placed outside the crop rotation, but it must follow a plant that has left clean weeds ground and even an improved structure of soil (for instance — after phacelia or marigold).

→ **CULTURE DURATION: 4-6 YEARS.**

ACTIVITIES FOR SETTING UP THE CULTURE

The lands where the *Sanguisorba* culture is to be established are cleaned from the vegetal debris from the pre-culture and the autumn plowing is made at a depth of 25-30 cm; freezing and thawing will contribute to obtain a loose germinative bed and conducive to the formation of the culture.

If the land is very dense in weeds, it is advisable to have a herbicidal operation with a total herbicide or cultivation of a

Sanguisorba officinalis

plant able to clean the field beforehand (pre-culture should not be from the same botanical family, as it would promote the transmission of common diseases and infestation with the same type of weeds). To shorten germination time, it is possible to practice the seed moistening 24 hours before sowing, after which the seed is dried and sown in the field.

The recommended propagation method is sowing directly into the field using the 4-6 kg/ha, in the second half of April. The emergence takes place 12-14 days after sowing. The sowing scheme is selected according to the machine with which the hoeing is done, respectively 50-70 cm between rows.

MAINTENANCE WORK

As soon as the rows are completed and the plants are emerging, the first manual hoeing on a row can be made, so that where the plants are very compact, thinning can be done and weeding of useful weeds emerged on the row.

When the plants have reached the stage of 3-4 leaves we can weed out mechanically on the interval. This work is repeated whenever it is needed (depending on the degree of crop weeding so that the crop be always clean, without weeds).

Until autumn of first year, the plants will go through the vegetative phase (they have only a well-developed leaf rosette) and they are ready for vegetative rest.

On re-starting the activities in spring, it is

recommended to carry out a work with spring-tooth harrow, that aims to aerate the bushes, remove the leaves affected by the winter that has passed and stimulate the emission of floral stems. The work is done perpendicular to the direction of the rows, adjusting the machine with the inclination adjusted so as not to remove the plants from the root.

In the following years, if the technological requirements for first year of vegetation were met, only mechanical hoeing on the interval between rows and harvesting will be carried out.

HARVESTING

The harvesting of raw material represented by:

- ▶ *sanguisorbae herba* - is done in the morning after the dew passed; the work is done manually, with the sickle, harvesting the entire air part, above the ground at 10-15 cm. The brown leaves, other foreign plants or dried stem residues are removed, then the plants are placed in baskets or big-bags and transported to the drying place as soon as possible. The drying yield was not determined;
- ▶ *sanguisorbae radix* - is done in spring or autumn during vegetative rest, when all active principles are accumulated in the root. The drying rate is 2,7 – 3 : 1.

*Sanguisorba officinalis***DRYING**

It is done naturally, in airy, warm, hygienized and ventilated areas, or artificially in dryers at a temperature of 35-40 °C. The product roll over to ensure an uniform drying of the plants.

Storage of production is done in labeled raffia or paper packaging in clean, dry, hygienic areas without foreign odorous.

*Stachys betonica***SPECIES DESCRIPTION**

From the botanical point of view, the species *Stachys betonica* belongs to the *Lamiales* Order, *Lamiaceae* Family, *Stachys* Genus. It presents all the morphological characteristics of this family. The people are also calling it as the robber's grass, grass-cut, grass-wound, healing, cutting weed, leaf-cut, wind grass, bark beetle, creeping grass, creeping The grass is also termed the grass, the grass-cut, grass-wound, the cut-leaf or common hedge nettle, betony, purple betony, wood betony, bishopwort, or bishop's wort. The French common name is betoine, and Betonie in German.

It is a perennial, grassy species with rhizomes root, which forms a rich rosette of long petiolate leaves, with elongated cordiform limb and emarginate edges. In the second year of vegetation it forms 3-4 floral rods, 4 edged and slightly pubescent, which rise above the leaves rosette, reaching the height of 50-100 cm. Simple, purple-red flowers are grouped into spike-like inflorescences of 1,5 - 3 cm. The flowering takes place in July and August; the fruit is an elongated nutlet, which at maturity is brown-black (**Photos 2 and 3**). Characteristics of stachys seed: 95% purity germination, TOM = 1g.

It is encountered in Europe in countries

such as Spain, Germany, Romania, Austria, England, Scotland where many ethnoiatry recipes are known, but it also appears in North Africa, Asia, being mentioned in China's flora also.



Fig. 1 Morphological Featuresk

*Stachys betonica***RAW MATERIAL**

The therapeutic value of the plant is present in all its organs, therefore the raw material is represented by:

- ▶ *Stachys rhizoma* — rhizomes harvested from plants in third year of vegetation. Harvesting takes place during vegetative rest (autumn or spring), washed with a fast jet of water and dried;
- ▶ *Stachys herbae* — the aerial part of the plant harvested during the flowering period; it dries in hygienic conditions;
- ▶ *Stachys flores* — flowers harvested separately from the rest of the component organs, just for certain preparations and uses.

CHEMICAL COMPOSITION AND THERAPEUTIC EFFECTS

It contains volatile oil and bitter principles giving it a characteristic fragrance. The whole plant contains flavonoids and glycosides that have a hypotensive action (lowering blood pressure) and thus Betony is effective in reducing stress and anxiety.

- ▶ dried herb mixed with honey helps for coughs and many other diseases of the lungs;
- ▶ recommended for the treatment of epidemic diseases such as plague;
- ▶ healing of jaundice, epilepsy, gout, paralysis, hydrophysea, cough, cold, flu and respiratory problems;
- ▶ juice from fresh leaves is good for bites caused by mad dogs, but it is also used to relieve toothache;
- ▶ as a treatment for wound healing, it is applied directly to the skin or it is used as decoction;
- ▶ infusion can also be used as a mouthwash, but also for gargle in case of sore throat;
- ▶ it has tannins and due to its astringent qualities it is used as a



Photo 2 - *Stachys betonica* — full flowering



Photo 3 - *Stachys betonica* — inflorescence (detail)

Stachys betonica

good treatment for diarrhea.

Stachys betonica is considered as a universal panacea, because it is a remedy for many diseases that address both the digestive system, the respiratory system, the nervous system but also the genital apparatus, and the endocrine system, etc.

CLIMATE AND SOIL REQUIREMENTS

It has a high ecological plasticity that demonstrates it is not a demanding species of climate and soil conditions and therefore it is recommended for introduction into culture. In fact, old writings recall that it was cultivated in the gardens of the monasteries, in individual yards, but also in batches near pharmacies and medicine Universities.

In Romania it is encountered in all geographical areas, in pastures and meadows along with other species, sometimes toxic, making it difficult to harvest. These arguments, as well as the increasing interest in this species and the desire to rediscover its virtues, are just as many reasons for introducing it into the culture.

CULTURE LOCATION

Being a perennial species, the *Stachys* culture is placed outside the crop rotation. Under conditions from Braşov County (mountain area), where the species *Stachys* is present in the medicinal and aromatic herbs collection (**Photo 4**) along with the species belonging to the same genus, studies have been made on biological features and observations on the vegetation phases. On this occasion seed was produced in order to multiply it for introduction into culture.



Photo 4 - *Stachys off* — seed-tree lot



Photo 5 - *Stachys off* — second year of vegetation

*Stachys betonica***CULTURE DURATION**

5-7 years, respecting technological recommendations.

ACTIVITIES FOR SETTING UP THE CULTURE

In the experimental conditions, in which we have done the works to establish a seed production unit necessary to initiate the stachys culture, the crop establishment was done with seedlings produced according to all rules in protected areas, resembling in 2 stages, respectively:

- sowing in pots in the second decade of March and at the end of May, and planting seedlings in culture was done 45-60 days after sowing. For autumn planting, sowing was done at the end of July and planting was finally done in the second decade of September.

- reproduction of seedlings in pots;
- acclimatization in cold beds;
- planting the seedling definitively in the crop following the planting scheme 0,3 x 0,7. Ditches are opened and seedlings are planted on pots, then they are planted in ditches.

It has a very slow pace of development in the first few months, therefore, the culture set up by direct sowing has the tendency to become weedy and it will not flourish in the first year. To simplify the works, we recommend using seedling produced in the summer months

and then planted in the final place either in the autumn of the same year or the following spring before starting in its vegetation.

MAINTENANCE WORK

5 days after plating rooting control must be made and all the gaps will be filled and the first hoeing can be done. Whenever necessary, mechanically hoeing is done in order for the culture not to become weedy.

At the end of the first year of vegetation, when the plants are preparing to enter on vegetative rest, the last work to be done for Stachys culture is a ridging, that is made with a special ridging machine or the potato ridging machine.

In the spring, the first hoeing can be done as soon as the land allows using a machine, and we must level the ditches. Plants will start in vegetation and hoeing is repeated once per month (depending on the field).

HARVESTING

THE AERIAL PART — *stachys herbe* — in the early phase of flowering (the beginning of the blossoming) by cutting with the sickle at 15-20 cm up from the ground. After harvesting, a hoeing into interval is made.

The seed lots are harvested when 60% of the plants are reached the physiological maturity.

Stachys betonica

Drying is done naturally, in airy, warm, hygiene and ventilated areas, or artificially in dryers at a temperature of 35-40 °C. The drying rate is 4-5: 1.

THE ROOT (*stachys rhizoma*) is harvested at the crop eradication and only during vegetative rest (spring or autumn).

TECHNICAL RECEPTION CONDITIONS

For the green product is admitted:
- impurities max. 2% yellowish leaves;

- organic foreign bodies max. 0.5%;
- foreign mineral impurities max. 0.25%;
- no fructifications are admitted.

For the dry product is admitted:

- impurities max. 3% brown leaves;
- organic foreign bodies max 0.5%;
- foreign mineral impurities max. 0.5%;
- humidity 13%;
- no fructifications are admitted.

Storage of production is done in raffia or paper packaging in clean, dry, hygienic areas without odd odorous.

Taraxacum officinale

SPECIES DESCRIPTION

Known in Romanian tradition as the popular dandelion, but also like blowball, lion's-tooth, cankerwort, milk-witch, yellow-gowan, Irish daisy, monks-head, priest's-crown and puff-ball, faceclock, pee-a-bed, wet-a-bed, swine's snout, white endive and wild endive, or in the German tradition under the name of the dente de lion, from the botanical point of view, *Taraxacum officinale* L. is a perennial herbaceous species belonging to the *Asterale* Order, *Asteraceae* Family, Genus *Taraxacum*.

The root is pivoting, with thin branches over its entire length (especially in dry summers). It emerges from the seeds, forming in the first year a rosette of leaves with the entire limb, vegetates in this form and winters in the rosette phase.

In the second year of vegetation, under favorable climatic conditions, they form one or more floriferous stems, empty on inside, having on top an inflorescence - calatidiu- characteristic of the *Asteraceae* Family, consisting of yellow ligulate flowers. Inflorescences open in the morning and close in the evenings and remain closed in cloudy days.

It blooms from spring (May) until most at the end of June. The fruit is an achene accompanied by a pappus like an umbrella that helps to spread the seeds anemochore (by the wind). The seeds germinate relatively quickly (10-14 days), not requiring a post-maturation

period.

With a particularly high ecological plasticity, dandelion is found in all geographical areas of the world; from the seaside to the alpine areas, from the plain to the hill.



Fig. 1 Morphological Features (F.H.Wigg)

Taraxacum officinale

RAW MATERIAL

Is represented by:

ROOT — *taraxacii radix* - harvested during vegetative rest (spring or autumn) when active principles migrate and accumulate in the root;

LEAVES — *Taraxacii folium* - which is harvested after the flowering phase has passed, because the dynamics of the dandelion active principles accumulation have shown that, during the flowering period, the plant has the lowest content of active principles in both the leaves and the root. For technical reasons it is forbidden to harvest the leaves together with the flowers, because this mixture would greatly extend the drying times and the resulting villosity after the maturing of the flowers would pollute the raw material irretrievably.

HERBA (aerial part) with root — *taraxacii herba cum radicibus* - it is harvested early in the spring before the forming of flowering buds

THERAPEUTIC VALUE

Dandelion contains minerals, vitamins and trace elements, along with bitter and inulin principles, helping to cleanse the body, favoring liver and bile activity; is depurative, sweating, diuretic, stimulating and is also used as a cosmetic treatment for lighter skin.

Dandelion also aids healing: anemia, acne, cellulitis, varicose veins, rheumatism, hemorrhoids, intestinal fermentations,

metabolism disorders, eczema, ganglions inflammation, gout, biliary and renal lithiasis.

The whole plant contains a latex that has a laxative effect.

CLIMATE AND SOIL REQUIREMENTS

Due to the wide spread of the species on so different areas, we have the proof of ecological plasticity. The only condition limiting its development potential is strong insolation; therefore, although the literature mentions that the dandelion loves the sun and does not grow in the shade (MUNTEANU LS, 2007), the experiment made by our project team, shows that the very strong sunstroke causes the dandelion plants to develop small size, with few leaves in rosette and poorly developed; plant height does not exceed 15-17 cm.

In a hidden and shaded culture (along with lucerne, peas, trigonella, herbs, phacelia, potato and even among rows of fruit shrubs), the dandelion reaches a height of 30-50 cm, forming well-developed leaves with the entire limb.

CULTURE LOCATION

In hidden culture, all rules for the basic culture location as well as its zoning will be respected. Cool areas are generally preferred, generally those that are favorable to shading culture. In our experiments, in mountains area, we achieved good results by associating

Taraxacum officinale

Photo 2 - *Taraxacum officinale*
— first year of culture



Photo 3 - *Taraxacum officinale*
— fifth year of culture

the dandelion with potato, phacelia and lucerne.

→ **CULTURE DURATION: IT LASTS 4 TO 5 YEARS.**

ACTIVITIES FOR SETTING UP THE CULTURE

Are the classic ones regarding the way of preparing the germinative bed (basic plowing, land shredding, compaction, sowing etc.), but closely related to the precursory plant and especially the basic plant that will make the shading. If the precursory plant releases the field early (peas, cereals) leaving it without weeds and enriched in nitrogen, the preparation of the land consists of a plowing, shredding of the land, compaction, sowing with the seed drill adjusted with the seed distribution tubes at the distance of 12.5 cm.

If the crop will be set up on a ground full of weeds, it is mandatory to clean the land by repeated herbicides or, in an organic version, must be established a precursor crop with a species that inhibits the development of weeds (phacelia, peas, and common vetch – *vicia sativa*).

After harvesting these crops, the land is being prepared and basic culture is established, and with it the dandelion culture. The seed mixture will be based on the basic plant (following the recommended seed standard, to which 2-3 kg / ha of dandelion seed is added).

In the potato case, vegetative propagation of the dandelion is recommended using root fragments harvested from the spontaneous flora (about 3-5 cm long). This method is also recommended for setting small dandelion plots in orchards on the land between tree rows. (**Photo 2** and **3**).

In pure culture (without shade plant, the dandelion can be multiplied by seedling, sown in caskets and then repopulated in pots), the seedling is acclimatised and then planted in the field definitively. At 10 days, the control of harvesting is done, the

Taraxacum officinale

barren spaces are filled and the first mechanical hoeing between the rows can be done.

MAINTENANCE WORK

Are the current ones for the basic culture (if the plant is a hoeing one or not).

HARVESTING

Is based on the type of raw material. Early spring, before the formation of floral buds, whole plants (root with leaf) can be harvested. Reception conditions are for:

- ▶ *taraxacii folium cum radicibus* — Leaves blacked out max. 3%; foreign bodies max. 3%; humidity max. 13%. There are NOT allowed stalks with fructification and villosity;
- ▶ *taraxacii folium* — Leaves blacked out max. 3%; organic foreign bodies max. 3%. There are NOT allowed stalks with fructification and villosity;

- ▶ *taraxacii radix* — organic foreign bodies max. 3%; no foreign mineral bodies are allowed. The thicker roots are splitted lengthwise to shorten the drying time. In culture, the root is harvested only when culture is destroyed; otherwise only the leaves are harvested by cutting with the sickle.

DRYING

It is made at specially designed spaces with the possibility of aeration and ventilation; the drying efficiency is approximate 6 : 1 for leaves, 5 : 1 for leaves with roots and 4 : 1 for roots.

PRODUCTION STORAGE

It is made in raffia or paper packaging, in salubrious, dry, odorless, sanitized areas. Prior to storing, dandelion raw material can be baled, reducing plant volume and making storage more efficient.

*Urtica dioica L.***SPECIES DESCRIPTION**

Stinging nettle is also known in various areas under the name of Curly nettle, Empress nettle, Forest nettle, Romanian nettle.

The species *Urtica dioica L.*, from a botanical point of view, is part of the *Lamiales* Order (*Labiales*), the *Labiatae* family (*sin. Lamiaceae*), genus *Urtica*.

It is a perennial, herbaceous plant with a stoloniferous rhizome having a horizontal growth.

It forms annual erect stems with a height of 30-150 cm, which in the section has 4 edges (characteristic to the family which it belongs).

Leaves are opposite, ovate with serrated margin; unisexual dioecious flowers (female organs are placed on different individuals from masculine ones, unlike unisexual monoecious plants in which both organs are on the same individual) are grouped in green panicles with cephaloid perianth; the fruit is like a small nut with persistent perianth. Flowering takes place between June and September.

The entire plant (leaves and stems) is finely covered with thin bristles (**Photo 2**) that lodge in the offended skin, leaving red patches that itch and burn — sometimes for up to 12 hours.

Stinging nettle is a nitrogen-loving plant,

that's why it can be frequently found around the lawns, animal shelters, around households, on manure platforms or in forest cuts.



Fig. 1 Morphological Features



Photo 2 - *Urtica dioica L.*
— thin bristles

*Urtica dioica L.***RAW MATERIAL**

Is represented by leaves (*urticae folium*), aerial parts (*urticae herba*) and root rhizomes (*urticae radix*).

The aerial part is harvested during the vegetation period, staggered, and the root is harvested during the vegetative rest period, when all the nutritive principles descend into the subterranean part of the plant and accumulate here.

The whole plant contains protein, amino acids, chlorophyll, sterols, vitamins (B, C, K), provitamin A.

Nettle leaves are used for chlorophyll extraction. They are harvested at the end of summer by haling directly from the root, using the glove; then they dry in well-ventilated spaces, in thin layers and repeatedly they turn from side to side and aerate; The drying yield of the leaves is 4.5-5.5 : 1;

The aerial part is harvested periodically by mowing, starting with the spring months, repeatedly so that each time it is harvested, the aerial part is cruel, without fruits. The drying rate is 6-7: 1. The whole plant has a specific smell and a bitter taste.

Subterranean part of the plant is harvested by dislocation with hoe, spade or plough, shaking off the debris, washing, spreading out to the sun to air and spread out in thin layer and in covered areas for drying. The drying rate is 4-5: 1

THERAPEUTIC VALUE

- ▶ is recommended as a source of chlorophyll for organism detoxification;
- ▶ increased diuresis and glycemic level adjustment;
- ▶ for rheumatic diseases, especially gout, and in some cases of renal lithiasis.

Scientific studies show us that extracts from the nettle root have favorable effects in benign prostatic hypertrophy and allergic affections such as allergic rhinitis.

Urtica dioica L.

Photo 3 - *Urtica dioica*
— first year of culture

In traditional medicine, nettle preparations are recommended for affections such as atonic wounds, varicose ulcers or hemorrhoids.

CLIMATE AND SOIL REQUIREMENTS

It is not a pretentious species, that's why it is considered a cosmopolitan plant that feels good in all parts of the world, less in the Arctic. Prefers drained soils, rich in nitrogen, but it grows very well at the edge of the glades, of the roads, besides abandoned houses or near the animals summer shelters.

CULTURE LOCATION

Because of its wide use, as well as the fact that the use of the root involves the destruction of plants and the damage to natural distribution sites, there is a growing need of introducing into the organised cultures. For this, are recommended the lands that have been occupied with animal shelters, and which, by moving them, left the land very rich in nitrogen.

The nettle, being a perennial species, it si recommended either the placement of the crop outside the rotation culture, or the practice of a rotation culture with leaping parcel or its placement in the potato crop where it finds favorable culture conditions.

CULTURE DURATION

Can last 3-4 years, after which the roots are dislodged and another plot is established using a part of the dislocated rhizomes.

When it is not desired to use the roots for therapeutic purposes, the culture can last even 5-7 years.

Urtica dioica L.

ACTIVITIES FOR SETTING UP THE CULTURE

Preparation of the seedbed by a deep ploughland in the autumn, after the pre-culture (if it existed) was harvested or for unclogging the land (if we are dealing with a pasture or an uncultivated land). In this case a total herbicide can be done and then leave the field for about 2 weeks for the herbicide to act, after which the autumn plowing can be made.

After the plowing, the field is allowed to freeze in winter and in spring, as soon as the ground can be worked, a disking is made and the trenches are opened according to the potato culture scheme (0,7-1 m between the billons).

In these ditches are spread the nettle stononifiers rhizomes, which were previously harvested by the displacement of an older crop or of places where the nettle was present. After planting, the trenches are closed, the billon is restored and rising occurs within 15-20 days (**Photo 3**).

MAINTENANCE WORK

Consist of making repeated hoeings throughout the growing season, so that the plants grow and evolve. This work will be repeated throughout the growing season after each harvest.

HARVESTING AND DRYING

On small surfaces harvesting is done manually with a scythe and on big surfaces it can be mechanized with a mowing machine or a trimmer equipped with a knife.

In spring, when the plants reached the height of 25-35 cm, it is possible to make the first mowing and then repeatedly throughout the growing season of the crop.

We can make 3-4 herba harvests. The plants are harvested and taken to the drying place where they lie in a relatively thin layer. During drying, it is necessary to repeat the twist of the plants with a pitchfork so as to aerate the plants favoring the drying process. Otherwise, plants can mold.

The drying time for the herba product is longer than for the leaves and this product requires more attention due to the high water content of the product. The drying yield for herba is 4.5-5.5: 1 and for the leaves it is 6-7: 1

Dried nettle leaves remain green and have a specific smell. The drying temperature may be 50-60 °C.

Harvesting of nettle roots is done outside the vegetation period, in autumn or spring, before the vegetation process starts. For this, it is necessary to mow down on the grass line, and on small surfaces the roots are dislodged with the hoe (they are not placed very deeply).

For larger surfaces, the displacement is done with the plow without moldboard or the beet dislocator.

Urtica dioica

Whatever the dislocation method is used, the roots must be shaken, washed with water and lied down in the sun until they dries, then move to the drying areas.

It is considered that the roots are dry if they break like a piece of wood. The drying rate is 4-5: 1 and the humidity at the reception is 13-14%.

