Mendel University in Brno
Faculty of Business and Economics

Cost Management of Selected Company

Bachelor thesis

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Abstrakt

Cílem bakalářské práce je analyzovat nákladový management v Zemědělském obchodním družstvu Kolinec v období 2009 – 2013. Bakalářská práce je rozdělena do dvou částí, teoretické a praktické. Teoretická část se zabývá objasněním pojmu nákladů, jejich klasifikací, kalkulacemi, kalkulačními metodami a systémem.

V praktické části bude zvláštní pozornost věnována kalkulacím, které se budou podrobně zabývat jednotlivými nákladovými položkami a přiřazování nákladů k jednotlivým kalkulačním položkám v rostlinné a živočišné výrobě. Vybrané výkony z rostlinné a živočišné výroby budou přepočítány a jejich výsledky analyzovány a zhodnoceny.

Klíčová slova

Náklady, kalkulace, kalkulační systém, kalkulační metody, kalkulační jednice.

Abstract

The aim of the Bachelor Thesis is to analyse the cost management of ZOD Kolinec and their costing system. The observed years for the analysis are the period of five years from 2009 to 2013. The Bachelor thesis is divided to two parts. The first part is the theoretical part which clarifies the terms of costs, classification of costs, costing methods and costing systems.

In the practical part, there are used some of the costing methods which are described in the theoretical part. The costing method of crop production and animal husbandry is examined and detail explained the each of costing item. Further the selected outputs of each category are recalculated and in detail analysed and evaluated.

Keywords

Costs, costing, costing systems, costing methods, costing unit.

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1 Introduction

The cost and its management is one of the main issues, which the managers have to deal with. The aim of cost management is the optimization of costs, not just costs minimization. The important thing is to use the costs effectively and efficiently. For example the fixed costs, these costs are not possible to lower, they are stable in the short period of time, so to minimize these costs are not physically possible. On the other hand, if the capacity will be full, the proportional fixed costs of one unit of output decrease. This can be one of the tool to optimize the costs, which leads to lowering the fixed costs and finally by fulfilling these objectives and the main objective, which is the profit maximization, can be achieved. This is the basic principle of doing business. Each owner of the enterprise is looking for the most satisfying way to fulfil this aim. The efficient cost management is one of the tool, how to be successful in profit maximization. There is several ways how to fulfil this objective. These ways are to use efficiently and effectively all economic sources which will lead to costs minimization and right costs management.

In the agricultural production, the situation is a little bit different, there are forces, which human being cannot influence and these forces are the weather conditions. For this reason there are couple of problems, there is a big difference in every year production, because of the influence of weather. There is a time difference between time when the resources were put into the production and between the products are obtained the time difference is approximately half a year. Planning the revenues is impossible, because the lack of knowledge of future prices. These are influence by demand and supply, the problem is when the harvested production is higher in physical units, the prices are usually lower, because the competitors have usually also the higher production.

2 Objectives and methodology

The objective of the bachelor thesis is to evaluate the cost management in a selected company and propose the possible measures for its improvement. Further the objectives are to scrutinize the costs management of ZOD Kolinec, their system of costing and techniques of assigning the costs to the outputs and the costs allocation.

The theoretical part of Bachelor Thesis examines the definition of the term costs, the classifying costs from different perspective. Further the theoretical part consists of specification of assigning and allocation of costs and principles of costing for different purposes with the closer look to the costing in agriculture business.

The practical part examines the cooperative. The main objective consist of analysing the costing system already used in ZOD Kolinec, explained costing method, which has been used to calculate the unit costs, further the dissection of each item of their costing is done.

The costing of the selected outputs of the crop production and animal husbandry are analysed and compared with the recommendation of the Authors who are concern with this problems, Poláčková and Novák.

On request of management of ZOD Kolinec, there will be the proposal of the way of calculation of own costs in ZOD Kolinec. The base for the right estimation of the costs shall be the several years' average of the costs of analysed costing. Using this technique, the weather influence of the agriculture production shall be restricted.