TECHNICAL RECEPTION CONDITIONS ALLOW:

- ▶ **FOR LEAVES:** max. 5% brownish or blackened leaves; max. 5% other parts of the plant; max. 2% foreign bodies; humidity max. 14%;
- ▶ **FOR HERBA:** max. 6% brown leaves; max. 3% wooded stems; max. 2% foreign bodies; humidity max. 14%;
- ▶ **FOR ROOTS:** max. 5% dried-up roots, stem stalks; max. 2% foreign bodies; max. 1% humidity.

PRODUCTION STORAGE

It is made in raffia or paper packaging, in salubrious, dry, odorless, sanitized areas. Prior to storing, nettle raw material can be baled, reducing plant volume and making storage more efficient.



PART III:

How to Plan Business?

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Development and Formatting of a Business Plan

Developing a business plan allows formulating one's ideas briefly and in a precise manner and being aware of the opportunities to implement the ideas.

A business plan helps to identify goals an entrepreneur wants to achieve and the way how to achieve them, as well as the means and resources to be used. A business plan allows following the progress made, as well as seeing problems early enough, thereby having an opportunity to avoid the problems in a timely manner.

A business plan could be developed for

various periods — a year, three or five years. It depends on the goal of the business plan. A business plan is not intended for a moment when the business is started up. The enterprise has to regularly go back to its business plan and see whether what is implemented matches what was planned.

Developing a business plan, it is important to answer a question: does this information is essential for those who are going to read it?

Feasibility, adequacy, consistency with reality and clear language are the prerequisites for a business plan.

Information sources are:

- books;
- periodicals (proceedings, newspapers, magazines, journals etc.);
- electronic resources;
- legal acts;
- figures (maps, posters, photos, video clips etc.);
- enterprise materials;
- institutions, organisations, enterprises.

Development and Formatting of a Business Plan

BEFORE DEVELOPING A BUSINESS PLAN, THE FOLLOWING SEVEN STAGES HAVE TO BE TAKEN INTO CONSIDERATION:

1. IDENTIFICATION OF INFORMATION SOURCES TO ACQUIRE THE NECESSARY INFORMATION FOR THE DEVELOPMENT OF THE BUSINESS PLAN

*Sharing his experience, a herb producer reveals that he studied a lot of **books on herbs** before starting up his economic activity. Valuable advice could be found on the **Internet** as well as acquired when consulting a **prominent researcher of herbs, a doctor of biology**.*

*Some family, however, managed to get the issues of the periodical "Praktiskais Latvietis" published in 1990-1992. The family read articles about a specialist in growing herbs whom the family acquainted with personally later. The family inspired by the **specialist** started up the business of growing, harvesting and processing herbs. At present, the **family can share the experience** with other herb growers as well as interested individuals with pleasure.*

*Supplementing the methodology for developing a business plan with practical examples, the authors also obtained information from **periodicals, electronic resources and interviews with herb growers**.*

2. IDENTIFICATION OF THE BUSINESS PLAN OBJECTIVES

BUSINESS PLAN DEVELOPMENT OBJECTIVES ARE TO:

- **verify** the viability of the project or another idea;
- **achieve** the most beneficial and available trade-off between the enterprise's intentions and real possibilities;
- accurately **define, design and formulate** the objectives of the business and the tactics to achieve the objectives;
- objectively **assess** the expected results.

Development and Formatting of a Business Plan

3. IDENTIFICATION OF THE TARGET AUDIENCE FOR THE BUSINESS PLAN, AS THE CONTENT OF THE BUSINESS PLAN DEPENDS ON ITS TARGET AUDIENCE

Business plan target audiences are:

- **entrepreneurs** – to really assess the advantages, disadvantages, business risks, current situation and prospects of the enterprise;
- **partners** – it is easier to negotiate with partners about investment attraction and other matters if a business plan is available;
- **investors** – credit institutions, venture capital funds;
- **enterprise employees** – especially if the enterprise is managed in a democratic way – every employee is informed about the business goals, the ways how to achieve them and the enterprise's advantages and disadvantages;
- **suppliers** – sometimes the suppliers have to be familiarised with business plans (long-term ones in particular), so that they see what purposes their supplies are used. Perhaps, it is necessary that a supplier adapts to and rearranges something.

4. IDENTIFICATION OF THE BUSINESS PLAN OVERALL STRUCTURE

Recommended business plan structure is as follows:

- Summary
1. Descriptions of the enterprise and the related industry
 2. Characteristics of the product
 3. Market analysis
 4. Competitor analysis
 5. Marketing plan
 6. Production plan (for enterprises producing goods only)
 7. Organisational plan
 8. Financial plan
 9. Potential risks
- Annexes

Development and Formatting of a Business Plan

5. COLLECTION OF INFORMATION FOR THE DEVELOPMENT OF BUSINESS PLAN COMPONENTS

During the collection of information for the development of the business plan, it was found out that the tastiest and most aromatic herbal teas were produced if collecting the herbs during a dry and sunny time, as the concentration of essential oils was the highest in them. It is not advised to collect herbs early in the morning or late in the evening, as well as before rain when plant flowers are closed. Moon phases influence the taste and aroma of herbs insignificantly. St John's-wort has to be harvested at the beginning of its flowering period because moths could get into seed pods during drying if the pods have been harvested when the herb stopped flowering. It is advised to harvest peppermint before flowering.

It is recommended to dry herbs in the shade and drought, tied in bunches. If a drying rack is used, an air flow has to be ensured from the bottom. If drying herbs by means of traditional techniques, with no heat supply, the herbs do not have to be shredded in order to keep their natural taste.

6. WRITING THE BUSINESS PLAN

Table 1 shows the sequence of business plan development. As shown in Table 1, the development of a business plan begins with the description of a business idea (**Chapter 2**) and an examination of the sales market and competitors (**Chapters 3 and 4**), followed

by giving the characteristics of this business and industry (**Chapter 1**). However, the "organisational plan" is designed when the production process has been planned out (**Chapter 6**) and it is clear where to get finance (**Chapter 8**).

Development and Formatting of a Business Plan

SEQUENCE OF BUSINESS PLAN DEVELOPMENT (TABLE 1)

SEQUENCE OF EXECUTION OF ACTIVITIES	BUSINESS PLAN CHAPTERS
1. Collection and analysis of information about products and services	→ Chapter 2 Characteristics of the product
2. Collection and analysis of information about the sales market	→ Chapter 3 Market analysis
3. Competitor analysis	→ Chapter 4 Competitor analysis
4. Analysis of the situation in and prospects for the enterprise. Analysis of the situation in the industry	→ Chapter 1 Descriptions of the enterprise and the related industry
5. Development of goods, price, sales and marketing communication policies	→ Chapter 5 Marketing plan
6. Identification of the need for production resources and supply opportunities, production process planning	→ Chapter 6 Production plan
7. Calculation of the necessary capital, cost identification, financial performance analysis and planning. Identification of the sources of finance	→ Chapter 8 Financial plan
8. Development of an organisational plan for the enterprise	→ Chapter 7 Organisational plan
9. Potential risk management	→ Chapter 9 Potential risks
10. Development of a summary of the business plan	→ Summary
11. Title page formatting	→ Title page

7. REREADING THE BUSINESS PLAN

The success of a business plan is ensured not only by its content but also by its style and the way it is formatted. A poorly formatted,

ungrammatical, too general or, on the contrary, too concise business plan does not attract potential investors.

Development and Formatting of a Business Plan

IN DEVELOPING A BUSINESS PLAN, THE FOLLOWING WRITING AND FORMATTING RULES HAVE TO BE OBSERVED:

- sentences have to be short, clear and direct. There is no need for verbalism and epithets. There is no need to put a lot of emotions in the business plan. It is not a composition but a set of technical and economic documents. The business plan has to be laconic and businesslike. It is not advised to use general and vague expressions. The reader of a business plan poorly perceives too academic and scientific compositions;
- it is not advised to use technical jargon and complicated terms. The business plan has to be simple so that is understood by laypersons;
- the business plan has to contain only the information that pertains to the matter – only relevant (important) information. There is no need to widely use general judgements, “excursions” to theory;
- the business plan has to be real, based on true and verified information. A “rose-coloured” business plan does not give anyone anything positive, and it might even do some harm. A business plan, mainly and first of all, is necessary for the entrepreneur him/herself; consequently, a biased plan could only harm the achievement of the goal;
- the business plan is the enterprise’s visiting card. Grammatical errors, ugly design, inaccurate data and inconsistency harm the prestige of the enterprise and could be a reason of negative consequences, e.g. loan or investment refusal;
- photos, diagrams, charts, tables, schemes etc. assist in interpreting the information. A correct application of the instruments can considerably enhance the impression about the business plan as well as its perception;
- it is required to take care about the structure of the business plan. The text has to be split into short subchapters. Various colours, fonts etc. could be used to highlight the components of the business plan. A well-structured and formatted text is easy to read and attracts attention. It may not “sink” into a mass of similar (unattractive) products placed on the table of a potential investor. The business plan has to stand out against the background;
- key proposals and conclusions have to be highlighted in the business plan;
- there is no need to overburden the business plan with information. If it

Development and Formatting of a Business Plan

is necessary and explains the nature of the matter, it could be placed in annexes;

- an appropriate time has to be chosen for writing the business plan – it has to be done when there are no

problems and everything goes perfect;

- when developing the business plan, it is required to refer to the principles of planning (basic principles);

PRINCIPLES OF PLANNING:

the recommended size of the business plan is 30-40 pages.

- participation principle – as many enterprise employees have to be involved in the planning process as possible;
- succession and continuity principle – all functional plans (e.g. the marketing, production, financial and organisational plans) have to be interrelated, derived from one another;
- flexibility principle – the business plan has to be corrected if changes

occur in the internal and external environments;

- carefulness and accuracy principle – planning has to be based on a careful and accurate examination of the situation, trends and factual deductions, the latest scientific discoveries and be scientifically reasoned; the business plan has to be as concise and detailed as it is required by the internal and external circumstances.

Outline of Business Plan Chapters

TITLE PAGE

The title page of the business plan has to be laconic and attractive. It does not have to contain details and unnecessary matters. The title page shows the name of the enterprise, the legal address, the title of the business plan and the year of production of it. The information included in the business plan reveals the multifaceted nature of entrepreneurship, but most importantly – its future policy; therefore, a potential investor has to be warned about the confidentiality of this information. For this reason, the title page could have an indication of confidentiality. Besides, the title page may require to return the business plan to the author if it is not interesting to the investor.

ENTERPRISE NAME
 Legal address
 Phone, e-mail _____

CONFIDENTIAL

It is requested to return the business plan NAME SURNAME,
 if you are not interested in it

TITLE OF THE BUSINESS PLAN

Enterprise manager: Name Surname, phone

Business plan developer: Name Surname, phone

Initial date of plan implementation xx.xx.xxxx
 Plan implementation duration xx months

Place and year

Fig. 1. Arrangement of information on the title page

Outline of Business Plan Chapters

CONTENTS

A table of contents shows all the details of the business plan, beginning with the summary through to annexes. It allows finding necessary information fast. Chapter headings in the table

of contents and in the text have to be identical. Any chapter heading needs the page number on the opposite side.

Contents	
Summary	3.
1. Descriptions of the enterprise and industry	4.
2. Characteristics of the product ..	6.
3. Market analysis	8.
4. Competitor analysis	10.
5. Marketing plan	15.
6. Production plan	17.
7. Organisational plan	20.
8. Financial plan	24.
9. Potential risks	30.
Annexes	35.

Fig. 2. Example of the table of contents of a business plan

SUMMARY

A summary is a resume of the business plan or an account of its key conclusions. The purpose of the summary is to help the target audience to understand what the business plan includes and what matters are explained in detail. The summary has to be concise and brief as well

as attractive and interesting in order to create interest and a wish in the target audience to read the business plan to the end. This means that the summary has to attract attention not only by its size but also by its quality, given the specifics of the business and the interests of

Outline of Business Plan Chapters

the business plan. The recommended length of the summary is 1-2 pages. It could be written only when all the other chapters are finished.

While writing the summary, the enterprise has to remember that it is its visiting card.

The following information is advised to be included in the summary:

- brief description of the enterprise (name, owners, location), the characteristics of the initial situation from which the planned activity is expected to begin;
- brief description of the product to be sold in the market, indicating what it is intended for, what consumer needs it meets and what its difference from competitor products is, stressing the key properties of the product;
- brief analysis of the market situation, indicating what consumers are going to buy the product, what quantity of the product is expected to be sold, which the key competitors are, specifying their advantages;
- brief description of production and work management at the enterprise, giving insight into its technologies;
- brief analysis of the expected risks;
- concise outline of the marketing plan;
- characteristics of the investment needed to start up the production or sales of the product, indicating the sources of finance;
- assessment of the situation and progress of the enterprise, as well as its prospects, specifying the period for which the business plan has been developed.

Outline of Business Plan Chapters

1. DESCRIPTIONS OF THE ENTERPRISE AND THE RELATED INDUSTRY

This chapter of the business plan describes the enterprise, its owners, the business, the industry it is engaged in and the environment for entrepreneurship in which it operates.

It is advised to include the following information on the business in this chapter:

- name of the enterprise, specifying the legal form of it;
- kind of economic activity of the enterprise;
- locations of the enterprise and its affiliates (if any is planned);
- history of the operation of the enterprise or the business idea;
- size of the equity capital;
- owners, their shares in the equity capital;
- mission of the enterprise: why it was established and why it should continue operating;
- business objectives (the situation the entrepreneur seeks to achieve);
- factors affecting the business.

A description of the business is presented in **Table 2**.

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GENERAL INFORMATION ON THE BUSINESS (TABLE 2)

CHARACTERISTICS	DESCRIPTION
Enterprise name, specifying the legal form of the enterprise	
Kind of economic activity of the enterprise, specifying the NACE code	
Business registration number or other registration data	
Legal address	
Phone	
E-mail address	
Information on the bank	
Account holder	
Bank account No.	
S.W.I.F.T. code	
Bank name	
Bank address	
Address of the key production site	
Information on the mother company (if any)	
Information on daughter companies (if any)	
Information on related enterprises (if any)	
Locations and characteristics of affiliates (if any)	

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Describing the location of the enterprise, it is important to stress its advantages or disadvantages, taking into consideration the following factors:

- earnings level;
- availability of labour;
- proximity of consumers and input suppliers;

- transport possibilities;
- local legal documents;
- taxes paid.

Establishing a new enterprise, it has to be explained why the particular location has been chosen and how all the above-mentioned factors affect the profit, costs and turnover of the enterprise. It is advised to add a **map**

(scheme) to the business plan or in its annex, where the location of the enterprise is shown.

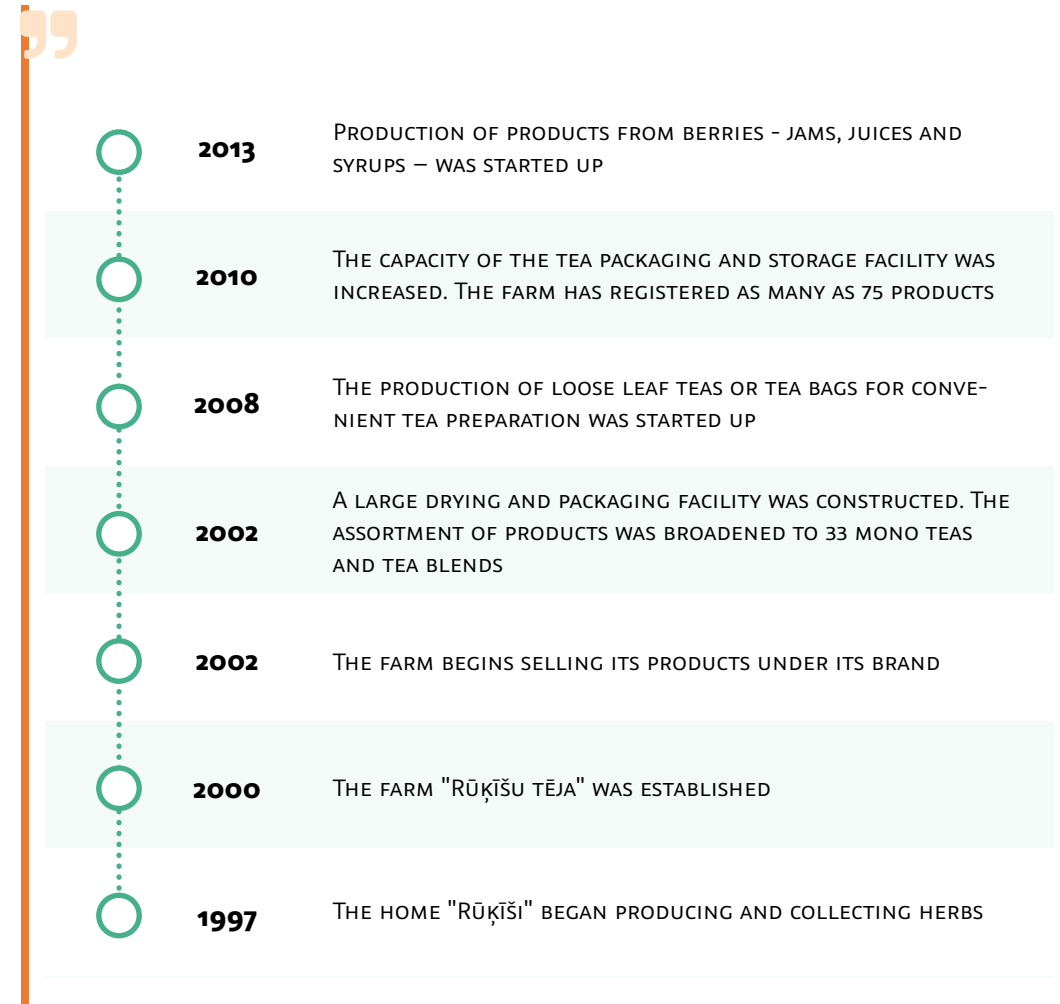
Information on the origins of the business is presented in **Table 3**.

HISTORICAL INFORMATION ON THE BUSINESS (TABLE 3)

CHARACTERISTICS	DESCRIPTION
Year and motives of the foundation of the enterprise	
Founders, their role in founding the enterprise	
Change in the composition of owners since the foundation	
Engagement of the owners in the management of the enterprise	
Current achievements of the enterprise	

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THE FARM „RŪKĪŠU TĒJAS” SHOWS ITS HISTORY AS FOLLOWS:



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A newly established enterprise is advised to outline the history of the business idea (how the idea emerged, what preconditions

contributed to it), indicating the underlying motives and the period of foundation of the enterprise.

Key motives to start up the business:

- wish to be individually independent and self-realisation achievement
- family prosperity enhancement
- motive to replenish the property and wealth
- wish to change the life
- use of vocational education and

- intellectual potential acquired during the life and previous employment
- fulfilment of personal wishes and dreams

The production and processing of herbs is started up both by those who have experience in agriculture and by those for whom this field

is completely unknown. Quite often, they are those who have knowledge of agronomy or own a farm.

Entrepreneurs in Latvia name very diverse reasons why they started up and continue producing and collecting herbs, e.g.:

- opportunity to expand and diversify their economic activity along with livestock and crop production;
- opportunity to farm and exploit their land inherited, which was not large in size; for this reason,

- the area is not sufficient for conventional agricultural activities;
- agricultural land owned was not appropriate for producing agricultural crops; for this reason, growing and collecting herbs was an option;

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- wish to cardinaly change the lifestyle, moving from a city to a rural area and doing something unconventional;
- wish to live "green" and produce healthy products;
- external encouragement, e.g. from herb processing enterprises that sought herb suppliers and herb collectors;

- wish to earn;
- awareness that a valuable job is done; along with growing, collecting and processing herbs, groups of interested individuals are educated, thereby increasing their interest in this industry and a healthy lifestyle.

An entrepreneur from Vidzeme shares his experience:

„I was a resident of Riga, then I lived in the capital city and, as many artist families, I had a house in countryside. And we began thinking of what extra activity to engage in. I baked bread, learnt to ferment apple tree leaves – it is a national Latvian technique to prepare tea that is similar to black tea. Actually I began and thought why such a tea could be sold in Riga? In the 1990s no such tea was available in shops. However, it was not easy. You have to know whether there is market demand. I was fearless and thought that the tea was so tasty that it would be demanded in the market for sure!”

When the new times began [after regaining independence], a pharmaceutical factory began looking for someone who would grow herbs for it, and then we applied. In the early 1990s we were trained, and after a year we had the first harvest. In our area, there were some 30 herb growers, yet only two of them had a good harvest. In the beginning, everyone had to grow valerian, yet later we purchased seedlings of St John's-wort and acquired seeds of marjoram and camomile. Now we grow more than 20 various herbs.”

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An entrepreneur from Latgale said:

„I had a small land area, and I still have a small area; my area has to be exploited in a way to generate higher value added. For this reason, I chose to grow herbs, as the land was not appropriate for cereals”

For some farm from North Latvia, the way towards herb business was shown by bees.

„We had several bee hives. We began looking for nectar crops to provide good feed for our bees. It turned out that 80-90% of nectar crops were herbs. We cropped a larger area with them than our bees needed; therefore, we began thinking – maybe we could do extra business”.

Health problems in the family made some farm in Kurzeme to undertake the production of herbs. By changing their diet – giving up consuming sugar, wheat bread and coffee and consuming the herbs growing in the vicinity –, the health improved. To change the attitude in favour of a healthy and environment-friendly lifestyle, the farmers united those thinking the same way, and, consequently, an environmental health family emerged. Doing good for nature and one's own health is the motto of this association.

If it is necessary to use land resources for implementing the business idea, the characteristics of the resources should be given in a table (see **Table 4**).

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CHARACTERISTICS OF LAND RESOURCES (TABLE 4)

LAND USES	AREA, HA	TOTAL LAND AREA BREAKDOWN, %	UNUTILISED AGRICULTURAL AREA BREAKDOWN, %
1. Total land area		100	×
2. UAA			100
arable land			
meadows			
pastures			
fruit orchards			
3. Farmed agricultural area			
4. Rented UAA area			
5. Unutilised agricultural area			×
forest			×
area under buildings			×
roads, ditches			×
shrubs			×
bogs			×
...			×

For example, some entrepreneur farms 40 hectares of land. As the demand for grain produced by the farm decreased, the entrepreneur decided to shift to growing herbs. The lean, unfertile soil turned to be the best solution. At present, 12 ha of the total farm area are sown with herbs, 8 ha are under berry bushes (chokeberry, blackcurrant, quince, hawthorn), while the other fields are cropped with nectar crops (borage, phacelia, hyssop, marjoram, coneflower and yellow sweet clover). In local meadows and forests, the entrepreneur collects meadowsweet, willowherb and birch tree and raspberry leaves.

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Another farm reveals that it is difficult for the farm to say what area is under herbs, as the herbs grow both in the 29.6 ha area of agricultural land owned by the farm and in the nearest forests. The farmers gather cowberry, raspberry and blueberry leaves, birch tree buds and leaves in the nearest forests, as well as many other things.

Another farm tells that its land area is very large, as garden crops are combined with teas. In total, the farm has an area of 148 ha. The farm has a lot of wild meadows that are mowed late, thereby allowing the plants to spread their seeds. Intensive fields where herbs are grown are five hectares in size.

To characterise the owners of equity capital and equity capital shares, it is advised to fill in **Table 5**.

CHARACTERISTICS OF FARM EQUITY OWNERS (TABLE 5)

NO.	EQUITY OWNERS	TYPES OF OWNERSHIP REPRESENTED IN EQUITY CAPITAL	NUMBER OF EQUITY SHARES OWNED	PROPORTION OF EQUITY SHARES OWNED, %
1.	Natural person's personas name, surname	<input checked="" type="checkbox"/> private <input type="checkbox"/> state-owned <input type="checkbox"/> municipal <input type="checkbox"/> mixed	50	42
2.	Legal person's name (firm)	<input type="checkbox"/> private <input type="checkbox"/> state-owned <input type="checkbox"/> municipal <input checked="" type="checkbox"/> mixed	60	50
3.	Municipality	<input type="checkbox"/> private <input type="checkbox"/> state-owned <input checked="" type="checkbox"/> municipal <input type="checkbox"/> mixed	10	8
4.	...	<input type="checkbox"/> private <input type="checkbox"/> state-owned <input type="checkbox"/> municipal <input type="checkbox"/> mixed		

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If the number of owners does not exceed 10, information about all the owners has to be presented in **Table 5**. If the number of owners is large, information about only those owning more than a 10% stake have to be presented.

It is preferable to reveal the **mission of**

the business in the business plan, as it allows convincing partners, employees, customers and investors of the need for and the role of the business, as well as opportunities for growth. The mission shows the meaning of existence of the enterprise and the general goal.

The mission always is unique, individual, and its nature is determined by the following factors:

- history of the enterprise – its successes and failures, experience, conventional economic activities, customers;
- culture of the enterprise – a system of internal values and norms, the

- nature of mutual relations among employees;
- power structure – the style of management, trust between managers and employees.

The mission of the enterprise has to encompass:

- targets to be achieved;
- the area of economic activity of the enterprise;

- moral code of the enterprise (its image, values etc.);
- techniques used to do the business.

The mission is expressed in a quite similar and easy to perceive manner.

The joint stock company „MADARA Cosmetics” was founded in 2006, and the brand MADARA, which the company represents, was the local pioneer in the field of cosmetics. The mission of MADARA is to purposefully give an opportunity to use natural, effective and really safe eco-cosmetics to as many women in the world as possible. The brand MADARA wants the eco-cosmetics, which is produced by the company „MADARA Cosmetics”, to be available to any woman. Every woman deserves to choose and acquire the ecologically best, safest and most effective cosmetics, which allows her natural beauty to blossom and does not damage the

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environment.

MADARA was created for you to have a choice to use the most appropriate and really natural eco-cosmetics, no matter in which part of the world you live.

The business plan shows also the **targets of the business** – performance parameters of the enterprise –, the achievement of which is defined in the mission of the enterprise and towards which the economic activity of the enterprise is oriented. It has to be taken into account that the objectives of individual organisational units have to be harmonised and be consistent with the general objectives of entrepreneurship. The objectives of entrepreneurship are set in seven areas (see **Table 6**).

TARGETS OF THE BUSINESS AND SUB-TARGET INDICATORS (TABLE 6)

TARGETS	SUB-TARGET INDICATORS
Markets	→ Market share, turnover, entry into new markets
Profitability	→ Profit, net profit margin, return on equity, gross profit margin and other kinds of profit margins
Financial stability	→ Creditworthiness, liquidity, self-financing level, capital structure
Social goals	→ Satisfaction with the job, social protection level, social integration, personality development
Prestige and position in the market	→ Independence, image in society, attitude to the political climate, recognition in society
Innovation	→ Production of new goods, entry into new markets, application of new technologies, use of new production management techniques
Personnel	→ Earnings level, interesting and multifaceted jobs, better working conditions, career growth

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The objectives have to be:

- expressed quantitatively;
- time-framed;

- real and achievable.

The goal of MADARA is to become one of the most recognisable brands of natural cosmetics in Europe. The enterprise makes efforts so that ...women in any European country refer to MADARA as one of three most known and popular cosmetics brands. When this goal is achieved, one can assert that MADARA has succeeded in making women more beautiful and happier – the world has become a better, slightly safer and cleaner place for living.

The enterprise „Dr. Tereško tējas” has defined a motto:

„Let God’s garden’s herbs give health and strength to all people in the world and particularly in Latvia.”

It is advised to perform a **SWOT** analysis for showing the factors affecting entrepreneurship in the business plan. SWOT analysis is one of the classical tools for entrepreneurship environment analysis. One of the advantages of SWOT analysis is that both the internal and external environments for the enterprise are examined. An analysis of the external environment identifies what **SHOULD** be done by the enterprise. An analysis of the internal environment identifies what the enterprise is

ABLE to do. The entrepreneur is not able to influence the external environment – it only could be examined –, whereas the internal environment is the one to be enhanced (through rearranging, optimising, creating favourable conditions), thereby bringing significant qualitative and quantitative changes. SWOT analysis is useful and convenient to perform **PERIODIC** analyses of affecting factors. **Table 7** gives a general list of potential factors.

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SWOT ANALYSIS OF THE ENTERPRISE (IDEAS) — TABLE 7

STRENGTHS	WEAKNESSES
Capacity	Insufficient capacity
Competitive advantage	Competitive disadvantages
Resources, means, employees	Finance
Experience, knowledge, information	Known imperfection
Financial reserves, profit	Deadlines and problems to meet the deadlines
Marketing – reachability, distribution, awareness	Shortage of cash
Innovative aspects	Absent-mindedness
Geographical location	Poor perception of information
Price, quality	Lack of morale, trust, leadership
Qualification, certificates, accreditation	Accreditation, certification
IT, communication, systems	Processes and systems
Culture, attitude, behaviour	Poor management
Management	
OPPORTUNITIES	THREATS
Market expansion	Political influence
Weaknesses of competitors	Effect of legal acts
Trends in production or lifestyle	Environmental impacts
Technological progress and innovation	IT development
Global impacts	Intentions of competitors
New markets, market niches	Market demand
Exports, imports	New technologies, services
New contracts	Most important partners and contracts
Product development	Barriers
Information and research	Loss of key employees
Cooperation, distribution	Loss of financial support
Quantities, products, economies	Economy – domestic, foreign
Impacts of the season and weather conditions	Impacts of the season and weather conditions

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At the end of Chapter 1, the business plan gives characteristics of the industry where the enterprise is engaged, in which the following information is provided:

- specifics of the industry;
- key indicators of the industry, based on statistical data;
- trends in the industry and an analysis
- of the trends;
- cycles and seasonality in the industry;
- prospects for the industry;
- export potential for the industry.

Before commencing business, it is important to be familiarised with the overall situation in the industry to understand what the entrepreneur could expect. Growing, harvesting and processing herbs involve diverse activities, thereby providing opportunities for both conventional and organic farming. One has to understand that the choice of the kind of economic activity might be associated with certification, more training and various requirements set by national and EU legal documents. Ideas about healthy lifestyle, organically produced and “pure” products, including medicines, nutrition, cosmetics, household chemical products etc., become increasingly popular in the world; therefore, one can assert that such products are in high demand.

„When we visited some exhibition abroad, for example, in England, we could see that the producers offered a lot of processed products: extracts, oils, deodorants, floral waters. And everything was mostly „organic“.

At the same time, herb gatherers admit that it becomes increasingly difficult to collect wild herbs, particularly in the municipalities where intensive agriculture is practised. Untouched meadows with a great variety of plants are becoming scarce.

Some organic entrepreneur shares her experience:

„We could create interest in us in the world by collecting wild herbs in particular because we cannot produce cheap herbs, compared with any other country. It is possible to produce cheap peppermint, valerian and everything that could be grown.

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At present, we still have wild plants, yet they become scarce. Because of intensive agriculture, land is tilled up to the edge of the ditch, pond and lake, forests are logged and also sprayed. Even all stone piles are sprayed! I do not know where I could get willowherb in a few years. Nettle is scarce now."

Trends related to the production and processing of plants and their use in the production of other products have to be identified, as the trends directly affect prospects for a potential enterprise. For example, today it is possible to grow individual parts of a plant in a laboratory, which are then used to produce certain organic compounds in order to create some cosmetics products. Such technological solutions in the future might reduce the demand for naturally grown plants.

Entrepreneurs in Latvia admit that competition in the industry is tough because of domestic and foreign producers and processors; besides, producing the same product in Latvia and, for example, in southern countries (Romania, Bulgaria) where the climate is different, is an entirely different challenge. The environment for entrepreneurship, tax policies, control requirements, the availability of seasonal labour, climatic conditions, infrastructure and other aspects are very different across countries and even their regions; for these reasons, one has to understand whether the business is profitable and could be implemented in the particular location. The herb producers admit that it is much more difficult for a farm to solve product packaging and storage problems and reduce costs and also make some profit if the farm is located in a remote area far away from the capital city or the sales market. By carefully analysing the situation, it is possible to make profits. However, initially many potential entrepreneurs have a delusion about the necessary investment, potential profits, labour, the sales market and stability in the industry.

Some entrepreneur believes that the production of herbs is a prospective business, which is determined by the growing interest in healthy lifestyle.

"I regularly bring my teas to various "green" markets and observe that buyers increasingly shop there, and I cannot complain about my sales. People are hungry for pure products. Customers from Scandinavia, where a green lifestyle becomes

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popular, have also shown interest; however, nowhere else other than Latvia so aromatic teas could be grown – they do not know how to do it," admitted the entrepreneur.

2. CHARACTERISTICS OF PRODUCTS

The description of a product has to stress the excellent properties of the product, which could attract the buyer. The positive utility effect has to be identified (particularities of the product, which the buyer benefits from, that make the buyer buy the product), which

- list of products offered;
- external appearance of the product;
- key properties of the product and the gains for potential buyers, as well as a comparison of the product with competitor products;
- protection of the product and

This chapter of the business plan has to refer to everything what generates revenue for the entrepreneur. If the number of products offered is large, it is advised to group the

Some farm describes its product as follows:

The main part of revenue is generated by tea sales. The teas are prepared according to the principle – the teas have to be healthy and taste good. The teas produced by the farm are specific, as the herbs are grown only by organic techniques. The family produces most of the raw materials on its farm. The farm grows more than

determines the profitability of the business (cost, price) and future business expansion.

This chapter comprehensively **characterises all the kinds of products the enterprise supplies to the market**, providing the following information:

- production processes;
- characteristics of exported products and prospects for the exports;
- viability of the product;
- planned portfolio of products in the future.

products and include a full list of the products in the business plan in an annex, yet this chapter has to focus on the products broken down by group.

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30 varieties of peppermint. The teas are added no artificial taste enhancers, the herbs are not heated but dried in a solar-type dryer. As regards tea mixtures, some wild plants are added to the grown herbs, and the local plants are well recognised by our bodies. Tea recipes are made based on the long experience of the family and its cooperation with its customers. Some recipes have been constant for ten years. New recipes are also designed. The farm also gets revenue from the production of tea bags. Since May 2017, the farm offers a number of cosmetic creams, hydrolates, ointments and balsams for aromatherapy and reflexology. These products are prepared using the herbs grown by the farm and the tinctures or infusions made from the herbs. The farm also offers farm visits and seminars.

The farm “Rūķīšu tēja” offers to enjoy natural, tasty and aromatic products from the nature of Latvia throughout the year. Since the day the business was commenced, the farm’s size has increased from less than a hectare to more than 30 hectares where more than 40 herbs are grown. Carefully harvested crude drugs turn into more than 80 teas under the brand “Rūķīšu tēja”, and the enterprise is one of the largest and most recognisable medicinal herb producers in Latvia. The broad assortment of teas is complemented by berry products – jams, syrups, and juices –, which are prepared according to traditional home recipes by using berries and sugar beet syrup. The farm offers juices, syrups and jams made from forest blueberries and bog cranberries harvested in Latvia as exclusive products. The saturated taste, aroma and colour of the products come from the natural properties of the plants, with no added flavour enhancers, colours and thickeners. The products are made using technologies that preserve the valuable substances of plants as much as possible.

The main purpose of a product is to meet the needs of customers; accordingly, the task of a business plan is to specify the key benefit from the product, placing the focus on the needs the product meets, and not only on the technical characteristics of the product. For example, individuals do not buy a toothpaste

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In describing a product, the business plan has to focus on:

- areas of product application;
- factors of product attractiveness (see **Figure 3**);
- advantages of the product and the factors ensuring it;
- disadvantages of the product and the ways of eliminating them.



Fig. 3. Factors of attractiveness of a product

(product), they buy confidence that their breath is not unpleasant to others (benefit); farmers do not buy fertilisers, they buy more grain to be available in their storehouses.

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„Herbal teas are one of the uses of medicinal herbs. Even though they cannot replace medicines in terms of effectiveness, they reduce the risk of illness, help in cases of chronic diseases and of mild illness as well as improve overall health,” says an experienced biologist, a doctor of biological sciences and a specialist in herbs, Dailonis Pakalns. He explains that autumn and winter diets have to include herbal teas in order to prepare for the winter period – to optimise the transition of the organism from the warm to the cool and cold season and to help the organism to adapt to the negative changes in the environment: low ambient temperatures, autumn rains and fog.

Dailonis Pakalns points out that plant-sourced drugs play not only a remedial role – the role of herbal teas in diets increases because in many cases the same herbs are used for producing teas, spices, nutritional supplements, dietary products and aromatherapy products that, at different levels, affect the functions of the organism and act as remedies enhancing wellbeing and life comfort. Besides, in any case the active components of plants affect the functions of the organism with varying intensity depending on the dose.

It is advised to aggregate the advantages and disadvantages of the product in **Table 8**.

CHARACTERISTICS OF THE ADVANTAGES AND DISADVANTAGES OF THE PRODUCT (TABLE 8)

PRODUCT'S		PRODUCT'S	
Advantages	What ensures them?	Disadvantages	How to avoid them?

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The priority of the farm “Rūķīšu tēja” is to supply high-quality products. Approximately 95 % of its tea products the enterprise grows and dries on the farm in order to be able to control quality and produce high-quality products. The healthiest and most needed substances for the human organism are those being present in the plants and fruits grown in the area of the same latitude.

The business plan has to describe the external appearance of the product, how it meets the requirements of modern design. It is useful to include photos, sketches and technical drawings in the business plan.

The business plan has to specify how the product is different from competitors' products. If there are no differences, the business plan has to indicate how the enterprise intends to attract customers.

Every herb grower faces questions: What will I produce? How my tea, herbal drugs, oils or other products are going to differ from those being in the market? Every entrepreneur has his or her own experience and tactics. Some grow what is easy to grow under the conditions in Latvia and are demanded in the market (e.g. camomile, calendula, peppermint), while others take a risk and grow exotic plants.

The choice of a species to grow is largely determined by the requirements for soil and climatic conditions. For example:

“The problem with growing herbs is that every plant needs something different. For example, peppermint needs a wet and quite light soil, although it also likes clay – and we have clayey soils. You may not plant peppermint in the same field for two-three years, as it does not grow. It simply perishes and dies out; only water mint and spearmint grow in nature.”

The choice of what wild herbs to collect depends on the market demand and the availability of the herbs in particular:

“From the very first year I always find some foreign buyer who is interested in nettle, strawberry leaves, ground-elder and mugwort. However, if you spray the field and control the weeds, no mugwort is available. Foreigners are ready to pay a lot for it

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because they have no this plant. Americans said: we cannot get dandelion anymore because of intensive agriculture and built-up areas.”

What the final product is going to look like depends on what purpose it is further used. There are growers who sell their crude drugs in large quantities to pharmaceutical factories and other processors for processing. In this case, there is no need to think of, for example, the attractiveness of packaging to final consumers, as the most important qualities of packaging are its capabilities to protect the herbal drug from external impacts, deterioration and pests. However, if the product is packaged in smaller quantities and intended for individual consumers, the appearance of the product and its packaging as well its functionality are important. Producers pay attention to the development of their brands and their farm recognition

It is useful to take care about intellectual property protection and production know-how. All new products, ideas and technologies should be patented. The business plan has to describe the situation with patents and intellectual property as well as other factors that could serve as an advantage over

competitors or their dominant position in the industry. All research and development activities, which have to be carried out before the product is placed on the market, have to be described. The costs incurred and the time spent have to be specified.

*In Latvia too herb producers and processors use an opportunity to patent their products, e.g. the individual proprietor IK “55 mārītes” produces more than 70 mono teas (single herb teas) and multi-herb teas and has patented **a selection of herbal teas and a set of herbal teas**. The enterprise offers also herbal thermal pads.*

If the enterprise exports its products, the following key characteristics in relation to exports have to be provided:

- countries;
- sales volume in every country;

- revenue earned.

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For example, the enterprise „Dr. Tereško tējas” exports tea in small quantities to Ireland, the United Kingdom, Germany and the USA, mainly for the Latvian community.

Other Latvian herb growers and processors sell their products in Lithuania, Germany and the United Kingdom. Finding opportunities for exports is carried out in cooperation with the Investment and Development Agency of Latvia (LIAA).

Some entrepreneur shares her experience:

„Almost every year we receive offers to export our products, yet always we face the problem that we cannot supply the required quantity, as it involves manual work. We can, of course, employ more people, yet these are very exclusive and quite expensive things. We know that very many people like them, and we take individual orders. We have received an offer from Latvian Americans, but there is a problem – it is not allowed to import herbal products into the USA – there are strict restrictions. We can focus only the European market. We have offered our products in Japan, yet no good cooperation was established with an intermediary. The interest in our products is regular, but we are not yet ready for it. If we receive some particular offer, we would like to take it.

An important component of product planning relates to the enhancement of the product and the development of new products.

The external reasons for the development of new products are as follows:

- scientific and technological progress;
- change in customer needs;
- market is saturated;
- threat of loss of the business due to competition.

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The internal reasons for the development of new products are as follows:

- larger sales volume;
- higher market share;
- creation of an image of the “enterprise – innovator”;
- reduction of dependence on selling only one kind of products.

If a product is new, the business plan has to specify its new, unique properties and prove that it could create interest in customers. If a product is at the stage of development, it is required to indicate how long it takes and

how much money is necessary to complete the development of it. All regulatory or approval or licensing requirements, if any, pertaining to the development or introduction of a new product have to be described.

As regards existing products, the purpose, ways and possibilities to enhance the products have to be described.

Some entrepreneur points out that his future plans involve the development of some new health teas, and there are ideas about the production of new food products from plants that have never been seen; a tempting idea is to produce soluble teas. The production of food supplements that really benefit human health have to be developed and expanded as well.

However, another entrepreneur, talking about his future opportunities, admits that he wants to focus on exclusivity. He believes that there are many tasty and good teas, yet the enterprise seeks to create new teas in order to enter the global market and be special. The entrepreneur admits that there are a lot of products to produce, e.g. herbal bath bags.

Characteristics of products could be presented as shown in **Table 9**.

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CHARACTERISTICS OF PRODUCTS (TABLE 9)

Product name	What consumer needs are met	Packaging	Design	Service lifespan	Storage conditions	Service	Product viability	Export potential

If using **Table 9**, only the necessary columns have to be filled in. All the kinds of products have to be specified. If services are produced,

all the kinds of services have to be specified in Table 10 and a brief description about every kind has to be given.

CHARACTERISTICS OF SERVICES (TABLE 10)

Kind of services	Specification/ description

3. MARKET ANALYSIS

Before commencing business, the market has to be studied, and it has to be understood whether this is the most appropriate moment for implementing the idea. It is likely that the product to be offered in the market is not in demand, yet in the future, with the situation improving in the economy, it is in demand or, on the contrary, there are a lot similar products and the market is saturated.

The experience shows that a poor knowledge of the market is one of the key causes of failures for commercial products. One of the key tasks to be tackled by the Business Plan Department is to identify the demand

for every kind of products in the market. This indicator shows the potential sales volume. The enterprise’s success in the market depends on how carefully and accurately the market demand and changes in it were determined.

This chapter is the most difficult to elaborate. A realistic approach has to be applied to giving information in this chapter, not exaggerating the enterprise’s capacity and not decreasing the possibilities of competitors. The information for this chapter is acquired from market studies.

Both primary and secondary information has to be used for market studies (see

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Figure 4). Information and findings provided by professionals (auditors, consultants, layers, bankers etc.), business partners (competitors, suppliers, buyers etc.) as well as producer

associations could be used for analyses.

This business plan chapter describes the size of and trends in the market, as well as the target market.

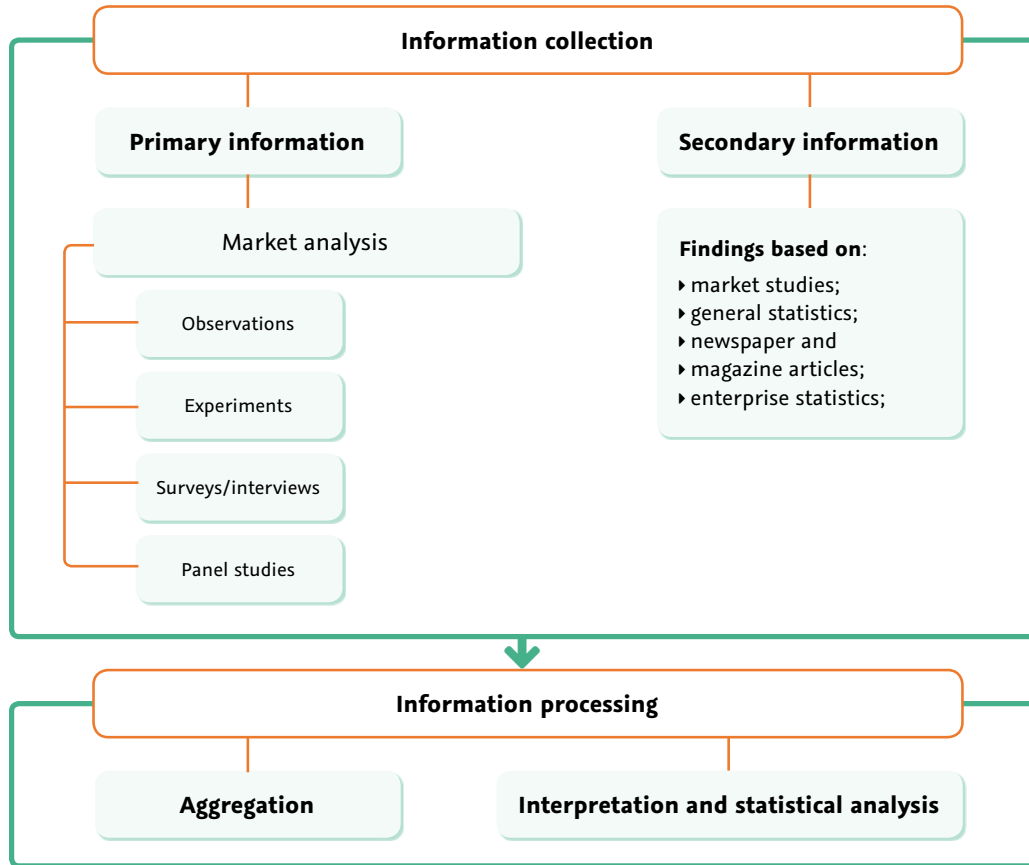


Fig. 4. Scheme for the process of market studies

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The present chapter focuses on the following matters:

- market characteristics;
- buyer, consumer characteristics;
- most essential potential factors that

- could affect the performance of the enterprise;
- projections of sales and revenue.