The materials of the practical part of the bachelor thesis are the intercompany documents of ZOD Kolinec. These are the profit and loss statement of the whole company as well as; profit and loss statements of each output, the costing lists made by the company, turnover list of animals, other intercompany documents and the information given by the management of the cooperative. The bachelor thesis deals with the costing in ZOD Kolinec in the period of 5 years, 2009 - 2013. The cooperative already has their costing system; in the bachelor thesis the analysis of this costing system is made, analysed and compared with recommendations of authors dealing with the same issues. For this purpose the costing of animal husbandry and the crop production is done. The general costing formula is:

$$\begin{aligned} &Material\ purchased \\ &+ \text{Inputs of own production} \\ &+Other\ direct\ costs\ and\ services \\ &+Personal\ expenses \\ &+Depreciation\ of\ \ tangible\ assets \\ &+ \text{Depreciation of adult breeding animals} \\ &+Internal\ work\ and\ services \\ &+\ Production\ overhead\ expenses \\ &+Overhead\ administrative\ expenses \\ &=\ Total\ costs \end{aligned} \tag{1}$$

The general formula of costing is used for all agricultural production. The item material purchased is seeds and planting, fertilizers in the case of crop production, feed, and bedding purchased in case of animal husbandry. These are also other direct purchased materials. Inputs of own production are all the own resources used for the production, these might be feed and bedding owned, seeds owned, owned fertilizers, which are farm manure. Other direct costs and services are costs of electricity, costs of pharmaceuticals, costs of protective substances and other items, insurance, rent, taxes and other costs of services needed for production process. Personal expenses are the costs of labour; these are wages the social insurance and the health insurance paid by employer and all kinds of benefits which the employer gives to the employees. Depreciation of tangible assets is costs of accounting depreciation and amortization of building, machinery, equipment and other tangible assets used in the production. The accounting depreciation of adult breeding animals belongs to the item depreciation of adult breeding animals. The item internal work and services contains of costs of workrooms, repairs, costs of mechanization etc. The item production overhead expenses are the costs of rental, depreciation of intangible fixed assets, repairs and other outputs which are joint for more outputs. The administrative expenses are the costs of the company as a whole, the wages of management, the electricity, and other costs. The last item is total costs which is the sum of all the items above.

In the animal husbandry all the costing items are calculated the same from the profit and loss statement. After calculation of the total costs, the costs of the farm manure are subtracted. The price of it is according the intercompany price list. The result is the costs of main production. This method is called net realizable value method, because the value of by-product was subtracted in the realizable price of the product. In all categories of animal husbandry these steps are the same, fur-

ther steps are different. In case of the category of dairy cows, there are two main products, for that reason the method of equivalent index method must be used for the distribution of costs. According Poláčková (2010) there is fixed index of 94:6. The costs of each main product are calculated as a percentage proportion of the total costs. 94% of total costs are the costs of milk and the 6% of the total costs are costs of new born calf.

Costing in the category of calves are the same up to the point of costs of the main production, where the production is in this case only one product, which is a weight gain in kilograms.

The amount of calves is taken from the turnover list of animals, the animals are priced according the intercompany price list. The live weight might be also calculated as the value of the new born calves plus the value of weight gain or it can be also calculated as a closing balance plus loss minus the initial state plus gain.

The number of forage days is total number of days when one calf is feed, which means that if 2 calves are fed in one day, it is two forage days that means that the total number of forage day divided by number of an observed period is the average number of fed animal of that period of time.

The costing in the crop production are calculated from the general formula and from the total costs the cereals which contain useful by-product, which is straw, is calculated by equivalent index method, in case of winter crops by indexes 88:12 and in case of spring crops the indexes are 85:15 (Novák 1997).

The crops which are used as a whole, for example the maize for silage or grass for hay or haylage, the costing method is a simple division method.

3 Cost management

Cost management is a system which belongs to the accounting information system as well as the financial accounting system. The financial accounting system provides the information for the financial authorities, potential investors, employees and other institutes. Cost management system serve as a provider of information by costing of goods and services for planning and control, decision making of management, economists and other internal users. To satisfy the objectives depends on the purpose for which the management needs to define the costs. According Drury (2012) the cost accounting is important for inventory prices, to calculate the costs of goods, or intercompany valuation. Then the costing includes the costs of material, labour and overheads. If the management wants to know the costs regarding to strategic decision making or to define profitability there is a need to involve the research and development costs, marketing costs and costs of design. Cost management is used for decision making as well and for planning and control (Král 2010, Hansen, Mowen, Guan 2007).

According to Popesko (2009) the cost management can be defined as a set of tools and methods, which allow influence of costs in the future. Strategic concepts of costs and affecting the costs in the future are the important aspect of cost management. The author refers to cost management, which can be characterised according the trends. The subject of analysis is all the company operations and all the processes. Costs arise from the idea to the liquidation of the product; the costs can be influenced, so the company shall manage them. The cost figures are known usually too late, but the information can be used for the future production. Further Popesko explains that the cost accounting and the management accounting are the base for the new appearing cost management.

3.1 Cost and its divisions

In the intercompany accounting also known as managerial accounting the costs appear in the production process, when the resources are effectively spent in the production of goods and services. Costs arise in the moment of usage of resources and they express these resources in monetary units and belong to one of the most important indicators of economic efficiency. In financial accounting the costs are the decrease of the scarce resources, which means the decrease of assets or the

increase of liability. The goal of the process of using the resources is the attainment of the yield and is followed by gaining of the profit (Král 2006).

According to Lang (2005), in managerial accounting, the costs are the amount of factors of production valuated in monetary units and the services to the third party which were realized during accounting period. The costs are the usages of the goods and services in the period with the goal of creation added value.

There are many ways accordingly which the division of costs can be made. Each division of costs has its own purpose. It can be divided according to importance of managing and controlling of production process, or for the purpose of decision making. The costs are divided according to their relation to the costing unit, the relation to the employment, their kind and costing division of costs. These are the division to direct and indirect costs, etc. (Drury 2012, Lang 2005, Král 2008).

3.1.1 Division of costs according to their kind

There is the connection of the kind of costs with their division. It is related to factors of production.

The basic kinds of costs are the consumption of raw material; consisting of the consumption of material resources, fuel, electricity etc. Consumption of external wok and services include the costs of maintenance, repairs, rents, etc. The wages and other personal costs equal the labour costs, which are the wages, bonuses, health and social insurance and other expenses paid to employees. Depreciation and amortization of tangible fixed assets consist of the costs of amortization of machinery, equipment, buildings and other tangible assets which are needed for production. Financial costs which consist of insurance, interest and other financial cots (Král 2010, Synek 2011).

3.1.2 Division of costs according the relation to costing unit

The unit costs and overhead expenses are the costs divided according the relation to costing unit. The unit costs are the costs of one unit of production. They are independent of the fluctuation of the production units. Overhead costs are the costs of the service and control the whole process and they do not increase proportionally, it stays unchanged for a certain amount of production. Overhead costs can be for instance the wage of the manager, costs of the equipment or the electricity, maintenance costs. (Král 2008)

The unit costs are directly assigned to the produced unit of goods or services. There are unit material costs, unit wages costs and special unit costs. The unit material costs are the exact amount of material which have to be used for production of one piece of product or service. The unit material is all the raw material, operating and auxiliary substance, equipment, constructions, accessories and unfinished and finished goods which are directly or indirectly entering the production process of the goods. The base for the records is the financial accounting, the purchase and the inventory accounting (Lang 2005).