Characterising the market, it is necessary to stress the following information for every product:

- whether it is a local (which region) or foreign (which country) market;
- market size (e.g. the annual or monthly consumption of the particular product over the last five years);
- market trends and their analysis;

- market growth prospects, i.e. a projection of the market size over the next 3-5 years;
- market constraints and limitations (economic, legal etc.).

In the production and processing of herbs, the choice of entrepreneurs to focus on the domestic market and/or exports are determined by various factors:

- readiness of entrepreneurs to take a risk and expand their activity;
- ability to compete with similar producers through cheaper, higher quality products;
- opportunity to offer a unique product;
- opportunity to produce products (commodities) in sufficient and constant quantities in order to meet the needs of cooperation

- partners;
- quantities of products produced;
- ability to respond to market fluctuations, cope with risks caused by, for example, problems to provide appropriate conditions for the storage of products and unfavourable climatic conditions, resulting in the inability to produce the required quantity;

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- skills and readiness to use modern technologies and infrastructure (e.g. sales via the Internet, modern packaging, storage capacity);
- readiness to cooperate with other

- producers to hold the market share jointly;
- number of employees at the enterprise.

Judging about the demand for herbal teas, a herb gatherer points out that

„many people currently live in stress. Many people want sedative teas composed of meadowsweet, valerian, and teas to be drunk in the evening before going to sleep. Second place belongs to teas for the stomach: yarrow, St.-John's-wort, red clover. However, third place is taken by cleansing teas, especially mixed ones containing peppermint, camomile, lady's-mantle, melissa, birch tree leaves and marjoram“.

Characterising the market, the present market size and growth potential in a short- and medium-term have to be identified. The calculations of growth potential could be

complemented by trends in the industry, the latest technologies and change in consumer needs.

Characterising the buyer and consumer, the following questions have to be answered:

- who buys the product/service?
- why they are going to buy it?
- how much they are going to buy?
- when they are going to buy?

- at what price they are going to buy?
- what quality and post-sale services are necessary?

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Identifying potential consumers, it is required to decide:

- whether selling products is oriented towards all potential consumers;
- whether the range of consumers is limited by their income, age,

gender, culture and other market segmentation characteristics (see **Table 11**).

MARKET SEGMENTATION CHARACTERISTICS (TABLE 11)

TYPE OF SEGMENTATION	CHARACTERISTICS
Geographic	country, city, village, population, population density, climate
Demographic	age, gender, family size, family lifestyle
Social and economic	income, social group, profession
National and cultural	education, nationality, religion
Personal	lifestyle (traditional, changing, untraditional), type of character (choleric, sanguine, melancholic, phlegmatic)
Behavioural	<p>shopping frequency (regular, occasional),</p> <p>choice criteria (product quality, service quality, savings, prestige),</p> <p>consumer type (non-user, earlier user, potential user, first time user, regular user),</p> <p>consumption degree (zero, low, medium, high),</p> <p>knowledge and intention stage (unaware, aware, informed, interested, a wish and intention to buy),</p> <p>position towards goods (enthusiasm, positive, indifferent, negative, antagonistic),</p> <p>consumption situation (at home, at work, during leave),</p> <p>inclination towards innovation (innovator, early adaptation, following the majority, slow adaptation, no adaptation),</p> <p>trust status (no trust, known, medium, strong, absolute)</p>

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The entrepreneur has to define the target market – the most attractive market segment for the enterprise at the current moment. A prospective market segment for the entrepreneur could be a segment with approximately 20% of the market consumers

that contribute to 80% of the revenue of the enterprise. The target market has to be capacious, with prospects for growth, free or quite free from competitors, in which the demand is not fully met.

The enterprise operating for the first year has to specify:

- main consumers, indicating data on contracts, which are at the disposal of the entrepreneur;
- potential consumers showing interest in the products of the enterprise;

- potential consumers who are not interested in the products of the enterprise but who might be attracted by the enterprise.

Based on an assessment of the advantages of the product and customer studies, potential sales volume is projected in terms of physical units and money. The purpose of making a projection is to show the potential revenue of

the enterprise. The enterprise earns its revenue from selling products or services. A projection of the total sales volume is comprised of a sales plan for every individual product – the planned sales volume and a unit price.

Accordingly, the most important components of a projection of sales are as follows:

- projection of sales measured in physical units;

- projection of prices;
- projection of sales revenue.

The enterprise could make a sales projection for every product that is or will be produced, or for every product group. In view of the specifics of the enterprise, it is necessary to project sales in detail not only for products

and product groups but also for: markets, customer groups or even individual customers.

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It is not correct to make a future projection by extrapolating data for the past. A number of factors have to be taken into account, which might affect the market demand for the products of the enterprise, for example:

- sales market growth rate;
- market share of the enterprise;
- price change;
- potential marketing activities;

- competitor activities;
- expected political and economic changes, amendments to legal acts.

The enterprise's sales volumes depend not only on past achievements (if any) and exogenous factors but also on the way the Sales Department is organised.

The enterprise's sales opportunities are significantly affected by the following factors:

- work management for salespersons;
- planned development of a product;

- planned marketing activities, including the price discount policy.

Making projections, two scenarios have to be developed – optimistic and pessimistic. It is necessary for the purpose of assessing opportunities, threats, external environment impact extent and choosing the most reliable projection.

It is necessary to make a projection of sales not too optimistic, as it could result in too large investment in fixed assets and inventory. This, in its turn, reduces the turnover of assets, results in large depreciation deductions and inventory maintenance costs and, perhaps,

increases the amount of damaged, old inventory, consequently leading to a lower profit.

It is important to make a projection of sales not too pessimistic. This does not mean projecting a sales decrease unless it is based on the enterprise's strategy or external circumstances. Pessimistic projections are rather cautious projections, as they reveal risk factors that, in their turn, allow drawing up a plan for risk reduction in a timely manner.

Making a projection of sales, the following factors have to be taken into consideration:

- Does the enterprise retain (increase/

- decrease) its market share?

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- What are market trends?
- What exogenous factors (competition, legal acts, policies etc.) can affect the achievement of the projected sales?

- What the enterprise has to do to contribute to an increase in its turnover?

Making a projection or plan of sales or revenue, it is advised to fill in **Table 12**, in which a projection could be made for every group

of goods or kind of services. **Table 12** could indicate the data both in physical units and in terms of money.

PROJECTION OF SALES AND REVENUE FOR PRODUCT A FOR THE FIRST YEAR OF OPERATION OF THE ENTERPRISE (TABLE 12)

INDICATOR	MONTHS												
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	
Market A (e.g. Latvia) Product A sales volume, in physical units Price, EUR Revenue, EUR													
Market B (e.g. Lithuania) Product A sales volume, in physical units Price, EUR Revenue, EUR													
Market C (e.g. Estonia) Product A sales volume, in physical units Price, EUR Revenue, EUR													
Total sales, in physical units Total revenue, EUR													

The projection of sales for the first year of operation of the enterprise has to be monthly, for the second year – semi-annual and for the third and next years – annual.

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4. COMPETITOR ANALYSIS

Entrepreneurs that are engaged in gathering, growing and processing herbs admit it is one of several kinds of economic activity that involves a number of risks; therefore, it is good that there is another field where to expand business. It generates additional revenue, and diverse business fields can

temporarily offset losses and provide a source of finance for investment. If herb production is not the main activity of the enterprise and the farm is not large, it is believed that it is good if there is some alternative occupation. The interviews revealed situations where the planned sales were not achieved.

The experience of some entrepreneur was as follows:



„I did not have a situation that I produced only herbs. The herbs did not generate enough revenue. There were some years when the processor ordered a certain quantity, controled it in summer to make sure whether we could supply it, and we even borrowed funds to complete everything, but in August the processor disappeared. Then you are bankrupt for two years. It is good that in that period I had sows and other kinds of business...”

In other situations, cooperation partners ask entrepreneur guarantees to supply a constant quantity for several years or even increase the quantity supplied. The entrepreneurs perceive it ambiguously, as herb production is affected by such factors as weather conditions and pests, which are difficult to control.

An analysis of enterprises that supply

similar products allows understanding the situation in the market, being aware of one’s own abilities and identifying the potential market share. A comparison of the activities of competitors with the enterprise’s plans allows understanding why the competitors are successful and what should be done differently or what could be enhanced.

Examining and analysing competitors, it is necessary to answer the following questions:

- Who are the key competitors?
- What are the advantages and disadvantages of the enterprise

- and its competitors (strengths and weaknesses)?
- How competitive the enterprise is?

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→ What factors determine the competitiveness of the enterprise in the market (competitive price, product quality, product uniqueness,

service, the location, a specific market niche etc.)?

→ What competition techniques the enterprise is going to use?

The identification of main competitors have to be done based on the following factors:

→ assortment;
→ geographic location;
→ market segment;

→ price policy;
→ distribution channels.

The entrepreneurs that are engaged in the collection, production and processing of herbs for a long time, usually are well aware of their most significant competitors. The competitors often become cooperation partners. Entrepreneurs admit that the market of Latvia is very saturated, as several dozens of producers and processors are engaged in this economic activity. Domestic producers face

very tough competition with foreign producers that can produce herbs in large quantities and cheaper. Organic farms cannot produce as much as conventional producers do.

Entrepreneurs sometimes make exploratory visits to similar farms abroad, thereby learning new knowledge and experience. Small producers are more open than large ones and share their experience; this is determined by competition.

An entrepreneur from Latgale region concludes:

„The market is quite small and “full” of the cheapest products. We have to learn ourselves how to produce the product cheaper, and then we do not have to complain about competition. We have to produce the product in large quantities, cheaply. However, it is a niche product.”

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Sharing her experience, an entrepreneur admits that:

“I do not perceive any tea grower in Latvia as a competitor, as teas produced by Anna Bergmans are organic, and this is another niche. In no case we are competitors for the entrepreneur Tereško, as her teas are very curative, while Anna Bergmans’ teas are ordinary teas. I have friendly relationships with other organic tea producers, for example, Brigita Lūkina – the author of “Lauku tejas” (countryside teas). We have common ideas, we make visits for examination purposes together. There is no competition among organic tea producers, only cooperation”.

After competitors have been identified, an analysis of strengths and weaknesses of the enterprise and main competitors has to be performed based on a SWOT analysis. The analysis of strengths and weaknesses has to be viewed through the prism of competitiveness

of the enterprise and its products. The analysis is particularly necessary during an economic recession for a market that has a capacity surplus and a lot of competitors. The key criteria to be used for assessing strengths and weaknesses are shown in **Table 13**.

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CRITERIA USED FOR ASSESSING THE STRENGTHS AND WEAKNESSES OF THE ENTERPRISE AND ITS COMPETITORS (TABLE 13)

CRITERIA	ENTERPRISE	KEY COMPETITORS		
		Competitor A	Competitor B	Competitor C
Monopoly on a certain technology for the production of goods or services				
High quality level				
Quite low prices				
Related (supporting) services before and after selling the product				
Flexibility in fulfilling special customer wishes				
Product line scope				
Speed of product delivery and order fulfilment				
Reliability regarding the quantity of products supplied and the supply time				
Qualifications of employees who communicate with consumers				
Opportunity to make stable contacts with regular buyers				
TOTAL SCORE				

Note: rated on a five-point scale (0 – lowest, 5 – highest)

Each criterion has to be rated on a scale from 0 (lowest position for the criterion) to 5 (dominant position in the market) both for the enterprise and for the key competitors. The criteria should be rated by a group of high qualification employees (including an external consultant).

The total score for every enterprise plays a large role in the analysis. A difference in total score, compared with competitors or a competitor, of more than 20% indicates low competitiveness, while a difference of more than 40% indicates the need to exit the market or to considerably change the operational

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strategy of the enterprise in the market.

The results of an analysis of strengths and weaknesses of the enterprise and its

competitors could be presented in a table for an analysis of advantages and disadvantages of the enterprise and its competitors (Table 14).

ANALYSIS OF ADVANTAGES AND DISADVANTAGES OF THE ENTERPRISE AND ITS COMPETITORS (TABLE 14)

CRITERIA	COMPETITOR A		COMPETITOR B		ENTERPRISE	
	advantages	disadvantages	advantages	disadvantages	advantages	disadvantages
Cost advantage	x			x	x	
Customer loyalty		x	x			x
...						

The information included in Table 15 could be useful to fill in Tables 13 and 14.

INDICATIONS OF STRENGTH AND WEAKNESS FOR THE COMPETITIVENESS POSITION OF THE ENTERPRISE (TABLE 15)

INDICATIONS OF STRENGTH	INDICATIONS OF WEAKNESS
<ul style="list-style-type: none"> • strong and decisive market share • increasing number and loyalty of customers • focus on a fast-growing market segment • very differentiated product • cost advantages • net profits are above the average in this industry • great opportunities to introduce new technologies and innovations • creative, high-quality management • high competence in the main economic activity 	<ul style="list-style-type: none"> • revenue increase is lower than the average in the industry • performance indicators of the enterprise are lower than those of competitors • lack of funds • deteriorating reputation among consumers • delays in product development • high costs • low product quality • low, weak market share • weak management • lack of competences in the main economic activity • lack of circumstances for avoiding threats

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The competitiveness of the enterprise – its real or potential ability to design, produce and sell a product under market conditions.

In business planning practice, the level of competitiveness of an enterprise is assessed

based on a comparison of performance between the enterprise and its key competitors according to a number of criteria. For this reason, an essential role is played by the choice of criteria and the assessment.

In a market economy, the quality of products is almost the same; therefore, a special role is played by:

- external appearance of the product;
- simplicity in exploitation;
- recognition of the brand;
- recognition of the producer;
- warranty period;
- availability of spare parts;
- fast and cheap repairs;
- service (technical maintenance).

Along with the mentioned indicators, other indicators that indicate marketing activities, sales management etc. could be also used to assess competitiveness.

Table 16 shows factors that could be used

in the analysis. In every particular situation, the choice of factors has to be made based on the specifics of production and sales of the enterprise.

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CRITERIA FOR COMPETITIVENESS ASSESSMENT OF THE ENTERPRISE (TABLE 16)

FACTORS	ENTERPRISE	COMPETITORS		
		A	B	C
Sales volume, in physical units or EUR				
Market share, %				
Location				
Duration of operation of the enterprise, years				
Image in society				
Profit margin, %				
Average price, EUR				
Technological level				
Product quality				
Expenses on advertising, EUR				
Order fulfilment time, days				
Related services				
Recognition of services of the enterprise				

As shown in **Table 16**, the factors that affect the competitiveness of the enterprise are quite numerous. The vectors of their effects are

different; therefore, to make an assessment of the level of competitiveness of the enterprise, a unifying assessment has to be made.

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Several methods could be employed to assess competitiveness:

- location score method;
 - score method;
 - requirement profile formation
- method;
 - score method that takes into account the importance coefficient.

Let us examine the application of the methods by using a particular example. Let us assume that enterprise A and two more competitors that offer similar products, i.e. competitor B and competitor C, operate in

the market. Enterprise A performed market studies, acquiring information on various competitiveness factors. The results are aggregated in **Table 17**.

COMPETITIVENESS FACTORS AND INPUT VALUES FOR ENTERPRISE A AND ITS COMPETITORS (TABLE 17)

COMPETITIVENESS FACTORS	A	COMPETITORS	
		B	C
Market share, %	60	30	10
Profit margin of services, %	20	20	15
Average price, EUR	3.50	4.00	4.30
Product quality	medium	high	medium
Order fulfilment time, days	10	8	6
Recognition of the enterprise	well recognised	recognised	little recognised
Expenses on advertising a year, EUR	250	120	50

Each competitiveness factor gives insight into the processes in the analysed enterprises, yet all the factors do not provide a comprehensive picture. In practice, a set of factors in the range of 7-10 is used, which excludes the cases of coincidence.

One of the methods to be used for a comprehensive comparison and analysis of competitors is competitor assessment according to the location score method. The idea of the method is that the competitiveness factors selected are assigned places. First place

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is given to the enterprise or its competitor, the competitiveness factor score of which is the highest. If two enterprises have the same factor values, they have the same place. The number of enterprises analysed is equal to the number of places (in the example, three

enterprises were analysed, and places 1, 2 and 3 were assigned). The lower the score, the higher the competitiveness.

An assessment of competitors by the location score method is presented in **Table 18**.

ASSESSMENT OF ENTERPRISE A AND ITS COMPETITORS BY THE LOCATION SCORE METHOD (TABLE 18)

COMPETITIVENESS FACTORS	A	COMPETITORS	
		B	C
Market share	1	2	3
Profit margin of services	1	1	2
Average price	1	2	3
Product quality	2	1	2
Order fulfilment time	3	2	1
Recognition of the enterprise	1	2	3
Expenses on advertising	1	2	3
Total score	10	12	17

As shown in **Table 18**, the strongest competitor for enterprise A is enterprise B, which had a total score of 12 and slightly lagged behind enterprise A. The difference in score between enterprises A and B was not large, whereas the difference between enterprise A and its second competitor C was considerable, which indicated that A dominated over C in terms of competitiveness.

A comparison of the places assigned to A and its closest competitor shows that B surpassed the analysed enterprise in two competitiveness criteria: quality of services and order fulfilment time, while in other criteria B lagged behind. A

comparison of A and C reveals that the quality of services in both enterprises was the same, while C surpassed both A and B in terms of order fulfilment time.

The analysis allows concluding that enterprise A should decrease its order fulfilment time as well as raise the quality of services provided.

This competitiveness analysis method, assigning places, does not take into account differences in the quantitative and qualitative values of competitiveness factors, i.e. how large differences among them are. This is taken into consideration by the next method – **the**

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competitor assessment score method.

Most often, an assessment employs a five-point system, where the highest rating is five, while the lowest is one. The criteria for all the competitors are rated and a total score is acquired – an index. The higher the

score, the higher the competitiveness, while the difference in score indicates advancement or backwardness among the competitors. An example of the competitors assessed by the score method is given in Table 19.

RATINGS OF ENTERPRISE A AND ITS COMPETITORS ACCORDING TO THE SCORE METHOD (TABLE 19)

COMPETITIVENESS FACTORS	A	COMPETITORS	
		B	C
Market share	5	2	1
Profit margin of services	5	5	4
Average price	5	4	4
Product quality	4	5	4
Order fulfilment time	2	3	5
Recognition of the enterprise	5	3	2
Expenses on advertising	5	2	1
Total	31	24	21

As shown in **Table 19**, enterprise A surpassed both competitors in terms of competitiveness. According to the data acquired by this method, enterprise B with a total score of 24 was the strongest competitor for enterprise A. According to the location score method, the difference in total score between A and B was not significant: 10 and 12. However, according to the score method, the difference in competitiveness between both competitors was significant: enterprise A had a score of 31, while enterprise B – only 24. In contrast, the difference between both competitors for enterprise A was not significant.

A detailed analysis of **Table 19** data reveals that in terms of quality of services, enterprise A (as well as competitor C) only slightly lagged behind its “strongest” competitor B. Enterprise A, however, has to considerably focus on the factor “order fulfilment time”, as this competitiveness factor was rated at 2 on a five point scale. The enhancement of this factor could raise the competitiveness of enterprise A.

The **requirement profile formation method** allows identifying, on the one hand, factors ensuring the enterprise has advantages over other ones and, on the other hand,

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factors because of which it lags behind. This method could be regarded as a schematic representation of the previous one.

According to this method, the strongest competitor is the enterprise, the graph of

which is located to the right. A requirement profile was formed for the analysed enterprise, i.e. enterprise A, and its strongest competitor – enterprise B (see **Figure 5**).

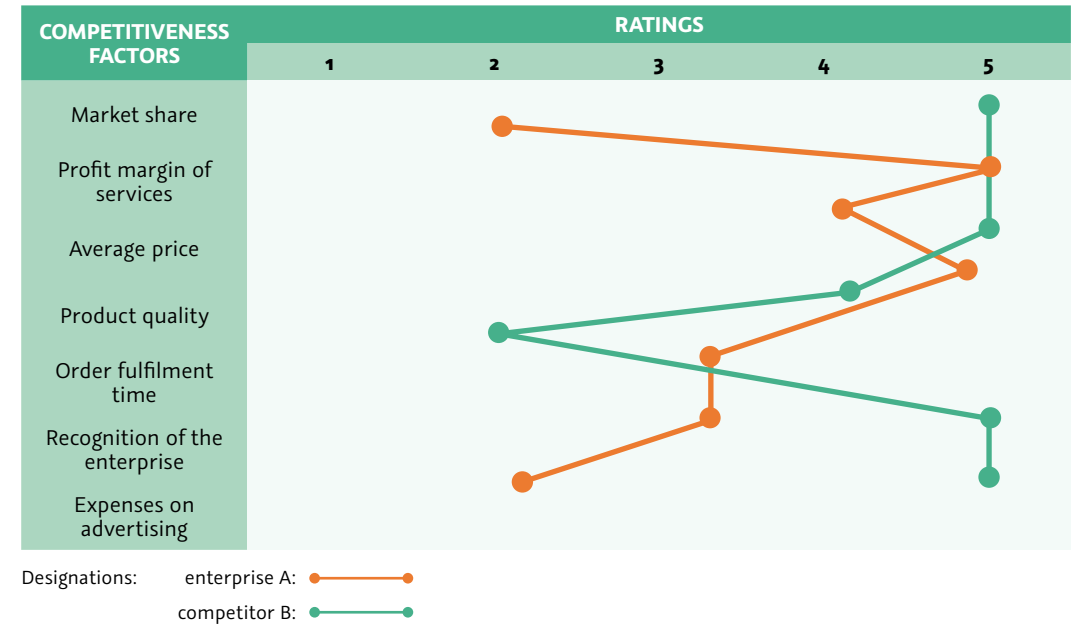


Fig. 5. Requirement profiles for enterprise A and competitor B

As shown in **Figure 5**, the analysed enterprise A is the leader based on the following factors:

- market share;
- recognition of services of the enterprise;
- expenses on advertising.