The unit wages are the wages costs of all employees who work in the production process. The unit wages costs arise by the manufacturing process, when there is a relation between the production of the goods and the time which is needed for it. Production time are set and controlled by the time evidence. The wages of the supervisors and management of the company, wages for the maintenance and wages of the inventory workers are not included in the unit wages costs, these costs are the part of the overhead costs (Lang 2005, Král 2010).

The special unit costs of the production process are the extraordinary costs which are added to a one certain kind of goods or one certain part of the performance of the good. For example it can be pattern, license, costs of plan or project design, etc. There is also included a demand of customers for a special product. Or in case of export the special requirements of the foreign country, for example the costs of translation of technical instruction to foreign languages, costs of special packages while sending abroad (Lang 2005).

The Overheads are in contrary not billable to the single products. It is primarily the wages of the supervisor whose work included the organizing and controlling of the production process as well as the communication with the suppliers and participated in decision making about the production in personal agenda. That is why it is impossible to set a part of the wage of the supervisor to each good. To find the right way of the correct division of overheads, the costs are assigned to the place such as inventory, production, administration and others, and from this position the overhead costs are distributed, for example material overheads costs, these are then assigned to each goods by surcharge rate to the material unit costs. The same principle is valid for the assigning the production and other overheads. Administrative overheads are added to total production costs (Lang 2005, Slovník controlling 2003).

3.1.3 Costing division of costs

The costs divided according to costing consist of direct and indirect costs. Direct costs are the costs which have a link to the concrete output and are assign to concrete product or service. The indirect costs do not bear on any type of output cannot be easily assign to concrete product or service, these costs are in most cases the costs of management and other organising in the company in broader context. It is more complicated to assign them to one single product (Král 2010, Drury 2012).

The first group of direct costs include almost all unit costs, also the costs which can be assign to the output by simple splitting of the costs. These are for example the depreciation of the time license, the selling of the products, costs of the advertisement. The direct costs do not have to be proportional to the outputs. Mainly the group of other direct costs include fixed costs, which have different relation to the volume of output then the unit costs. Direct costs are divided to direct material costs and direct labour costs (Král 2010, Synek 2011).

Direct material costs are the costs of material used for manufacturing the single product. The finished product consists of the material which is presented by direct material costs. It usually exists only in manufacturing firms, in the Merchandising and services organizations are not the direct material costs. Direct material is physical part of the product. Direct labour costs include all labour costs which are a part of transformation of raw material into the final product. In the service organization the direct labour costs are the costs representing dealing with the client and doing the particular service. In the manufacturing firm the direct labour costs are the costs of labour of manufacturing workers, it is a time which has been spent on manufacturing of the products (Král 2010).

The most of the overheads (excluded the ones which are assign to concrete output) is a part of indirect costs and consist of indirect labour, indirect material and expenses. The indirect costs are not directly related to specific product. The example of these costs could be the wage of the storekeepers. Indirect material costs could be the costs of material to repair and maintain the equipment. The term “Overheads” is sometimes used instead of term indirect costs. The division of overheads is manufacturing overheads, administrative overheads and marketing overheads. Administrative Overheads are the costs of administrations, the top management, secretary, research and development costs (Drury 2012).

3.1.4 The division of costs according the relation to the employment

The costs are divided to fixed and variable costs and they are divided according to their ability to react on the change of employment. The actual employment shows the volume of the workload and used capacity (Lang 2005).

The unit costs are assigned just to the one product or services, that is why the unit costs appear only in the case that the products are manufactured, which means that these costs are also the variable costs, all unit costs are variable. The manufacturing material costs, wage and personal costs and special unit costs are all variable costs too, but there are also some overheads which can be variable. These are depreciation of equipment or electricity. In case of variable costs, there is a linear dependence on the manufactured amount of outputs. The costs of outputs are increasing linearly with dependence on the number of produced goods. When the production stops, there are not any variable costs (Lang 2005, Drury 2012).

Whereas variable costs arise only in case of production, the fixed costs arise always, even when there is not any production. Fixed costs emerge also in case of the strike or company holiday when there is not any performance. Fixed costs are for example insurance of the assets, basic payment of the electricity and basic maintenance of the equipment and machinery, renting of the building or their depreciation, etc. These costs in many cases cannot even be added to single outputs and they are not dependent on the employment of the machinery (Synek 2011). The fixed costs are still increasing. Theoretically the fixed costs are unchangeable and the amount is the same in case of full capacity as well as if the production stops. The unit fixed costs decreasing with the increasing of the amount of outputs produced. In the praxis the situation is different. There exist jumps - the increase of the costs at once, when the production rapidly increases. The reason is for example the bigger depreciation of machinery or simply innovation of the equipment or machinery. The fixed costs can also increase in accounting period in case of rise in price of the insurance or electricity, rent, interest, etc. (Drury 2012).

3.1.5 Opportunity and sunk costs

Opportunity costs are the costs of alternative usage of the scarce resources. By the choice of using the resources in the certain way, the other usage of these resources is lost; this value of the resources is called the opportunity costs (Popesko 2009).

The example of the opportunity costs can be the rent of the building and the salary, if the man decides to have his own business in his own building instead of being employed and renting the building (Drury 2012).

The sunk costs are the ones which are not possible to influence by future decisions. It is the decision about the usage of the resources which had been made in the past and cannot be changed by future decisions. The example can be the project which has been started but which has not been ever finished. The resources were drowned in the project, and any future decision cannot diminish these costs (Popesko 2009).

3.1.6 Period and Product costs

The main purpose of classification of the costs to the product and period costs is for inventory valuation. The period costs are not a part of the inventory valuation. The reason is that the period costs are expenses according the accounting law, and the products costs are a part of the valuation of the inventory, it means a part of assets, on the account of finished goods or work in progress. If the goods are sold, it is also an expense. The product costs are connected to the production. The costs are easily assigned to the output. Period costs are the costs of management, of the storage, distribution, etc. (Drury 2012)

3.2 Costs allocation and Assigning costs

Assigning the costs can be separated to assigning of direct costs and assigning of indirect costs, which are sometimes called overheads. Direct costs are exactly traced to the costs objects, but indirect costs cannot be. The process of assigning the direct costs is called direct costs tracing. Assigning the indirect costs (overheads) to costs object is more complicated process. It is called costs allocation. Most of the traditional costing systems allocate indirect costs to costs objects. The base for the costs allocation to costs object is costs driver sometimes called allocation base. The term costs driver is understood as any activity that causes the costs, which means the production of goods and services. For example the variable costs are changed with direct proportion to the costs drivers. Variable costs are changing in total, with increase of the production the variable costs are also increasing, but the variable costs per unit of goods are always the same, they are stable and unchangeable. The Fixed costs are the same in total. Fixed costs does not change

even when the costs drivers differs. With increasing the production the fixed costs does not change. That mean that unit fixed costs are decreasing with increasing of production of goods and services. The only case is the jump in the fixed costs that is in the long run, when the new equipment is bought or a new building is built (Drury 2012, Lang 2005, Hilton 1991).

Assigning the costs to the costs object is done according to many documents. There is an example. Direct costs consist of direct labour costs, direct material and overheads. Assigning the direct labour consist of recording of all time spent on the manufacturing a product, or providing the service to the customers, all the time is recorded on the document called time sheets or job cards. On this document is specification of the product on which the time was spent, such as product's code or job number. According to the employee's hourly wage, the direct labour costs are assigned to the costs object (to specific product). The document Materials Requisition is used for assigning the direct material. This document contains of details of the material which is issued for manufacturing the certain product or service. The materials listed on the requisition document are priced according to the acquisition price. That means that the details listed on the materials requisition document are base for assigning the costs if the materials to the costs object (Drury 2012).