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At the same time, enterprise A lags behind its competitors in relation to the factor “order fulfilment time”. This factor in particular makes the largest gap in competitiveness.

Since all the analysed and examined competitiveness factors are not equally significant, the score method could be enhanced and a more accurate assessment could be made by defining significance for each competitiveness factor. A more significant criterion acquires a higher significance coefficient, while a less significant one – a

lower coefficient. In determining significance coefficients, it has to be taken into account that their sum has to be equal to one. The **score method that takes into account significance coefficients** is designed in this way.

Applying this method, a significance coefficient is multiplied by the rating of a corresponding competitiveness factor and the products are summed.

An example of the application of the score method that takes into account significance coefficients is shown in **Table 20**.

ASSESSMENT OF ENTERPRISE A AND ITS COMPETITORS ACCORDING TO THE SCORE METHOD TAKING INTO ACCOUNT SIGNIFICANCE COEFFICIENTS (TABLE 20)

COMPETITIVENESS FACTORS	Significance coefficient	A		Competitors			
		score	significance coefficient x score	B		C	
				score	significance coefficient x score	score	significance coefficient x score
Market share	0.20	5	1.00	2	0.40	1	0.20
Profit margin of services	0.20	5	1.00	5	0.40	1	0.80
Average price	0.15	5	0.75	4	0.60	4	0.60
Product quality	0.15	4	0.60	5	0.75	4	0.60
Order fulfilment time	0.15	2	0.30	3	0.45	5	0.75
Recognition of the enterprise	0.10	5	0.50	3	0.30	2	0.20
Expenses on advertising	0.05	5	0.25	2	0.10	1	0.05
Total score	1.00	31	4.40	24	3.60	21	3.30

Note: significance coefficients were obtained from expert evaluations

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As shown in **Table 20**, according to the score method that takes into account significance coefficients, the analysed enterprise A obtained a score of 4.4, while its competitors: enterprise

B – 3.6 and enterprise C – 3.3.

Based on the data, one can calculate the relative indicator of competitive advantages for enterprise A.

The relative indicator of competitive advantages for an enterprise, compared with the strongest competitor, could be calculated by equation:

$$\text{Relative indicator of competitive advantages for an enterprise} = \left(\frac{\text{Total score for the analysed enterprise}}{\text{Total score for the strongest competitor}} - 1 \right) * 100$$

The relative indicator of competitive advantages shows whether an enterprise has

competitive advantages compared with its competitors.

The experience of the Western world indicates that if an enterprise's advantages over its competitors are higher:

- up to 30%, this means that it is necessary to build up experience in the given market by carefully following the activities of competitors;
- 30-50 % – the enterprise's situation in the market is sufficiently stable;
- 50-70 % – the enterprise succeeds

in the market and it has to continue making success;
 → more than 70 % – the enterprise can actually control the market and it is necessary to consider the way how to maintain the market position.

The relative indicator of competitive advantages for enterprise A is calculated as follows:

$$\text{Relative indicator of competitive advantages for enterprise A} = \left(\frac{4.40}{3.60} - 1 \right) * 100 = 22\%$$

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In the given example, the competitive advantages of enterprise A exceed those of the strongest competitor by 22%. It follows that the **position of enterprise A in the market is sufficiently stable**.

Other original solutions could be also used to assess the competitiveness of an enterprise in the market. For example, enterprise D and six competitors that produce analogous products. The personnel of enterprise D have visited its competitors several times. However, all the interesting information on the competitors

is confidential, and the data are not available. Only the product prices of the competitors are known. The employees of enterprise D who visited competitor enterprises, met their representatives at exhibitions and phoned sales department specialists were surveyed to assess the performance of the competitors.

The employees were requested to assess the performance of their competitors on a 3-point scale. Since no output information was available, first of all, scales for rating competitiveness factors were designed (see **Tables 21 and 22**).

EXAMPLE OF A SCALE FOR RATING THE EFFICIENCY AND REPUTATION OF AN ENTERPRISE (TABLE 21)

QUALITATIVE RATING OF A FACTOR	QUANTITATIVE RATING OF A FACTOR
Poor	0
Satisfactory	1
Good	2
Excellent	3

EXAMPLE OF A SCALE FOR RATING THE SALES VOLUME OF AN ENTERPRISE (TABLE 22)

QUALITATIVE RATING OF A FACTOR	QUANTITATIVE RATING OF A FACTOR
Less than our sales volume	0
The same sales volume	1
More than our sales volume	2
Much more than our sales volume	3

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Based on the scales given in **Table 21 and 22**, the efficiency, reputation and sales volume of an enterprise is assessed in comparison with one's own (analysed) enterprise; besides, the level of the analysed enterprise (e.g. enterprise D) is assumed to be satisfactory, i.e. it means that

the ratings of all the competitiveness factors is "1". The ratings of each enterprise by the experts (in the example – employees) are summed and then divided by the number of the experts, identifying the average expert rating (see **Table 23**).

RATINGS OF THE PERFORMANCE OF ENTERPRISE D AND ITS COMPETITORS (TABLE 23)

NAME OF THE ENTERPRISE	RATINGS OF COMPETITIVENESS FACTORS		
	Reputation	Sales volume	Efficiency
E	2.66	3	0.66
F	2	3	1.33
G	2.66	2.66	3
H	0.66	2.33	0.33
J	0.66	2	0.66
K	1	2.33	0.33
D	1	1	1

Note: ratings on a 4-point scale (0 – lowest, 3 – highest).

As shown in **Table 23**, enterprise D has to make a lot of efforts to achieve the performance of its competitors. In view of the fact that the enterprise only now tries to conquer the market, the given competitiveness indicator values could be considered to be acceptable.

Competitors E and F are leaders in terms of sales volume, and they have high reputation but low efficiency. According to the experts, the market leader is competitor G.

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After the competitiveness of the enterprise has been assessed, it is necessary to design a competition strategy for the future, choosing some of the following strategies:

- production cost reduction;
- product differentiation;
- market segmentation;
- introduction of innovations;
- focus on market needs (see **Table 24**).

PRECONDITIONS AND PREREQUISITES FOR BASIC COMPETITIVENESS STRATEGIES (TABLE 24)

KIND OF BASIC STRATEGIES	PRECONDITIONS AND PREREQUISITES
Production cost reduction	<ul style="list-style-type: none"> ▶ High market share and broad availability of cheap inputs. ▶ Price elastic and homogenous demand for the enterprise's products. ▶ Mainly price competition. ▶ Consumers lose their incomes due to price increases. ▶ Standardisation of the industry and the lack of an effective differentiation.
Product differentiation (prices, related services, personnel, image)	<ul style="list-style-type: none"> ▶ Broad opportunities to diversify the product in the market; consumers perceive the product well and appreciate it. ▶ Diversity of the composition of demand for a product. ▶ Non-price competition. ▶ Cost of the product constitutes an insignificant share of the consumer's budget. ▶ Products are not differentiated in the industry.
Market segmentation	<ul style="list-style-type: none"> ▶ Diversity of consumers in terms of their needs and product uses. ▶ Lack of a specialisation of competitors for a particular market segment. ▶ Enterprise lacks reserves to serve the entire market.
Focus on market needs	<ul style="list-style-type: none"> ▶ Existence of deficit. ▶ Price inelastic demand. ▶ No problems to "enter" and "exit" the market. ▶ Small number of competitors. ▶ Market instability.
Introduction of innovations	<ul style="list-style-type: none"> ▶ Nonexistence of analogues products. ▶ Existence of potential demand for innovative products. ▶ Readiness of large enterprises to contribute to the introduction of innovations.

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The business plan has to show the tactics and techniques of competition that are employed by the enterprise to enhance its competition position in the market. The

potential techniques of competition, taking into account the market share, are aggregated in **Table 25**.

TABLE 25

ENTERPRISE DOMINANCE LEVEL IN A COMPETITIVE MARKET	COMPETITION TECHNIQUES
Leader	<ul style="list-style-type: none"> ▶ Continuing the advance: analysing the sufficiency of resources for continuing innovation and making pressure on competitors. ▶ Stabilising the position: maintaining the achieved profit margin, identifying entry barriers, enhancing related services and balancing prices, maintaining the market share. ▶ Struggling with competitors: attracting consumers and suppliers, discrediting the competitors, enticing the personnel away from the competitors.
Strong competitiveness positions	<ul style="list-style-type: none"> ▶ Seeking unoccupied market niches with weak competition. ▶ Adapting to the chosen target market. ▶ Creating ideal services. ▶ Imitating the leader behaviour. ▶ "Swallowing up" small competitors. ▶ Creating a different enterprise image.
Weak competitiveness positions	<ul style="list-style-type: none"> ▶ Lowering the product price or differentiating the product. ▶ Retaining the market share and the profit margin. ▶ Reinvesting to earn short-term profits: allocating funds to prospective sectors.
Outsiders	<ul style="list-style-type: none"> ▶ Radically reorganising the enterprise: repositioning the business, seeking internal reserves, merging with competitors, reducing the unprofitable assortment. ▶ Raising prices if demand is price inelastic. ▶ Reducing all costs. ▶ Selling the assets, reducing the personnel, decreasing the assortment of products. ▶ Exiting the business.

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5. MARKETING PLAN

The chapter describes the way how to conquer the market and ensure product sales. The marketing plan consists of four policies: product, price, sales and marketing communication.

Designing a marketing plan, answers to the following questions have to be sought:

- What product development and enhancement measures are going to be employed?
- What product sales prices and discounts are going to be used and why?
- What product sales system is going to be used and why?
- What sales promotion measures are going to be implemented, where and when the measures are carried out, what are their costs, what they ensure etc.?

A marketing plan should be designed for every enterprise. In reality, only large enterprises have such plans, as well as those that took loans or used rural development policy instruments for business expansion. However, every herb grower and processor has a solution how to effectively exploit resources being at their disposal, how to optimise costs and plan revenues. Some part of herb growers are conservative and do not want to take a risk by experimenting with new species or products, as well as their profit projections are conservative.

PRODUCT POLICY

An effective product policy is associated with two problems:

- the entrepreneur has to organise the work within the scope of existing products, taking into account the life cycle stage of every product;
- development of a new products has to be commenced early enough in order to replace the products to be withdrawn from production and the market.

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This necessitates considering the development and enhancement of products. It is useful to summarise this information in a table (see **Table 26**). Only the necessary columns have to be filled-in in **Table 26**.

CHARACTERISTICS OF A PRODUCT POLICY (TABLE 26)

Product group	Product name	Model	Proportion of revenue from the product in total revenue, %	Product life cycle stage	Possibilities to extend the product life cycle stage
Teas	Yarrow tea	-	5	Growth	Packaging teas in sachets
	Cornflower tea	-	20	Maturity	Increasing expenditure on product promotion
	...				

Some herb producer admits that the consumption of herbal teas is subject to the fashion process. In the beginning, valerian was the most demanded tea, while later – mixtures of various teas. One and the same product does not attract the attention of consumers for more than three years; for this reason, something new has to be persistently introduced.

→ PRICE POLICY

Any enterprise has to set a price on its product. Price is the only element of marketing that relates to revenue, as the other elements (product development, distribution and promotion in the market) only increase enterprise costs. Besides, price is also the most flexible element of marketing.

its pricing strategy. It could be compared with competitor strategies. It is advised that the business plan shows how pricing techniques contribute to entry in the market, the market position and strengthening the position, as well as profits.

First of all, the business plan has to design

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The price strategy is affected by the product life cycle stage. For new products at the **product introduction and growth stages**, entrepreneurs usually choose between two price strategies:

→ market – skimming pricing;

→ market – penetration pricing (see **Table 27**).

PRICING STRATEGIES FOR NEW PRODUCTS (TABLE 27)

KIND OF STRATEGY	PRECONDITIONS FOR APPLYING THE STRATEGY
Market – skimming pricing	<ul style="list-style-type: none"> ▶ High demand from a large number of consumers. ▶ Costs are not so high to exclude financial gains. ▶ High price makes an impression of high product quality.
Market – penetration pricing	<ul style="list-style-type: none"> ▶ Market is sensitive to price, and a low price promotes market expansion. ▶ As output increases, the costs of production and sales decrease. ▶ Low price is not attractive for competitors.

Entering the market with an imitated product, as well as at the imitated product growth stage, the entrepreneur prefers

some of nine pricing strategies, choosing an appropriate price/quality ratio (see **Table 28**).

PRICING STRATEGIES FOR IMITATED PRODUCTS (IMITATORS) OR PRICING STRATEGY MATRIX (TABLE 28)

QUALITY \ PRICE	HIGH	MEDIUM	LOW
	High	Premiere Offering (or Premium)	Ideal for Penetration (or High Value)
Medium	Over Priced(or Over Charging)	Average Goods (or Middle of the Road)	Real Bargain (or Good Value)
Low	Sell and Run (or Rip-off)	Unhappy Customer (or False Economy)	Cheap Value (or Economy)

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When the product is at the **maturity stage**, the entrepreneur chooses between the following two pricing strategies:

→ falling price (a continuation to the price skimming strategy);
 → key price (a continuation to the

market conquest strategy) – competitive advantages gained by means of cost or quality.

At the maturity stage, any price strategy is not the most important one to have high sales

volumes, and here the role of the non-price strategy increases.

However, at the **decline stage**, the entrepreneur chooses between the following two pricing strategies:

→ product price reduction to a very low level;

→ product life cycle extension through increasing product promotion costs.

Before setting the final price, the entrepreneur has to remember that, first of all, it has to be established what the enterprise pursues by selling the product, what objectives it wishes to achieve. The approach to pricing is identified based on a particular objective. For example, if the enterprise's objective is to increase the market share, in this situation the enterprise will persistently offer new products in the market, broaden the assortment and sell the products in diverse market segments at different prices (from high to low).

Any enterprise has to set a price that covers its production, distribution and sale costs. This means that an analysis of costs has to be performed, as it helps the enterprise to

identify the minimum price, below which the product should not be sold. In order that the enterprise can sell its product in the market at a maximum price, an analysis of market demand (at what price the consumer is ready to buy the product) and an analysis of competitors have to be performed.

If the enterprise's offer in the market is better than the offers of competitors, and consumers perceive this difference positively, then the price could be higher than that of competitors, since it is perceived as a reward for added value. Conversely, if competitors have a price/quality advantage, then the price has to be reduced. In other situations, it could be similar to the price of competitors, and the

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enterprise might increase its turnover/profit owing to other competitive advantages. The price does not have to be lower than the level that allows the cost to be covered and not higher than the level, beyond which the product is no

longer in demand. The price is determined in the range between two extremes and depends largely on the chosen method; therefore the pricing method has to be also specified in the business plan (see **Table 29**).

CLASSIFICATION OF PRICING METHODS (TABLE 29)

BY COST	BY DEMAND	BY COMPETITOR
<ul style="list-style-type: none"> ▶ cost + profit (total or as a % of cost) ▶ average cost + mark-up ▶ average cost + target profit 	<ul style="list-style-type: none"> ▶ product price differentiation ▶ product consumption properties (value of consumption; value of use) 	<ul style="list-style-type: none"> ▶ proportional prices ▶ expected profit estimate

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The market price tactic used has to be also described in the business plan. The enterprise could use the following market price tactics:

→ **identification of discriminating prices:**

- ▶ based on diverse consumer groups – the consumers pay different prices for the same product;
- ▶ based on product variants – the variants are sold at different prices; however, there are no difference in production cost among them;
- ▶ based on the location – the product is sold at different prices at different locations, although production cost is the same;
- ▶ based on the period – prices change depending on the season, day, week

etc.;

→ **identification of a psychologically attractive price (e.g. EUR 6.99);**

→ **identification of a price for a product group;**

→ **setting price discounts:**

- ▶ discount for paying in cash;
- ▶ discount for buying the product in a large quantity;
- ▶ discount for dealers;
- ▶ discount for regular or important clients;
- ▶ seasonal discount;
- ▶ export discount etc.

“The final price of a product is affected by production cost, e.g. whether growing and gathering herbs involves only manual work or this process is mechanised. The price is affected by where and who sells the product: supermarket chains, Internet shops or the producer him/herself. The price of the product is affected by who packages and sells it, and for what purpose.

An entrepreneur shares her experience:

“When you package the product yourself, you are sure that you earn some EUR 30 per kilogram. In contrast, when I give it to a processor, the maximum price what I earn from my crude drugs is EUR 8 per kg. It is always possible to find what to do, how to earn a living. Now bathhouses are popular. When you visit an enterprise in Estonia that is presented as a herb farm, I have to say that what they put in small

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packages is the smallest part what brings profits. They mainly make profit on visits by individuals who take a bath and make their legs wet, for example, in a thyme bath; by this, they earn many times more. It is always possible to figure something out.”

After identifying the market price tactic, the business plan can present the **initial prices on the products offered** by the enterprise, which could be compared with competitor prices (see **Table 30**).

PRICES ON THE PRODUCTS OFFERED BY THE ENTERPRISE AND ITS MAIN COMPETITORS, EUR (TABLE 30)

PRODUCTS	ENTERPRISE	COMPETITOR A	COMPETITOR B
Yarrow tea	1.70	2.00	2.70
Linden flower tea	2.35	2.80	not offered
...			

The final part of the chapter on the price policy of the enterprise seeks to predict:

- responses of consumers and competitors to changes in the enterprise’s prices due to:
 - change in demand;
 - transition of the product from one life cycle stage to another;
- response of the enterprise to changes in competitor prices;
 - increase or decrease in cost;

SALES POLICY

To meet the needs of consumers for a product, distribution channels have to be established – a group of interrelated enterprises that participate in and perform all the functions related to the transport of the product from the producer to the consumer and its distribution and promotion in the market.

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Some herb grower admits that

„in any case, the grower has to be aware of the sales market – it is useless to do anything (grow herbs) if you do not know where to later sell the herbs produced.

As regards the sales policy, the business plan has to answer the following questions:

- What is the plan for the distribution of the product?
 - In what geographic locations it is distributed?
 - Does the enterprise use intermediaries or direct marketing?
- Why?
- In what way intermediaries or sales representatives are going to be selected?
 - What is the service and warranty policy?

If the enterprise prefers direct marketing, the business plan has to describe the way it is organised and controlled, the number of employees involved and the location, remuneration (wages, commissions etc.).

To distribute the product, the producer could choose:

- zero-level channel, which means the producer sells its product directly to consumers;
- one-level channel – the producer cooperates with one intermediary (retailer);
- two-level channel – two intermediaries are involved;
- three-level channel – three intermediaries are involved in distribution (see **Figure 6**).

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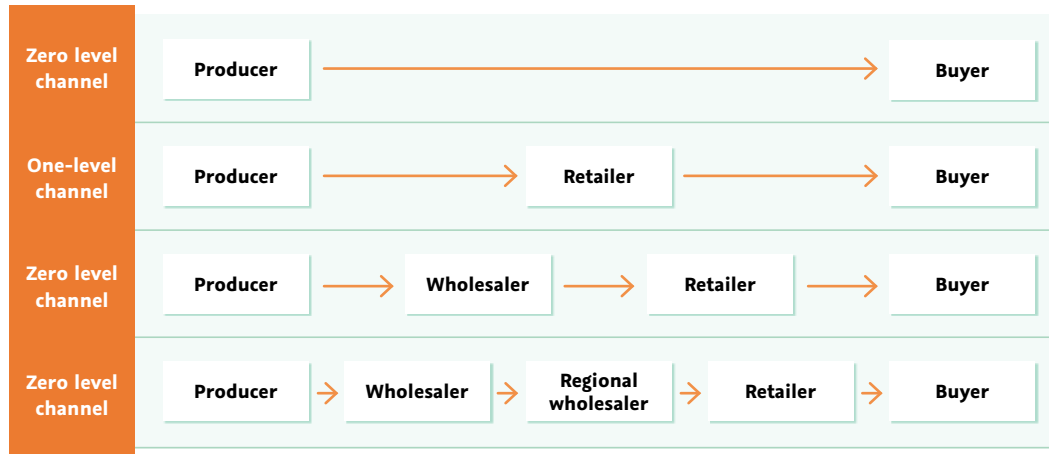


Fig. 6. Product distribution channels

Some herb grower describes his distribution channels as follows:

„The most reliable cooperation partner in Latvia is the well-known doctor Tereško who buys medicinal herbs for preparing medicinal teas. The teas produced by the farm could be also bought at several shops in the capital city. In the future, the farm plans to build its own teahouse where the farm’s visitors and those driving by could enjoy the teas prepared on the farm.”

The products of another entrepreneur could be bought at shops and pharmacies throughout Latvia, as well as in the Internet shop and at the production site.

The next issue that has to be described in the business plan is the number of intermediaries the enterprise plans to cooperate with at each level of product distribution, i.e. whether the

enterprise is going to cooperate with one or several intermediaries.

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The need to cooperate with intermediaries is determined by:

- horizontal market, which has a lot of consumers. This requires creating a large sales network and considerable investment;
- sales market is geographically scattered, and direct contacts with consumers are unprofitable;
- supplying the product in large quantities to a small number of wholesalers saves on transport cost;
- difference between the product price and cost is insignificant, which means that maintaining the self-sales network is unprofitable for the entrepreneur.

Further, the business plan has to describe a particular way of choosing intermediaries and what factors have to be taken into consideration when making the choice, the planned increase

in the number of intermediaries and every intermediary’s sales volume, as well as the ways of attracting the intermediaries.

Specialists suggest the following criteria for selecting intermediaries:

- duration of doing business in the particular field;
- specific field (how many and what product groups they handle);
- economic performance (sales volumes and profits);
- solvency;
- mutual contacts;
- reputation.

Intermediaries have to be persistently motivated. To make cooperation with them successfully, the enterprise could use various motivation methods:

- compulsion: if an intermediary ignores the terms and conditions agreed on, the producer may stop cooperation or limit access to the products;
- reward: the producer pays an extra commission to the intermediary for performing specific activities;
- contract-based method: the producer requires the intermediary to comply

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with the terms and conditions of the contract;

- cooperation-based method: the intermediary cooperates with the producer, e.g. in the field of training sales personnel;

- leadership-based method: if the producer is an indisputable leader within the product distribution channels, the intermediaries compete with one another and are proud of cooperating with the producer.