The most important principle of costs allocation is about a nonexistence of universal right or wrong costs allocation to a certain output. There are several methods how to allocate the costs to costing units. (Král 2008, Lang 2005)

3.3 Costing

Costing is the one of the key tool of managerial accounting. The Managerial accounting is the basic instrument for the management, control and decision making of the company. In general the costing can be defined as assigning of costs, margin, profit, price or other valuable items to goods, services, activity, operation or other unit of output (Popesko 2009). The costing has the valuable information for many different fields in the business. It is not only for economists and managers, but also for research and development department, for workers from technical department, constructers, businessmen, dealers and others. Costing is a key tool for effective handling of the costs; it helps for price formation, and efficiently evaluates the department (Král 2008, Lang 2005).

There exist many different division of costing.

1. Division according the completeness of costs used for costing, the costing is divided to Full (absorption) costing, variable costing and direct costing (Král 2010).
2. Special type of costing is costing according fundamental processes, costing with assigning the costs to the activities so called Activity base costing (ABC method) and target costing which is based on the assumption, that the price of the goods are not based on costs but based on the market. (Synek 2011)
3. Synek (2011) further divides the types of costing according the time of composition to preliminary costing which is prepared before the performance and its main purpose is to plan the costs and actual costing which is calculated after the performance and its main purpose is to evaluate and control of efficiency of performance. The preliminary costing includes operational costing, plan costing and budget costing. Král (2010) calls this division of costing as a costing system.
4. Division of costing methods according Synek (2011):
   - 4.1. Division methods
     - 4.1.1. Simple division methods
     - 4.1.2. Stepped division costing method
     - 4.1.3. Division costing with proportional numbers
   - 4.2. Overhead rates costing (absorbing costing)
   - 4.3. Joint product costing
     - 4.3.1. Net realizable value method
     - 4.3.2. Equivalent index method
     - 4.3.3. Method of quantitative yield
   - 4.4. Variation method
     - 4.4.1. Standard costing
5. Costing according structure is divided to progressive costing and continuous costing (Synek 2011)

There are many more types of costing their purposes are different.

3.3.1 Costing according the completeness of costs

These costing methods differ according to their calculation of costs which has or has not relation to the volume of outputs, it changes or not with the change of outputs (Synek 2011).

The absorption and the variable costing, both of these methods have its advantages and disadvantages. That is why the managers have to decide when to use each of these methods Král (2008).

Absorption (Full) costing

Full costing is calculated with all the costs, that is why it is also called absorption costing, because it absorbs all the costs. The full costing method determines the minimal price of output, because the minimal price should not be lower than the complete actual costs of the output, the outputs with lower price are unprofitable (Synek 2011).

Absorption costing advantages represent the situation when the costing is calculated for long-time costs analyses of outputs, pricing of individual order, declaration of fasten costs in intercompany inventory, illustration of change of intercompany inventory and declaration of long time contribution of selling outputs to total profit. But there are also many disadvantages, so absorption costing method is not suitable for costing while the problem is in existing capacity. The example can be the decision about future structure of the outputs and their volume. The reason is in calculation of fixed costs, when there is a change in output, and then there will be change in the fixed unit costs. The fixed costs are unchangeable with different volume of outputs, fixed costs does not depend on the volume of outputs, which means if the volume decrease, the unit costs increase when the absorption costing is used. Another problem would be while deciding about the lowest possible price of the outputs or if it is more favourable to make or to buy certain part of the goods. That is why this costing method is not suitable for decision about those problems; in that case the suitable method would be variable costing (Král 2008).

Variable costing

Synek (2011) calls the variable costing method as the costing method of incomplete costs, because it is method of separated management of fixed and variable costs, to the costing method of incomplete costs further classify the direct costing method.