The producer has to periodically assess the performance of intermediaries according to the following criteria:

- compliance with the terms and conditions of the contract;
- level of product inventory;
- speed of product delivery (sales);

- responsibility for damaged and lost products;
- number of services offered for consumers etc.

The final part of the description of the sales policy has to answer the following questions:

- How orders are processed (by phone, e-mail etc.)?
- Where products and raw materials are stored? What are storage costs?
- What minimum inventory of products

- (as well as raw materials) should be?
- In what way the product is sent, transported, specifying the kind of transport? What is the transport cost?

A herb grower and processor remembers the commencement of cooperation with retailers:



„I sought and phoned myself the main buyer in this field. We met and I showed my products and specially designed new packaging – so that the products look nice on the shelf. Now I sell more than half of my products to this supermarket chain.”

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Storage is necessary to extend the period of delivery of the product to consumers. Storage could be done by the producer, the intermediary and the consumer. After storage,

products are sold at a higher price that includes both storage cost and the cost of lost products during the storage.

Storage costs include:

- cost related to storage – depreciation of buildings and structures, electricity etc.;
- cost related to maintaining the quality

- of products during storage, e.g. preservatives and other chemicals;
- cost of the lost quantity and quality of products during the storage.

The business plan has to specify **product transport**, which involves transport cost. It is easier to identify this cost if the owner of

the vehicle is paid for transport services. In situations where the vehicle belongs to the enterprise, it is difficult to identify the cost.

The potential components of transport cost are as follows:

- wages for the vehicle driver and the assistant;
- fuel cost and other repair- and maintenance-related costs;

- license fees, taxes, insurance and other compulsory payments;
- other transport costs, e.g. the road user charge etc.

Often **transport packaging** (sacks, boxes, bags) is necessary for product transport, which incurs extra costs for the entrepreneur that have to be taken into consideration in calculating total marketing cost. The cost of transport packaging could be simply calculated for the packaging used only once. More

expensive kinds of transport packaging are usually multiple-use packaging; therefore, the number of reuses has to be known. If secondary or transport packaging is reused, the cost of returning the empty packaging has to be taken into account, which, in this case, relate to transport cost.

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Farm owners, sharing their marketing experience, admit that

„one of the most important things is that product packaging is accurately designed, so that controlling institutions have no objections, and buyers can have the necessary information. It is important for buyers to know where the herbs come from, as well as some information about the producer, and it is also important that the producer is proud of its product. A shorter expiry period helps to guarantee the quality.”

The farm „Rūķīšu tēja” offers different kinds of tea packaging, so that consumers can choose the most appropriate one – it is both loose leaf tea and immersible teabags. The farm “Rūķīšu tēja” created not only teas making a sophisticated sense of taste but also tea mixtures, each of which fits a particular life situation and mood.

Another entrepreneur agrees that tea packaging plays a role,

„as individuals buy with eyes. The difference is that, for example, the turnover of a British enterprise is very high, whereas in Latvia it is very low; therefore, design is very expensive. If it were possible to produce the product in large quantities and export it, it would pay off. However, we try to invest in the design as much as possible at the expense of other expenditures.”

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MARKETING COMMUNICATION PLAN

A marketing communication plan aims to provide information on all planned marketing activities in the planning period. The marketing communication plan is usually closely associated with a projection of sales, as

planned marketing activities can considerably increase sales volumes as well as planned price discounts can significantly affect the marketing activities.

Enterprises use various kinds of marketing communication. Those herb growers that commenced their business more than 20 years ago point out that it was not easy for them to enter the market, e.g. supermarket chains and shops. It was the time when such products were new, and the producers had to visit retailers and convince them of the opportunity to sell their products. A lot of time and efforts were dedicated to direct marketing at marketplaces and at fairs. On the other hand, overall, the market was not so saturated as it is today.

Entrepreneurs admit that they are well recognised in the market, and customers themselves used to phone them and were interested in their products, as the customers had found contact details on the enterprise website, on the packaging of their products purchased and in other informative materials. Local governments are accustomed to use local producer products for representational purposes.

The enterprise has to regularly communicate with existing and potential consumers, with its target audience and the public; therefore, in the business plan, the

entrepreneur has to answer the following questions: what information to provide, when, whom and how frequently to provide it?

The entrepreneur could use various methods to promote the product in the market:

- mass marketing communications:
 - **advertisements** – a kind of paid and impersonalised marketing communication, which is done by

an identified advertiser by using various means and techniques in order to influence the behaviour of buyers in the market and achieve

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communication goals;

- ▶ **sales promotion of products** – a kind of temporary marketing communication aimed at motivating the purchases and sales of a product by means of various marketing techniques;
- ▶ **public contact** – a kind of marketing communication aimed at indirectly influencing the behaviour of buyers in the market by distributing information about the enterprise, its products produced (sold) and its brand free of charge and massively;

→ personal marketing communication:

- ▶ **direct marketing** – information distribution and the creation of a database, including basic details about consumers and the characteristics of their behaviour in the market, to use this information to attract and retain consumers and for their loyalty purposes;
- ▶ **personal service** – oral communication with the buyer and handing the product directly to the buyer, which is aimed at encouraging and convincing the buyer to make the purchase.

With regard to the marketing communication plan, the business plan has to present four stages:

- identification and examination of the target audience for communication;
- identification of marketing communication goals;

- choice of a channel for message distribution;
- identification of marketing communication costs.

At the initial stage, the target audiences or those whom the information is intended for are identified, this means the enterprise could communicate with:

- employees of the enterprise;
- existing and potential customers;
- marketing service intermediaries;
- contact audience;

- suppliers;
- public authority and state administration bodies.

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The requirements of each target audience are different; therefore, the enterprise has to know: what to report? how to report? when to report? where to report? from what perspective to report (e.g. from the producer perspective)?

After the target audiences have been identified and examined, particular marketing communication goals have to be set, namely what exactly the enterprise wants to achieve by planning and implementing the communication with consumers.

Five different marketing communication goals could be distinguished:

- need for the product/brand;
- recognition and remembrance of the product/brand;
- attitude to the product/brand;

- promotion of the product/brand;
- consumption risk avoidance and the formation of customer loyalty.

After the marketing communication goals have been defined, information distribution means or communication channels have to be chosen, i.e.:

- **personal communication** (two or more persons participate in communication);
- **mass communication** (mass media (newspapers, magazines, radio, television, the Internet, mobile phones etc.), instructional

aids (placards, posters, signboards etc.) special arrangements (a room arrangement, a pleasant environment etc.), special events (press conferences, solemn events, opening ceremonies etc.), sponsorship).



Information in the mass media is a good way of advertising for entrepreneurs, particularly when the entrepreneurs are engaged in something new and unconventional, offer interesting products or are among the first ones that commence some specific business.

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One of the first herb growers in Latvia shares her experience:

„We have collected a lot of printed materials about our farm. Almost every year they reported about us... In all newspapers, and now also the local newspaper calls us. The first reporter was from the magazine „Vides vēstis” (Environmental News), followed by „Ieva” (Eve) and „Ievas māja” (Eve’s Home). Sometimes it is like this – they see a nice tea in a shop, on the packaging they get the phone number and call us! In the first years, they called us many times. Customers themselves find us now. It is our advantage that we were the first ones in Latvia.”

Various kinds of marketing communication are needed for the consumption and business markets. In the consumption market, advertisements are preferred, followed by sales promotion of products, direct marketing and only then personal service. In the business market, direct marketing is favoured, followed by personal service, sales promotion of products and only then advertisements. Public contacts are not much used in both markets. In the consumption market, it is useful to combine advertisements and activities aimed at the sales promotion of products. Initially, advertisements in particular draw a lot of attention to the product and motivate consumers to buy it, yet the decision to make a purchase mainly depends on various stimulating activities.

Making a decision on marketing communications is affected by the characteristics of the product. The more complicated, in terms

of its functions, the product is and the more complicated the behaviour of consumers in the market is, the more important personal service is.

The greater the purchase risk is, e.g. if buying an expensive product, the more a combination of advertising and personal service is needed.

The product related to daily consumer behaviour (regarding everyday consumption products) requires more expenditures on advertising in particular, as it allows presenting and demonstrating the properties of the product, satisfaction from consumption and emotions in a relatively short period. It is useful to do activities aimed at the sale promotion of the product: price discounts, lotteries, coupons etc.

The choice of a kind of marketing communication is considerably affected by the life cycle of the product (see **Table 31**).

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MARKETING COMMUNICATION ACCORDING TO THE LIFE CYCLE OF THE PRODUCT (TABLE 31)

INDICATOR	STAGES OF THE PRODUCT LIFE CYCLE			
	Introduction	Development	Maturity	Decline
Goal of marketing communication	To inform about the new product and its advantages	To convince consumers of the differences between the enterprise’s product and the products of other enterprises	To remind	To survive
Kinds of marketing communication	Advertisements about the new product on TV, on the Internet, in magazines. Distribution of product free samples among potential consumers. Personal service to encourage retailers to buy the new product.	Advertisements that give information about some properties and advantages of the product. Highly qualified personal service. Direct marketing.	Reminding advertisements. Discount coupons, lotteries, price discounts, cultural event sponsorship. Direct marketing.	Marketing communication cost reduction. Techniques of stimulating product sales.

The behaviour of consumers and the decision-making process also affect the choice of a kind of marketing communication. At **the pre-purchase stage** when consumers have to be provided with information on and knowledge of the product, advertising plays the key role – it informs potential consumers about the product/brand. The distribution of free samples could also be used as technique for increasing product sales. After extensive advertising, the enterprise could use direct marketing and personal service techniques.

During making a purchase, when an attitude of consumers is shaped and

the consumers begin trusting and make a decision on buying the product, the role of direct marketing and personal service sharply increases. In some situations, techniques for sales promotion (price discounts, coupons, lotteries etc.) are effective as well. It is useful to also employ public contacts.

At the **post-purchase stage**, advertising has to eliminate the post-purchased “concern” of the consumer that the product does not meet the needs. Sales promotion as well as public information play a quite insignificant role. In order for consumers to make purchases again, a database has to be created and the

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enterprise has to continue communicating with the consumers.

The content and form of marketing communication has to be designed based on the strategy of management of the product distribution channel. If the producer quite aggressively offers the product to wholesalers, the wholesalers – to retailers and the retailers – to consumers, this affects the content of advertisements and the ways personal service, direct marketing and sales promotion are carried out.

If the producer purposefully stimulates consumer demand for brands/products, the producer uses advertising, public awareness and sponsorship.

First of all, a proper technique for planning marketing communication costs has to be chosen. The most popular ones are as follows:

- commission on sales volume (e.g. as a percentage of the real or expected sales volume or the product unit price);
- parity with competitors (the entrepreneur spends approximately as much money as the competitors);

After the marketing communication budget has been drawn up, it is necessary to distribute the sum by kind of marketing communication.

Managing the sales promotion of the product in the market, all the kinds of marketing communication have to be combined, taking into account their characteristics and affecting factors.

After the information distributions means or communication channels have been chosen, the enterprise has to plan how much to spend on every kind of marketing communication and on all the kinds put together. Many enterprises arbitrarily allocate funds for communication, taking into consideration only their financial possibilities. The sums allocated in an arbitrary manner change year by year, which makes planning marketing activities in a long-term difficult.

- targets – tasks (expenditures are set based on the sales targets set and the related tasks);
- expert evaluation (independent experts make their projections of required expenditures) etc.

The distribution is usually done in proportion to what it was in previous years.

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If nothing was spent on this purpose in the base year, the following composition is suggested:

→ 70% of the budget is spent on advertising;

→ 25% – on stimulating sales;
→ 5% – on performing market studies.

In the business plan, it is important to summarise all the marketing activities in a single plan, thereby making accurate the

targets, priorities and their interrelation. A single marketing plan gives accurate insight into the efficiency of resource use.

MARKETING COMMUNICATION PLAN FOR THE FIRST YEAR OF OPERATION OF THE ENTERPRISE (TABLE 32)

Cost group	Cost item	Months												Total a year
		1	2	3	4	5	6	7	8	9	10	11	12	
Degustation activity	Total													
	Product cost													
	Rent of premises													
	Personnel cost													
Advertising activities	Total													
	Printing advertisement booklets													
	Distribution of booklets													
	...													

Outline of Business Plan Chapters

The marketing communication plan for the first year of operation of the enterprise has to be monthly, for the second year – semi-annual and for the third and next years – annual. The marketing communication plan could be summarised in a table (see **Table 33**).

SUMMARY OF THE MARKETING COMMUNICATION POLICY OF THE ENTERPRISE (TABLE 33)

COMMUNICATION ADDRESSEE	COMMUNICATION GOAL	SHORT DESCRIPTION OF COMMUNICATION	COST, EUR

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6. PRODUCTION PLAN

The chapter “Production plan” of the business plan describes how and by means of what equipment a product or service is produced. Elaborating this chapter, it is required to:

- identify the size of the enterprise, the output of goods/services and harmonise it with the expected sales volume;
- design a production process flowchart that shows how raw materials, materials and goods are transformed into a final product or service;
- identify what fixed assets are needed, in what amount, where they are placed and where to buy them, what it costs;
- identify the amount of inventory of materials needed, how the materials are stored, managed and controlled;
- identify what quality assurance measures have to be taken etc.

This chapter is needed only for an enterprise that plans to produce goods. An enterprise producing services present this information

(e.g. on fixed assets, current assets, a projection of production cost) in the chapter “Financial plan”.

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Designing a production plan, answers to the following questions have to be given:

→ **where goods or services are produced?** It could be:

- ▶ premises belonging to the enterprise – the premises have to be described and assessed on whether they are appropriate for the production;
- ▶ rented premises – their characteristics, appropriateness; rent on the premises;
- ▶ newly constructed premises – their characteristics, construction cost;
- ▶ land resources and their characteristics and appropriateness for the production (if no characteristics of the resources are given in the first chapter “Description of the enterprise and the related industry”);

→ **how the product is going to be produced?**

- ▶ equipment needed for the production;
- ▶ enterprises supplying the equipment;
- ▶ list of pieces of equipment and the purchase cost;
- ▶ capacity of the equipment;
- ▶ characteristics of the production

process and the production process flowchart;

- ▶ cooperation with domestic and foreign partners;
- ▶ how product quality and work safety and compliance with environmental regulations are ensured;

→ **where, from which enterprise and on what conditions raw materials and other inputs are going to be purchased?** There should be

distinguished the following matters:

- ▶ domestic raw materials, their prices and purchase opportunities;
- ▶ imported raw materials, their prices and purchase opportunities;
- ▶ energy, its prices and purchase opportunities;
- ▶ other inputs, their prices and purchase opportunities;

→ **what amount of products the enterprise plans to produce** or a production programme has to be designed;

→ **what is the production cost** or a projection of production cost has to be made.

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Herb growers and processors suggest that August is the most appropriate period for planting perennial herbs. Marjoram, melissa, St. John's Wort and coneflower look very nice in beds for winter resistant herbs, where the herbs can grow without being replanted for at least three years. It is advised to sow annual herbs (chamomile, calendula, northern dragonhead, milk thistle, common mallow) in spring, as young shoots do not benefit from the warm autumn of Latvia. If herbs are self-seeded, they have to be covered with garden fabric. Decaying leaves should not be used as a cover, as it contributes to the spread of plant diseases.

Herbs do not need very fertile soil. The only requirement is that the soil has to be loose. Flowering herbs that produce essential oils (coneflower, marjoram, melissa, catmint, St.-John's-wort) prefer sunny places, whereas chicory and valerian grow well in shady places.

Lavender, whose aromatic flowers are used in the production of herb pillows and for repelling moths, should be planted in sunny and dry places.

If growing *Rhodiola rosea* – it grows very slowly, and it might take at least four years before part of its root could be dug out for the preparation of a medicinal elixir.

The most significant cost item is herb seeds and seedlings. Any herb grower has to know where and how seeds and/or seedlings are bought, whether they are domestic or imported. Various plants and their seeds might not be appropriate for any climatic conditions and soils. Before growing herbs, the entrepreneur has to know in what soil the herbs are going to be grown and make sure the most appropriate conditions are available for the herbs. The purchase and distribution of seeds could be regulated by the national and international legal frameworks. The entrepreneur has to check on it before purchasing seeds and seedlings. For example, organic farms may use only certified organic seeds.

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Entrepreneurs share their experience:

„I purchased my first seedlings from the Skriveri Science Centre (it does not exist anymore). If you want to grow organic herbs, you have to get seeds from some organic farmer, as the seeds have to be certified as organic. If someone asks me for some seeds, I give the seeds, but not a large quantity because it involves manual work. I bought marjoram seeds from a farmer, and he has large fields with it. This farmer is experienced in growing herbs that do not grow in Latvia – the herbs are brought from Tibet, e.g. lavender”.

“There is no problem to buy seeds today”. There are websites where to buy. No problem – just pay and it is delivered to your door”.

Characteristics of equipment needed for herb production could be given in a table (see **Table 34**)

CHARACTERISTICS OF EQUIPMENT NEEDED FOR HERB PRODUCTION (TABLE 34)

Name of equipment	Model	Manufacturer/ supplier	Number, pcs.	Delivery period	Equipment cost, EUR

„To grow, harvest, dry out and sell herbs, entrepreneurs use special technologies. Many producers still use manual work; however, to grow herbs in large areas and be able to harvest the herbs fast, equipment is needed. Production cost increases if the quantity produced and the cropped area are small, yet it is offset if several dozens of hectares are farmed. Land is tilled, and herbs are sown by means of machinery. Some herbs, e.g. camomile requires specific tools to harvest it, and a dryer is needed, which allows drying the harvested herbs out fast and at high quality. If entrepreneurs package their produce themselves, appropriate equipment has to be bought.

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Drying herbs needs a dryer and a specially equipped facility:

„We took a loan for our facility – several thousands of lats. We had a bathhouse, which we reconstructed into a facility with a dryer, as the dryer was required. If herbs are grown in small quantities, it is home production, the requirements are not so strict, and it is possible to find a solution where to dry the herbs.”

„We received support from the government: in the very beginning, we prepared small project proposals for farm restructuring and submitted to the Rural Support Service. As regards herb production, we bought, for example, a pedestrian-controlled tractor and a mower for 700 lats.”

An entrepreneur admits that in recent years the farm became mechanised, yet planting, weeding and harvesting herbs still involve manual work. During a dry period, herb rows are trimmed. Loosening soil, herb leaves and flowers get covered with dust, and it is not all right. As regards the specific equipment bought, the farm acquired and mainly uses a tea siever, a tea sorter, a tea shredder and a semiautomatic dryer. Earlier, herbs were dried for a week, while now the herbs are ready for packaging within twenty-four hours.

Another farmer, sharing the experience, told that the beginning was tough. Herbs were shredded by hands. Some issue of the magazine „Praktiskais Latvietis” had a technical drawing of a special crude drug shredder. The farmer was inspired by the drawing and designed his own original variant.

Another farmer remembers that initially he harvested herbs together with his wife, cut them by scissors and dried on the balcony of their home. It was another production capacity when we bought a Swedish machine manufactured in 1936, which allowed shredding herbs 10 times faster. Now the farm is equipped with modern equipment for shredding, drying and packaging herbs.

The enterprise may not forget about new fixed assets: depreciation, transport, costs arising from purchasing and operating installation, maintenance and repairs.

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If no new equipment and other fixed assets are needed for herb production, the business plan has to describe the existing fixed assets and intangible assets:

- composition;
- percentage breakdown;
- value;
- technical characteristics;
- level of depreciation;
- need for repairs and reconstruction.

To specify the depreciation level of fixed assets, a depreciation ratio is calculated by equation:

$$\text{Depreciation ratio} = \frac{\text{Accumulated depreciation}}{\text{Initial value of the fixed asset}}$$

Characteristics of existing fixed assets could be given in a table (see **Table 35**).

CHARACTERISTICS OF FIXED ASSETS (TABLE 35)

FIXED ASSET OR A GROUP OF FIXED ASSETS	Initial value, EUR	Depreciation ratio	Annual depreciation, EUR			Remaining value, EUR		
			20__.	20__.	20__.	31.12.20__.	31.12.20__.	31.12.20__.

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This chapter deals with matters related to the expansion, modernisation or reconstruction of the existing facility, as well as the construction of a new production facility:

- availability of documentation;
- enterprises that are able to do construction and assembly works
- within the time limits;
- costs etc.

Based on the aggregated information, the business plan determines the need for additional equipment and fixed assets and intangible assets.

NEED FOR FIXED ASSETS AND INTANGIBLE ASSETS (TABLE 36)

LONG-TERM INVESTMENT	20__.	20__.	20__.	20__.	20__.
	operational, EUR	total need, EUR	increase, %	total need, EUR	increase, %
1. Intangible assets					
2. Fixed assets					
2.1. Land parcels					
2.2. Buildings, structures					
2.3. Equipment and machinery					
2.4. Vehicles					
2.5. Requisites					
2.6. Other					
Total					

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The description of the production process provides information about the **kind of production** and specify the **key operations of**

the production process that could be shown in a production process flowchart.

There are three major kinds of production:

- **individual production** – a kind of production, in which the products produced are different in terms of structure and size. The products are produced in one unit or a few units, and the output of the products is repeated infrequently or not at all;
- **serial production** – a kind of production, in which the products are produced in series that consist of the

same products in terms of structure and size. Product series are repeated after some period. The series could be classified by size: small, medium and large;

- **mass production** – a kind of production, in which one and the same product is manufactured within an unlimited period.

This means the choice of a kind of production is determined by several factors:

- product nomenclature – the names and kinds of products produced and their numbers. The broader the nomenclature, the less specialised the production process and the larger number of technological processes and operations;
- output of products in a certain period;
- nomenclature permanency level –

- production periodicity and regularity;
- workplace specifics – operations and technological processes are assigned to a particular workplace. If it involves a minimum number of operations, the production process is highly specialised. If it involves a lot of operations, the production process is broad in scope.

The choice of a kind of production depends on the need to balance the needs and possibilities of production of a product.

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The business plan has to specify the existing technologies:

- compliance of technologies with modern requirements;
- automation level of the production process;
- production process flexibility;
- possibilities to increase or decrease the output of products.

If it is intended to subcontract some of the production operations to other enterprises, it has to be stated in the business plan. The business plan has to justify the need for cooperation, as well as the choice of the particular partners. The business plan has to provide the following information about the subcontractors:

- name of the enterprise;
- location of it;
- works subcontracted and the terms
- and conditions of the execution of the works.



We have a field of 2.5 hectares where we grow milk thistle, northern dragonhead, calendula, oats, buckwheat, clover, hawthorn, common couch roots as well as nettle and mugwort. If we are not able to produce a sufficient quantity of some herb, we order the herb from other farms specialised in growing herbs and gathering wild herbs. For examples, we buy peppermint, camomile and marjoram from the farm "Dunduri". From the farm "Kurmīši", we buy sweet clover, melissa, anise hyssop, thyme etc. Juniper berries come from Estonia, while mistletoe greens from Lithuania, as they are included in the Red Data Book of Latvia.

The business plan has to describe how the production process is controlled and how the work safety and environmental protection regulations are complied with by the enterprise.

A plan for purchasing raw materials and other inputs could be summarised in a table (see **Table 37**).

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PLAN FOR PURCHASING RAW MATERIALS AND OTHER INPUTS (TABLE 37)

Kind of raw materials/ inputs	Producer/ supplier	January			February			...
		Required quantity in physical units	Price per unit, EUR	Cost, EUR	Required quantity in physical units	Price per unit, EUR	Cost, EUR	
Seed A	Supplier 1	10	100	10 000				
Fertiliser B	Supplier 2	100	200	20 000				

Those who just commenced growing herbs often face a problem – where to buy seeds in the required quantity. One of the most convenient ways is to order seeds online with trusted suppliers. Experienced professionals that are engaged in herb business recommend get familiarised with the assortment of seeds of suppliers and, if needed, place orders on:
<http://www.jelitto.com>
<https://b-and-t-world-seeds.com/>

Some farmer, sharing the experience, told:

It is not easy to work in this non-traditional industry. No information about the time when to sow. We learn everything by doing. It is also difficult to acquire seeds. If we see some needed herb by the roadside, we dig it out and try to propagate. For example, we tried to propagate restharrow for three years, but it has not yet acclimatised on our farm.

The farm „Rūķīšu tēja” describes the way its products are produced as follows:

The first stage involves sowing and planting:
 Every herb has its own requirements – they do not grow in any place. Soils of various types are at the disposal of the farm: sandy loam, loamy, sandy, gravelly and other types of soil. On the farm, the largest area is cropped with camomile, as the

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yield of this herb is the lowest, which requires the largest area for it. Some crops that have been planted by the farm represent an investment in the future because, for example, it takes up to three years to get the first harvest of mountain everlasting.

The second stage involves growing:

About 95 % of the herbs and fruits needed for tea production are grown in our fields in order to ensure high quality. Totally, the farm grows about 40 herbs. The herbs are mainly planted, weeded and harvested by hand. We fertilise our herbs a little bit – compared with fruit and grain production – a small quantity of fertilisers is applied, so that the herb gets the necessary nutrients and minerals. It is not possible to grow herbs without fertilisers for a long time, as **the third stage involves harvesting:**

There is the right time for every herb, which could not be missed. Every herb is carefully harvested and then dried to get good quality crude drugs and use the most valuable parts of them. Most of our herbs are harvested by hand, whereas camomile and peppermint are harvested in a mechanised way. In an area of 22 ha, the farm produces about 15 t of herb products.

Fourth stage – drying:

Herbs are dried in a dryer, which was constructed by the owners themselves. When drying, a temperature is set that allows maintaining the most valuable properties, aromas and colours of herbs as much as possible.

It is followed by the packaging and sale of the product.

The purpose of a **production programme** is to identify what kinds of products and in what quantities have to be produced in a particular period. A projection of output and sales is made based on the findings of market studies, which are harmonised with the production capacity of the enterprise. For this reason, the output could be equal or larger

than the sales volume projected. Otherwise, product inventory increases. The business plan has to specify data on output for every kind of products in physical units as shown in **Table 38.**

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PRODUCTION PROGRAMME (A PROJECTION OF OUTPUT) (TABLE 38)

Kind of products	Physical units	Output						
		20__.				20__.		20__.
		1	2	...	12	Half-year 1	Half-year 2	
Product A	kilogram							
Product B	pieces							
Product C	litres							
...								

The final part of the production plan ends with a projection of output. The projection of output for the first year of operation of the

enterprise has to be monthly, for the second year – semi-annual and for the third and next years – annual.

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PROJECTION OF COST FOR THE FIRST YEAR OF OPERATION OF THE ENTERPRISE (TABLE 39)

PRODUCTION COST	MONTHS								TOTAL
	1	2	3	...	10	11	12		
Seed (raw material, input) purchase cost									
Fertiliser purchase cost									
Plant protection product purchase cost									
Cost of outsourced services									
Remuneration for employees									
Employer taxes and fees paid on personnel									
Operating and repair costs of machinery									
Cost of fuel and lubricants									
Rental of premises, equipment and land									
Cost of electricity									
Cost of other utilities									
Operating and repair costs of production buildings									
Cost of deratisation and disinfection									
Cost of the clean-up and maintenance of the surrounding area									
Cost of work safety activities									
Cost of environmental protection activities									
...									
Total production cost									

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A few recommendations for production cost calculations.

Seeds could be bought through being exchanged for self-produced products or other products being at the disposal of the enterprise. The average seed rate per ha is determined based on the germinating power of the seeds and the economic utility of the seeds. The quantity of seeds required annually

is calculated by multiplying the area to be sown by the assumed seed rate. The value of self-produced seeds is estimated in market prices.

The need for **fertilisers** is estimated based on the nutritional needs of herbs to achieve an average yield.

The need for **plant protection products** is estimated based on the state of soil and other farming conditions.

In identifying the **cost of fuel and lubricants**, the following factors have to be considered:

- how economical is machinery;
- sufficiency of machinery;

- locations of the enterprise and its buildings and fields.

The expected consumption of lubricants has to be estimated based on the expected consumption of fuel. In terms of money, the consumption of lubricants makes up 5-7% of the consumption of fuel.

The cost of outsourced services (e.g. ploughing, surface-tillage etc.) depends on the availability of machinery at the enterprise.

Personnel remuneration for hourly work could be calculated by multiplying the number of hours worked by the hourly rate. It may not be less than the minimum rate set by the government for full-time employment. If it is piecework, the quantity of products produced is multiplied by the fixed piece rate. The calculations have to show the amount of hourly or piecework to be done.

Employer taxes and fees paid on

personnel represent employer social insurance contributions and the state fee of business risk.

The cost of fuel (firewood, coal, diesel fuel, natural gas etc.) is the cost relating to heating the production process and premises.

The cost of utilities represents the expenditures on heating, water supply, wastewater disposal, garbage collection and other utilities.

Operating and repair costs are planned for a particular situation, projecting the necessary amount.

The rental is set by mutual agreement between the owner and the lessee.

Transport costs include all the transport costs pertaining to the production process.

The amount of work to be done and the quantity of materials, which depend on the daily

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needs, have to be estimated in order to identify the **cost of the clean-up and maintenance of the surrounding area** (grassland mowing,

greenery trimming, driveway maintenance, collection of tree leaves, snow clearing, grassland establishment etc.).

7. ORGANISATIONAL PLAN

The chapter provides information on the employees engaged in the implementation of

the business plan, as well as the management of the enterprise.

Designing an organisational plan, answers to the following questions have to be provided:

- How many employees of what professions and qualifications are needed to ensure the effective operation and expansion of the enterprise?
- What functions every employee has to perform?

- What basic principles of personnel management are used in the enterprise?
- What motivations and for what purpose are used for the personnel?
- What are working hours?

Giving answers to the questions, it is advised to design a **personnel or organisational structure** and show the subordination and responsibilities of employees.

As regards the personnel, it is required to consider what training might be needed and that it could cost.



In summer, ten assistants intensively work in the meadows of the farm, who are transported by the farm owner from their homes to the farm early in the morning. They weed until dew disappears, then they gather herbs. Every summer month we have five school students on the farm, who are supported by the State Employment Agency.

However, another entrepreneur remembers that he hired two employees in the late 1990s after he had founded an enterprise, while in 2008 when a newly constructed facility was put into service, 10 more people were hired. The production premises and

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a storage room are 900 m² in floor space, the dryer, which can dry 1000 kg of crude drugs, is also of the same size.

Entrepreneurs tell that:

The main summer work done by a team of eight people involves gathering wild herbs in close and distant areas of Vidzeme region. We harvest about 300 kg of crude drugs every day, which is shredded and placed in the dryer on sieves.

Of course, one way or another, the entire family is engaged in the business. The family has three children – a daughter and two sons. During the busy season, we hire labourers. At present, we have two hired employees, while in summer we have from five to ten people, depending on the needs.

Besides, the chapter has to give answers to the following questions about the management of the enterprise:

- Who is going to manage the enterprise?
- What is a background (knowledge, experience) of the management in this particular business?
- If a team of management is organised, what are the functions and responsibilities of every team member?
- What is the number of equity shares owned by the management of the enterprise?
- What banks, consultancy centres, business centres and other institutions and organisations the management of the enterprise plans to cooperate with in order to get advice, to hold training and to make contacts with domestic and foreign partners?

A description of the management of the enterprise could be presented in a table (see **Table 40**).

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DESCRIPTION OF THE MANAGEMENT OF THE ENTERPRISE (TABLE 40)

Name of a department	Name, surname of the manager of the department	Experience and qualifications, specifying the length of service in the enterprise	Responsibilities	Number of equity shares owned

It is advised to include CVs of the management in an annex in the business plan.

This chapter has to have an **administrative cost plan** that includes all the administrative costs of the enterprise (see **Table 41**).

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ADMINISTRATIVE COST PLAN (OR A PROJECTION) FOR THE FIRST YEAR OF YEAR OF OPERATION OF THE ENTERPRISE (TABLE 41)

Items	Months												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Remuneration for the management													
Employer taxes and fees paid on the management													
Business trip costs													
Stationery													
Communication services													
Internet services													
Office equipment maintenance													
Office maintenance													
Postal services													
Costs of the press													
Seminars, courses													
Transport cost													
Lawyer services													
Consultancy services													
Auditor services													
Other administrative costs													
...													
Administrative costs, total													

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The administrative cost plan (projection) for the third and next years – annual. for the second year has to be semi-annual and

8. FINANCIAL PLAN

The financial plan represents a summary of the previous chapters, expressed in terms of money.

The financial plan shows:

- how much funds and in what period are needed to ensure the business idea is implemented?
- what are the expected results of the implementation of the idea?
- Designing a financial plan, several essential recommendations have to be considered:
- it is important the information presented in the financial plan is unbiased and real. Otherwise, the business plan loses its meaning;
- it is advised to design more than one business plan financial scenario, e.g.

- optimistic and pessimistic;
- the financial plan has to be periodically reviewed and, when necessary, corrected. The reasons for corrections could be changes in prices, costs, technologies, the market situation and taxes;
- all the targets of the financial plan have to be in line with the data and information presented in the other chapters of the business plan;
- entire set of assumptions, on which the projection is based, has to be specified.

The financial plan consists of:

- cash flow plan (or a projection);
- profit and loss plan (or a projection);

- projection of the balance sheet;
- assessment of financial performance.

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Designing the financial plan, the business plan has to reveal the assumptions, which the financial projection is based on, e.g.:

- national economic situation (inflation, overall growth in the industry);
- economic situation in foreign countries, which the enterprise plans to cooperate with;
- growth indicators of the enterprise;
- potential financial resources, their sources;
- price policy;
- market growth;
- legal acts, including those in the area of taxes, customs etc.

The purpose of a **cash flow plan** (projection) is to create confidence that the enterprise is protected from a cash deficit. The cash flow plan (projection) shows the amount of cash being transferred into and out of the enterprise during a certain period (see Table 42). Cash flow shows the real cash revenue and expenditure regardless of the source of cash – sales of products, sales of fixed assets, loans received – or expenditure on fixed assets bought, loans returned etc. The difference between incoming and outgoing cash flows is the cash balance over a certain period.

The purposes of drawing up a cash flow plan are as follows:

- enterprise owners are given an opportunity to accurately plan the operation of their enterprise and insight into the situation with cash revenue and expenditure in a longer period;
- for external investors, it shows the period and the way how to get back their investments.

At the initial stage of business, cash flow plays a greater role than an opportunity to earn profits does. For this reason, the calculations reveal the viability of the business. An enterprise that has commenced operation could have a large sales volume, but no cash revenue if the products are supplied to customers on an open account. If such an enterprise has not commenced its operation with a sufficient amount of current assets, it lacks cash to meet its liabilities. Its viability is endangered.

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Several considerations have to be taken into account when planning cash flow:

- the longer period it is, the less accurate projection is; therefore, the cash flow has to be planned for
 - first 12 months – for every month or even a shorter period, e.g. a week;
 - next years – quarterly or yearly;
- it is important to examine the cash flow within a day. The required amount of current assets depends on several factors:
 - period, within which cash is received from a customer, and when to make payments to suppliers and other creditors;
 - cash flow continuity;
 - probability of emergence of acute problems and opportunities;
- in identifying the amount of capital required to commence the operation of the enterprise, it is difficult to accurately determine the needed amount of current assets. A projection of cash flow allows predicting a potential cash deficit and the size of it.

As regards the cash flow, all the cash revenue has to be registered for the month when the cash was received. Cash expenditure has to be planned monthly. Cash expenditure has to be planned monthly – payments for resources or services needed for the business.

In a cash flow plan (projection), fixed asset depreciation is not registered on the expenditure side, indicating investments (including for the purchase of fixed assets) in

real prices instead.

If receiving a loan, the full amount of the loan has to be registered as revenue, while the outgoing cash flow includes the principal and interest gradually repaid.

It is desirable that the balance is positive at the beginning of a month, i.e. 15-20% of the monthly expenditure. This enables the enterprise to have cash reserves.

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The balance at the end of a period is calculated by equation:

$$\text{Balance at BEGINNING (month or year)} + (\text{Real cash REVENUE} - \text{Real cash Expenditure}) = \text{Balance at the END (month or year)}$$

The balance at the end of a period is always equal to the balance at the beginning of the next period:

$$\text{Balance at the END of the period} = \text{Balance at the BEGINNING of the next period}$$

If a negative balance occurs at the end of a month, one can conclude that the enterprise is not solvent in this period and a solution is required to it:

- loan is needed from a credit institution or other individuals;
- resources and services have to be bought on credit – on an open

account – in the period when the solvency of the enterprise improves, e.g. in the period payments are received for products sold.

Turnover in a period is calculated by subtracting expenditure in a particular period from revenue in the particular period. Turnover in a period could be negative if the incoming cash flow in a particular month has been

lower than the outgoing cash flow. This does not mean that the enterprise was insolvent in the particular period, as the expenditures were financed by the cash reserves available at the beginning of the period.

In estimating the cash flow, the following considerations have to be taken into account:

- does the enterprise have a positive cash flow?
- does the enterprise need additional

financing?
→ does the net profit change if using the additional financing?

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PROJECTION OF THE CASH FLOW FOR THE FIRST YEAR (TABLE 42)

Items	Months												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Balance at the beginning of a period													
Revenues													
Revenue from main activity													
Owner investment													
Loans													
Sold fixes assets													
...													
Other revenues													
Total revenue:													
Expenditures													
Repairs of premises													
Purchase of fixes assets													
Production costs													
Administrative costs													
Marketing communication cost													
Transport cost													
Packaging cost													
Storage cost													
Cost of risk reduction measures													
Principal repayment													
Interest repayment													
Employee training cost													
Taxes													
...													
Total expenditure													
Turnover in the period (revenue – expenditure)													
Balance at the end of the period													

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The purpose of drawing up a **profit or loss plan (projection)** is to identify the viability of the business. Profit or loss calculations give information about revenues and costs in a reporting period as well as the profit or loss made during the period (usually, a year).

The calculations show the part of profit to be taxed and the factors that increase or decrease it.

If the enterprise is a value-added tax payer, the profit or loss calculations show the revenue and expenditure exclusive of value-added tax.

If the enterprise is not a value-added tax payer, the profit or loss calculations show the revenue and expenditure inclusive of value-added tax.

All the plans of revenue and expenditure are summarised in a projection (see Table 43). It follows that the projection is made based on earlier projections and plans and indicate the overall economic performance of the enterprise.

Based on the data obtained, the management of the enterprise can analyse the expected performance and whether it is in line with the targets set. If the performance is poorer than it was projected, all the plans and projections have to be reviewed and corrected until the revenues and costs of the enterprise are consistent with the strategy of the enterprise.

In making a profit or loss projection, the following considerations have to be taken into account:

→ is it possible to improve the economic performance of the enterprise? How?

→ are all the services and products produced profitable?

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PROFIT OR LOSS PLAN (PROJECTION) (TABLE 43)

ACTIVITY	INDICATOR	YEAR 1	YEAR 2	YEAR 3
	1. Net turnover			
	2. Production cost of products sold + depreciation			
(1.) - (2.)=(3.)	3. Gross profit or loss			
	4. Marketing cost + depreciation			
	5. Administrative cost + depreciation			
(3.)-(4.)-(5.)=(6.)	6. Profit or loss from main activity			
	7. Other revenues			
	8. Other costs			
	9. Interest payments			
(6.)+(7.)-(8.)-(9.)=(10.)	(10.) Profit or loss before taxes			
	(11.) Taxes			
(10.)-(11.)=(12.)	(12.) Net profit			



New entrepreneurs usually commence their business full of enthusiasm, yet often they realise the efforts and resources invested are huge, the expected profit is not large enough and projectable, herb production is affected by such factors as climatic conditions that could not be influenced by the entrepreneur. Entrepreneurs share their experience: the plans might not be implemented, a herb harvest could be poor, the herbs are not possible to harvest and dry out, the quality of herbs depends on weather and growth conditions. Sometimes growing a few herb species is safer, while sometimes diversification and risk-taking pay off. Entrepreneurs usually diversify their production, also offering herb baths and educational seminars. Small entrepreneurs try to do everything themselves; this, in its turn, limits their potential output and often rely on success. Herb growers usually cooperate, selling raw materials to one another.

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An entrepreneur shares her experience:

„I mainly produce raw materials. I gather, shred and dry the herbs myself. I try to sell my products in large sacks to processors as much as possible. The factory did not buy anything from me last year, let us see what happens this year. Last year, there was a company that needed the produce in large quantities. We bargained over the price for a long time, yet, finally, we reached an agreement. Now I can sell my produce to another herb grower, as she cannot produce the required quantity herself. She buys some 150 kg of raspberry leaves, and it is a significant quantity for me.”

Economic activity could be affected by unpredictable conditions, e.g. a fire destroys the premises and produce, which requires investment in restoring the facility. It is difficult for small entrepreneurs to make cash reserves, and risk could be substantial in unforeseen circumstances.

A **balance sheet** is a report showing cash reserves (assets), borrowed capital and equity capital at the beginning and end of a reporting period. Assets are composed of fixed and current assets of an enterprise. Liabilities indicate the proportions of borrowed and own

capital.

A balance sheet could be drawn up only after the other components of the financial plan have been designed and could be presented in a table (see **Tables 44** and **45**)

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PROJECTION OF BALANCE SHEET ASSETS (TABLE 44)

ASSETS	YEAR 1	YEAR 2	YEAR 3
1. LONG-TERM INVESTMENT			
Intangible investment			
Fixed assets			
Long-term financial investment			
2. CURRENT ASSETS			
Inventory			
Accounts receivable			
Short-term financial investment			
Cash			
TOTAL assets			

PROJECTION OF BALANCE SHEET LIABILITIES (TABLE 45)

LIABILITIES	YEAR 1	YEAR 2	YEAR 3
1. EQUITY CAPITAL			
Share capital			
Reserves			
Retained profits of previous years or uncovered losses			
Profit or loss of the reporting year			
2. RESERVES			
3. CREDITORS			
Long-term creditors			
Short-term creditors			
TOTAL liabilities			

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The balance sheet includes only the **value of owned land**, based on inventory data. Fixed assets (buildings, structures, machinery and equipment) have to be estimated either in purchase prices or in construction costs. The balance sheet has to show the value of fixed assets of respective groups as of the beginning of the period. If it is not planned to change the composition of fixed assets in the reporting period, their value at the end of the period decreases by the **amount of depreciation deductions**.

The following items have to be registered if planned receivables change during a period:

- receivables recovered during the period that reduce the debt balance as of the end of the period;
- new receivables that have incurred

The **cash balance** at the beginning and end of the period has to be equal to the respective cash balance in the cash flow plan (projection).

The **balance sheet** has to show the loan principal balance as of the beginning and end of the period.

Short-term loans are those to be repaid within a year. Wages, tax debts, debts to

Purchased inventories are valued in purchase prices, while self-produced ones – in market prices.

Investment in land for the next harvest or **unfinished agricultural production** are, actually, a kind of inventory, which has to be accounted for to identify the part of costs pertaining to agricultural production in the reporting period.

Accounts receivable occur in situations where the enterprise has made advance payments or supplied its products or services, but no payments have yet been received.

during the period that increase the debt balance as of the end of the period.

suppliers and loans for current assets pertain to this category.

Long-term loans have to be repaid within a period of more than a year.

The loan principal balance as of the end of the period, compared with that as of the beginning of the period, decreases by the amount of principal repaid during the period.

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When planning, it is important to remember that the products pertaining to profit or loss calculations are not the same as those pertaining to the cash flow because:

- inventory from previous periods could be sold during the period;
- part of the products produced during

the period could be unsold, which has to be reported as inventory as of the end of the period.

A relation between sales volume and output is identified based on change in the value of inventory. The value of inventory as of the beginning and end of the period is shown

in the balance sheet.

If the real result is not in line with the planned one, the designer of the business plan has to review the functional plans.

Making a projection of the balance sheet, it has to be considered:

- is the solvency of the enterprise is sufficient?
- can the enterprise repay its short-term liabilities within the scheduled time and in full amount?

- is the cash flow of the enterprise is sufficient?
- does the return on investment satisfies the owners?



It has to be taken into account that any business requires large investments. First of all, the financial possibilities and the market have to be examined. The enterprise annually invests thousands of euro, the investments are required for particular projects, e.g. a dryer.

There is a fairy tale about three brothers who walked down the road. One of them heard that someone in the forest screamed and, in spite what the other brothers said, entered the forest and found an axe that could cut anything. In this way, he found three good things. The same pertains to people living in countryside – there are a lot of people who just sit in front of a TV set and do not want to go to seminars, as they believe they know everything anyway. If you want to do business, the ears and eyes have to be pointed towards different directions. Instead of surfing the Internet and playing computer games, which is usually observed in rural areas

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when there is a shortage of money, people have to examine the situation, learn a foreign language, see what happens abroad, what things cost and go to seminars. There are a lot of opportunities, people only have to be open and wish to do something. Many people do not start up business, as they prefer doing nothing.