The fixed costs does not causal relate with the costing unit, they relate to time period. In contrast with the traditional division of the costs to direct and indirect, the division to fix and variable costs is becoming the most important for costing. The fixed costs are also included in the costing, but not in the full amount and the essential is that the costing of variable and fixed costs is separated. The variable costs are the costs of the product and the fixed costs are inseparable part of costs, which needs to spend in the time period. It is needed to understand the fixed costs as a whole; they have to be covered in the time period, without regards to volume, yield, or sold goods. Fixed costs are not a part in the valuation of goods they are the costs of the period. The problem of the variable costing is in definition of the fixed and variable costs. It seems like the obvious in the short time period, when the fixed costs are really stable, but in the long run, the fixed costs are also changing. If there is a concern about the production in the long run, the decision about the fixed and variable costs is rather difficult, because the fixed costs are also stepwise increasing in the long run (Král 2008).

Variable costing calculates only the variable costs plus the contribution margin, which is a compensation of fixed costs and profit. The variable costs are only the unit costs which and variable overheads, the rest of fixed overheads are considered as costs which are needed to provide the running of business in the certain period of time, they are not included to the costs of goods or services but they are included to the total results of overall business. That means that the profit are not determined for each outputs but the profit/loss is the result of the company as a whole. As a contribution to the profit/loss of the business is consider the difference between the selling price of output and its variable costs, it is called the contribution margin. The profitability of the goods is compared according the proportion of contribution margin to the selling price of the good. The contribution margin is more stable and more reliable than the profit, because it does not change with the change of volume of outputs Synek (2011).

Direct costing

In the practice the total variable costs of an output are not known, there are known only partially which is a direct costs, there appear direct costing method which substitute the contribution margin by gross margin, which is a difference between the selling price and the direct costs. The direct costing method is also a costing method of incomplete costs. The calculation of direct costing consists of calculation of direct costs plus so called gross margin. Gross margin is also called marginal yield or a margin Synek (2011).

3.3.2 Costing method of assigning the costs to the activities

Costing method of assigning the costs to the activities are so called Activity base costing (ABC method). Activity base costing appear when the traditional costing system is no longer satisfying for the company. The ABC method disposes of the shortcoming of the traditional costing system. The problem was in the change in production process. Traditional costing system was satisfying when the main proportion of costs was material and labour costs and the overheads were only a small proportion. Nowadays the share of the costs has changed. Hence the costing system should change as well. The major change is in the proportion of the overheads and the labour costs. The labour costs decreased while the production is mainly automatic, hence the overheads quite increased (Drury 2012).

The main difference of Activity base costing is in the costs allocation, which is based on the relation of costs to the activity. The activity base costing uses measure of the real output of performed activities for assigning costs to the objects. The first step in this method is to define the main activities which are done in the organization. Activities consume the resources hence they create the costs. The key in the selection of the activities is not to choose too many, because that is costly and ineffective. The activities which consume less than five percent of the resources should not be a separate activity. There are three main categories of the activities: Unit level activities, bath-level activities and the product-sustaining activities. The Unit level activities are also called volume-related activities, which mean they are related to volume of production units. Each unit of production increase the costs of the activities proportionally. It includes the labour costs, the costs of material, etc. (Drury 2012).

The batch-level activities are the activities which are not related to the units of production but they are related to the batch. The example of these activities is the set-up of machine or the placing the purchase order or internal transport of material. In the traditional costing system it would be classified as fixed costs. The significance of these activities is that the resources are not consumed according to the number of units of production but according to the number of batches. It does not matter how many products are produced in each batch (10 or 5000). The examples of product-sustaining activities are maintaining and updating products, technical support, design processes, etc. These are the processes which enable the whole production processes. These activities are independent on the units of production or on the batches of products (Drury 2012, Mucćan, Doković 2003).