If the cash flow reveals that own funds are not sufficient to implement the business idea or business expansion, or it was known before the business plan was developed that external financing was necessary, the financial plan has to also show:

- need for finance (the amount of finance needed and for what purposes, e.g. the purchase of a new fixed asset, repairs of premises);
- choice of the source of finance (why

the entrepreneur, the author of the idea prefers a particular source of finance, e.g. for an investment loan);

- terms and conditions of financing.

The need for finance could be shown in table (see **Table 46**).

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NEED FOR INVESTMENT AND THE SOURCES OF FINANCE (TABLE 46)

INDICATOR	AMOUNT, EUR						
	20__.				20__.		20__.
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Half-year 1	Half-year 2	
Need for investment, total							
including: <ul style="list-style-type: none"> ▶ repairs of premises; ▶ purchase of fixed assets etc. 							
Finance available, total							
including: <ul style="list-style-type: none"> capital and loans acquired: <ul style="list-style-type: none"> ▶ loans; ▶ sale of new capital shares; ▶ EU funding; ▶ foreign investment etc. own capital: <ul style="list-style-type: none"> ▶ retained profits from previous years; ▶ reserves; ▶ depreciation deductions etc. 							

The business plan has to specify the terms and conditions of financing (see **Table 47**).

CHARACTERISTICS OF TERMS AND CONDITIONS OF FINANCING (TABLE 47)

Name of the creditor	Date of receiving a loan	Kind of loan	Loan term, months	Loan granting terms	Loan repayment terms	Annual interest rate, %	Collateral
X bank	First month of operation	Investment loan	36	A business plan has to be drawn up and collateral is needed	Principal has to be paid twice a year, while interest – every month	12	Real property

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The business plan has to present a loan (including interest) repayment schedule.

Every component of the financial plan does not give complete insight into the viability of the business. It could be acquired if examining

interrelations among individual components of the financial plan, which means that it is necessary to do an analysis of the planned financial performance.

It is advised that the business plan focuses on the following indicators:

- | | |
|-----------------------------------|-----------------------------------|
| → breakeven point; | indicators; |
| → financial reserves; | → profitability indicators; |
| → liquidity indicators; | → efficiency indicators of use of |
| → financial stability or solvency | enterprise funds. |

To make conclusions in relation to the indicator values, comparisons could be made with:

- | | |
|--------------------------------------|-------------------|
| → ideal level, in any; | available; |
| → previous periods if information is | → industry level. |

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9. POTENTIAL RISKS

An examination of business risks helps to assess the viability of the business. If there are a lot of risks and the probability of occurrence of risks is quite high and the amount of potential damage is quite large, it is worth rethinking the implementation of the idea.

Entrepreneurship always involves risks. Any entrepreneur is subject to a greater or smaller risk. However, the task of an entrepreneur is not to avoid the risk or seek safer, riskless economic activities, as such an approach goes

beyond the boundaries of entrepreneurship. The entrepreneur has to be able not to avoid but manage the risk.

Risk management is a process that helps to effectively reduce the probability of losses. The goal of risk management is to ensure normal functioning of the enterprise. The goal could be achieved by identifying potential risks and designing a set of measures to avoid them, thereby reducing potential financial losses.

Effective risk management assists in:

- | | |
|---|---|
| → raising confidence that the desired goals and results are achieved; | up to an allowable level in an effective way; |
| → ensuring that threats are minimised | → raising the quality of decision-making. |

In the business plan, the process of potential risk management has to be commenced with **risk identification**. The key task at this stage is to define risk assessment boundaries, identify real and potential threats as well as classify the threats. In identifying risks, it should be remembered that the risks are caused by almost every circumstance. For this reason, the purpose of risk identification is to determine the risks that have to be certainly managed in the particular enterprise. Otherwise, a list of risks is created, with hundreds risks, and the entrepreneur is either afraid of further business expansion

or understands that it is simply impossible to manage so many risks. For this reason, in the very beginning as narrow assessment boundaries have to be set as possible in order to focus on the most significant risks. One of the first decisions to be made is to whether focus on internal or external risks, or to focus on only one of them. One can say, a priori, compared with the other risks, the internal risks of the enterprise is easier to manage. Accordingly, if there are no substantial arguments for the existence of very significant external risks, the enterprise has to focus on internal ones.

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Usually, brainstorm sessions are carried out to identify risks. It is a very creative process, which results in multifaceted insight into real and potential risks.

Identifying risks, the following questions have to be answered:

- what might happen?
- where and when it might happen?
- how and why it might happen? or what are the causes of the risk?

After the potential risks have been identified, it is required to classify them.

Risks could be classified by various features. In the business plan, risks could be classified by the following features:

- **by risk source:**
 - ▶ natural risk – related to natural forces (earthquakes, floods, storms, epidemics etc.);
 - ▶ technological risk – it is caused by any chemicals and inflammable substances, as well as equipment and machinery breakdowns;
 - ▶ economic risk – it is caused by an economic recession, competition, inflation, a deteriorating economic situation in the country;
 - ▶ political risk – caused by corruption, bureaucracy etc.;
 - ▶ military risk – caused by a military intervention of another country, terrorism;
 - ▶ medical risk – a risk caused by an epidemic, a pandemic, disease spread etc.;
- ▶ religious risk – a risk caused by disagreements among various religions;
- **by kind of business:**
 - ▶ financial risks – interest rate risks, liquidity risks, exchange rate risks, credit risks;
 - ▶ legal risks – related to low-quality legal acts, unexpected amendments in legal acts;
 - ▶ commercial risks – related to change in the market situation (demand and supply);
 - ▶ insurance risks – related to insurance funds etc.;
 - ▶ investment risks – related to uncertainty in the field of investment;
 - ▶ innovation risks – those beginning with the idea trough to sales in a market.

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In the business plan, risks could be classified into four categories (see Figure 7):

- operational risks;
- accidents risks;
- entrepreneurship risks;
- financial risks.

OPERATIONAL RISKS	ENTREPRENEURSHIP RISKS
enterprise- and management-related risks information security risks production, process and productivity risks business interruption risk profit loss risk project activity risk contract and responsibility risks supply risk crisis situation risk illegal activity risk	entrepreneurship expansion risks entrepreneurship environment risks market risks technological risks political, economic, cultural and legal act risks global climate change, epidemics and other phenomena
ACCIDENT RISKS	FINANCIAL RISKS
work safety and health risks employee safety risks environmental risks fire and other accidents natural disasters territory security risks	liquidity risks exchange rate risks interest rate risks credit risks

Fig. 7. Risk categories and the risks contained therein

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Individuals who wish to engage in herb production for profit-making purposes have to understand that this is a specific area involving both risks typical of business and specific risks. The most widespread ones are as follows:

- ▶ *natural risks (weather conditions, pests, floods etc.);*
- ▶ *problems with drying and storing herbs (choice of technologies, pest control);*
- ▶ *limited availability of seasonal employees;*
- ▶ *lack of awareness of controlling institutions about the situation, too high requirements;*
- ▶ *sudden changes in the tax policy and amendments in the legal framework for the environment for entrepreneurship;*
- ▶ *inhomogeneous demand;*
- ▶ *inability to produce a constant quantity over a long period;*
- ▶ *lack of areas for gathering wild herbs and the limited availability of herbs due to intensive agriculture;*
- ▶ *availability of cheaper products in the market.*

The result of the risk identification stage is a high-quality risk portfolio, which could be presented in a table (see **Table 49**).

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CHARACTERISTICS OF RISKS (EXAMPLE) (TABLE 49)

KIND OF RISK (CATEGORY)	NATURE OF THE RISK	CAUSE OF THE RISK	RISK-CAUSED CONSEQUENCES OR LOSSES
Entrepreneurship risk	Risk of unfavourable weather conditions	Global climate change	Low-quality of herbs and the loss of a harvest. Herbs could not be harvested in time. High moisture content.
ACCIDENT RISK	THEFTS, DAMAGES	DISLOYAL EMPLOYEES; AN INCOMPLETE ACCOUNTING SYSTEM; TERRITORY SECURITY GUARD IRRESPONSIBILITY, NEGLIGENCE	MATERIAL AND FINANCIAL LOSSES
...			

Besides the characteristics of identified and classified risks, the losses or risk consequences have to be examined **qualitatively**.

Risk-caused losses (consequences) could be classified into five categories:

- **material losses** – direct losses expressed in physical units (e.g. damages to buildings, structures, communication equipment, products, semi-finished products, materials, raw materials, components etc.);
- **work losses** – losses of working time due to accidental or unexpected circumstances (measured in man-hours);
- **financial losses** – due to a loss of funds (e.g. payments, fines, additional taxes, exchange rate or securities losses). The losses might be incurred due fully or partly uncollected accounts receivable;
- **time losses** – in case business occurs at a slower pace than projected in the business plan (measured in hours, days, ten-day periods, months etc.);
- **specific losses** – losses related to damages done to the health and lives of individuals, the environment, the prestige of the enterprise, as well as other unfavourable, moral and psychological factors.

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Losses due to risks could be also classified by cause: direct and indirect. Direct losses arise from the direct consequences caused by a risk.

Direct losses include:

- | | |
|--|---|
| <ul style="list-style-type: none"> → losses caused to property; → losses caused to the health and safety of employees; → losses caused by the irresponsibility of | <ul style="list-style-type: none"> an entrepreneur; → losses caused to leading specialist and the management of enterprise. |
|--|---|

Direct losses are usually followed by indirect ones. Indirect losses include:

- | | |
|--|--|
| <ul style="list-style-type: none"> → business revenue losses, e.g. due to low herb yields; → extra business costs incurred due to the avoidance of direct risk | <ul style="list-style-type: none"> consequences; → fines; → loss of reputation in the business world. |
|--|--|

It is usually difficult to estimate indirect losses, compared with direct ones. Indirect losses could be remote from their cause. No one knows how long a recovery period after

the occurrence of a risk and the related higher cost period might last. It is easier to estimate direct losses.

After the risks have been identified and classified, a risk assessment has to be performed. Being aware of not being able to foresee all risk situations, it is important for the entrepreneur to answer at least two questions:

- | | |
|--|---|
| <ul style="list-style-type: none"> → how high could be the probability of occurrence of a risk? | <ul style="list-style-type: none"> → what and how large losses or damage to business a risk can cause? |
|--|---|

A risk assessment scale has to be created for **risk assessment** based on the information presented in **Table 50**.

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RISK ASSESSMENT SCALE: EXAMPLE 1 (TABLE 50)

Component	Rating	Explanation	Risk characteristics	
Probability of occurrence of a risk	1	impossible	Once in 50 years or less frequently	< 10 % probability
	2	rarely possible	At least once in 5 – 10 years	10 – 35 % probability
	3	almost possible	At least once 1 – 5 years	35 – 65 % probability
	4	possible	At least once a year	65 - 90% probability
	5	often/certainly possible	At least once a month	90 % probability
Potential loss	1	insignificant	Financial losses are less than X EUR; Local media focus on the problem, causing a short-term effect; No traumas to employees or third individuals; Some employees are unsatisfied.	
	2	small	Financial losses from X to Y EUR*; Lost reputation in the local area; Minor traumas to employees or third individuals; General moral problems to employees and an increase in employee turnover.	
	3	medium	Financial losses from X to Y EUR*; Short-term negative news in the national mass media; Ambulatory treatment is necessary for employees or third individuals; Widespread moral problems to employees and an increase in employee turnover.	
	4	large	Financial losses from X to Y EUR*; Lasting negative news in the national mass media; loss of a considerable market share; Limited stationary care for employees or third individuals; High turnover of experienced employees; a few high-level leaders quit.	
	5	very large	Financial losses X EUR* or more; Negative news in the mass media – long-lasting and at international level, the loss of market share; Criminal proceedings and fees, imprisonment of the leaders; Major traumas to employees or third individuals or death; Several high-level leaders quit.	

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— CONTINUATION OF TABLE 50

Risk effect, the period	1	very low	it takes long, more than a year or longer
	2	low	it takes several months
	3	medium	it takes a few months
	4	high	it takes a few days, less than a week
	5	very high	it takes a short time, momentary, no warnings or too few warnings

Explanation: *Financial losses in euro are estimated by every entrepreneur based on the financial possibilities.

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Table 51 shows an example of a risk assessment scale.

RISK ASSESSMENT SCALE: EXAMPLE 2 (TABLE 51)

Component	Rating	Risk	
		characteristics	explanation
Probability of occurrence of a risk	1	very low	once in 30 years
	2	low	once in 7- 15 years
	3	insignificant	once in 4-7 years
	4	medium	once in 2-4 years
	5	high	once a year
	6	very high	several times a year
Potential loss	1	insignificant losses	< 1000 EUR a year
	2	small losses	~ 5000 EUR a year
	3	allowable losses	~ 10 000 EUR a year
	4	medium losses	~ 15 000 EUR a year
	5	large losses	~ 20 000 EUR a year
	6	very large losses	> 25 000 EUR a year
Risk effect, the period	1	could occur in a long period, giving an opportunity to limit the effect	occurrence of a risk is known several months/years in advance
	2	occurs fast, yet the effect is observed over several reporting periods; early warning possibilities are limited	an event, which incurs costs over a certain period
	3	occurs suddenly, the effect is observed immediately	no warning

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Based on the above risk assessment scale, the risks identified have to be assessed for every component individually – the probability of occurrence of a risk, potential losses and the effect period. This analysis helps to identify the most important risks, which could be later

compared among one another.

In order for a risk assessment to be high-quality and accurate, it is necessary to calculate a total score for every risk, which indicates the risks being the most significant. The total score for every risk is calculated by **equation**:

$$B_k = (B_1 + B_2) \times B_3$$

where B_k – total score for the risk;

B_1 – probability of occurrence of a risk;

B_2 – risk effect period;

B_3 – potential losses.

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EXAMPLE OF AN ASSESSMENT OF IDENTIFIED RISKS (TABLE 52)

No.	Risks	Probability of occurrence of a risk (B_1)	Risk effect period (B_2)	Potential loss (B_3)	Calculation	Total score (B_k)
1.	Risk of new competitors entering the market	2	2	5	$(2+2) \times 5$	20
2.	Decrease in market demand	3	2	3	$(3+2) \times 3$	15
3.	Employee irresponsibility, negligence	6	3	2	$(6+3) \times 2$	18
4.	Failures and breakdowns of machinery and equipment	2	3	3	$(2+3) \times 3$	15
5.	Inappropriate raw materials	5	2	2	$(5+2) \times 2$	14
6.	Risk of making damage to the environment	2	2	4	$(2+2) \times 4$	16
7.	Increase in unforeseen costs	6	3	2	$(6+3) \times 2$	18
8.	Unfavourable changes in taxes amendments to the legislation	3	2	2	$(3+2) \times 2$	10
9.	Thefts, damage	6	3	2	$(6+3) \times 2$	18
10.	Risk of unfavourable weather conditions	6	3	4	$(6+3) \times 4$	36

The larger the score, the more significant the risk; therefore, the high priority risks given in the example are the risk of unfavourable weather conditions (36), the risk of new competitors entering the market (20), employee irresponsibility, negligence (18), thefts, damage (18) and increase in unforeseen costs (18).

The risks identified in the business plan could be depicted in a risk map. A **risk map** is made based on two parameters: probability of occurrence of a risk and potential losses (see

Figure 8).

The red and dark red areas in the risk map represent the risks to be tackled immediately, as the consequence might be catastrophic. The **critical risk area** represents potential losses that are larger than the estimated profit, while in the worst situation the losses could reach the expected amount of revenue. The **catastrophic (unallowable) risk area** represents potential losses that exceed a critical level and, at worst, the losses could reach the value of property

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owned by the entrepreneur. The catastrophic risk unavoidable leads to the collapse, bankruptcy and liquidation of the enterprise. The catastrophic risk represents situations where the lives of people are endangered or environmental catastrophes are possible. The yellow and green areas represent the risks causing less problems, yet the enterprise may not forget about these risks. The **low**

(minimum) risk area shows a relatively low level of losses. In the elevated-risk area, losses exceed the profit or are equal to the profit. At worst, the entrepreneur risks being able to cover only business expenditures, while at best – the entrepreneur earns some insignificant profit, which is not enough to repay loans or expand the business.

1 - 9 low (minimum) risk		POTENTIAL LOSSES					
		POTENTIAL LOSSES					
10 - 18 - medium (elevated) risk		POTENTIAL LOSSES					
19 - 27 - high (critical) risk		insignificant 1	small 2	allowable 3	medium 4	large 5	very large 6
28- 36 - very high (catastrophic) risk		insignificant 1	small 2	allowable 3	medium 4	large 5	very large 6
PROBABILITY OF OCCURRENCE OF A RISK	very high 6	6	12	18	24	30	36
	high 5	5	10	15	20	25	30
	medium 4	4	8	12	16	20	24
	insignificant 3	3	6	9	12	15	18
	small 2	2	4	6	8	10	12
	very small 1	1	2	3	4	5	6

Fig. 8. Risk map

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1 - 9 low (minimum) risk		POTENTIAL LOSSES					
		POTENTIAL LOSSES					
10 - 18 - medium (elevated) risk		POTENTIAL LOSSES					
19 - 27 - high (critical) risk		insignificant 1	small 2	allowable 3	medium 4	large 5	very large 6
28- 36 - very high (catastrophic) risk		insignificant 1	small 2	allowable 3	medium 4	large 5	very large 6
PROBABILITY OF OCCURRENCE OF A RISK	very high 6		3; 7; 9				10.
	high 5		5.				
	medium 4						
	insignificant 3		8.	2.			
	small 2			4.	6.		1.
	very small 1						

Numbers of identified risks:

1. - Risk of new competitors entering the market
2. - Decrease in market demand
3. - Employee irresponsibility, negligence
4. - Failures and breakdowns of machinery and equipment
5. - Inappropriate raw materials
6. - Risk of making damage to the environment
7. - Increase in unforeseen costs
8. - Unfavourable changes in taxes and amendments to the legislation
9. - Thefts, damage
10. - Risk of unfavourable weather conditions

Fig. 9. Example of a risk map

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The risk map (**Figure 9**) shows that out of ten risks identified, five ones are in the elevated-risk area, while the risk of unfavourable weather conditions is in the catastrophic risk area.

After the risks have been assessed, a **risk score analysis** has to be performed at the third stage of risk management – the risks have to be compared with risk acceptance

standards or acceptability criteria. They help to define various risk levels, e.g. insignificant, high and unallowable risks. Analysing the risk scores, the entrepreneur decides which risks require risk reduction measures and which not. The risks that exceed the acceptable risk level set by the entrepreneur have to be certainly reduced, and the higher the risk, the earlier it has to be done.

The information presented in **Figure 10** could be used in determining which risks require risk reduction measures and which not.

RISK RATING	MEASURES	RISK FINANCING
Very high (catastrophic) risk	Risk reduction measures are required	Risk transfer
High (critical) risk	Risk reduction measures are required	Risk retention or transfer
medium (elevated) risk	Risk requires being careful	Risk retention or transfer
Low (minimum) risk	No direct measures are required	Risk retention

Fig. 10. Recommended actions in risk management depending on the risk rating

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The final risk management stage to be shown in the business plan is the **development of risk reduction measures**. Such measures could be divided into three categories: **preventive, administrative and compensatory**:

→ **preventive risk reduction measures** – timely precautionary steps aimed at avoiding disastrous events and potential losses, e.g. the observance of work safety regulations and fire safety regulations, the establishment of reserves (e.g. seeds, fuel), the construction of a land amelioration system, the installation of an alarm system, the diversification of suppliers, the collection and analysis of information, market studies etc.;

→ **administrative risk reduction measures** – the measures are taken by the national or local governments in order to control the disastrous spread of damages;

→ **compensatory risk reduction measures** – aimed at partially compensating for the damage, e.g. insurance, the establishment of reserve funds for covering losses caused by risks, national subsidies etc.

In risk management, the main focus has to be placed on preventive measures aimed at reducing the probability of occurrence of risks. Both technical and organisational measures could be taken to reduce risks. The choice

of a measure mainly lies in the cause of the risk. What is the most important – the real capability of the chosen measure to reduce the risk has to be evaluated.

The following risk management techniques are distinguished:

→ **avoidance or refusal of the risk**. This risk management technique is very effective if there is a high probability of incurring losses and a large potential loss, and the avoidance of risky situations is the best and the only real alternative;

→ **risk assumption by oneself** – losses

are covered by the enterprise's own funds;

→ **avoidance of losses** – measures are taken to reduce the probability of occurrence of risks. The application of the technique is associated with the development and introduction of preventive measure programmes,

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the implementation of which has to be controlled and periodically revised, given the changes that have occurred;

- **reduction of losses** – measures aimed at reducing the potential amount of a loss. To reduce a potential loss, the enterprise has to focus on minimising negative activities that incur losses;
- **insurance** – the enterprise

participates in covering losses through transferring responsibility for a risk to an insurance company;

- **self-insurance** – own security funds are created to cover losses incurred;
- **risk transfer other than insurance** – e.g. hedging – protection against losses, conclusion of premises rental contracts.

A herb grower admits that

herb business is unstable. Entrepreneurs are dependent on both weather conditions and policy makers who often prefer prohibiting something rather than making efforts to make the laws passed work in the interests of Latvian farmers. That is why it is all right that after a severe winter and a dry summer when the harvest is not good I earn revenue from a veterinary pharmacy and a bee wax facility. This means entrepreneurs who are engaged in herb production have to consider the diversification of their farm business.

Designing risk reduction measures, the entrepreneur has to take into account the fact that the implementation of the measures involves investments; therefore, the costs of risk avoidance and reduction have to be

budgeted in parallel.

It is advised to present the measures aimed at reducing the risks identified in a table (see **Table 53**).

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MANAGEMENT OF THE RISKS IDENTIFIED (TABLE 53)

RISKS	RISK REDUCTION MEASURES	PROJECTION OF RISK AVOIDANCE COST, EUR
Thefts, damage	Insurance; more strict control; introduction of a security system	1500.00
Failures and breakdowns of machinery and equipment	Machinery/equipment checks; employee instruction	500.00
...

ANNEXES

Annexes include copies of the documents, schemes, tables, diagrams, market studies, competitor analyses, contracts, licenses, certificates, patents etc. supporting the facts and findings presented in the business plan.

Annexes usually contain materials that do not necessarily have to be placed in the body

text of the business plan. Only the documents that can create the interest of potential investors have to be placed in the business plan. The other documents could be described in brief. The body text of the business plan have to refer to the annexes.

It is advised to place the following documents in annexes:

- CVs of the management;
- results of market analyses;
- product specifications, photographs;
- advertisement prospectuses;
- map with the location of the enterprise;
- rental contracts;
- most important contracts – business deals, raw material supply contracts, cooperation agreements, insurance

- contracts etc.;
- patents, licences etc. that belong to the enterprise;
- articles about the enterprise;
- production cost calculations;
- previous year annual reports etc.