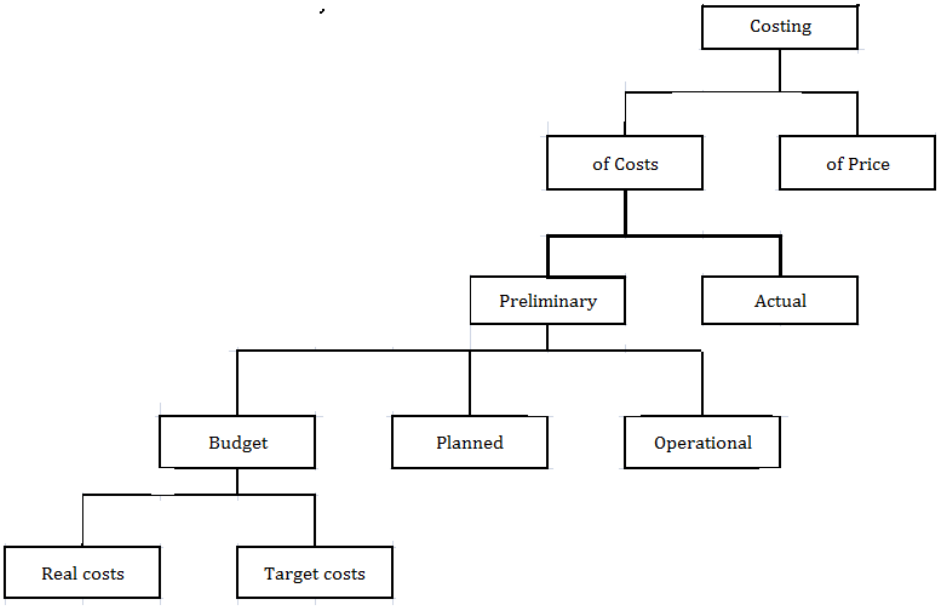
The second step is to assign the costs to the activity costs centres (sometimes called costs pools). After defining the activities, the costs must be assigning to them. Many costs are directly assigned to the activities, but there are some activities where it is impossible, so the estimation is used, for example the calculation of the electricity bills. There is used the estimation of proportion usage.

The third step is the selection of the costs drivers for activity. The selection of the appropriate costs drivers is a crucial in this step. There exist volume-based and non-volume-based costs drivers. The volume-based costs drivers are those where the amount of costs dependence on the number of units of outputs. The examples are units of outputs, number of labour hours, etc. The non-volume-based costs drivers are those where the costs are independent on the production. The examples are number of set ups or number of orders. There are also transaction and duration costs drivers. The transaction costs drivers are such where is number of activity performed. The examples are the number of orders, the number of set ups, number of inspections. The duration costs drivers are those where the important is the amount of time which is needed for activity. The example is the inspection hours or the set up hours (Drury 2012, Mucćan, Doković 2003).

The final step in the process is calculation of the costs of activities to the products which means the applying the costs drivers. The costs drivers must be measurable so they can be assigned to the individual products (Drury 2012, Mucćan, Doković 2003).

3.3.3 Costing according the time of composition

It is also called as a costing system. All costing in the company forms a costing system of the company. Each part of the system, which is costing is different in a time period when the costing was made, assigning the costs to costs objects and depiction of relationship of full or variable costs to costing unit. The differentiation is in the objectives why the costing is made. The costing is made for strategic decision making or for tactical management or operational management or the verification of companies' processes. There is the division of costing system (Král 2010).



Obr. 1 Costing system and his classification according the relation of the costing to the time horizon of processing and application
Source: Král (2010)

Actual costing

Actual costing is also known as final costing (Král 2010). According the accounting law, the own production has to be evaluated by the actual costs. For this reason, the actual costing method is used. There are not exact details in the accounting law about what can be included in actual costs, hence to define the actual costs is in competency of the accountant.

The actual costing is done after finishing of the performance or at the end of the accounting period, after accounting all the actual costs of the current year, which means that to the costs of the current year, the costs of the previous year which are related to the production of the current year must be add. Also the costs of the current year which are related to the future production which has not been realized in the current accounting period must be subtracted. On the basis of the actual costs of the current year the calculation is made. (Neplechová 2007)

The actual costing has the biggest importance for the control of the efficiency of the company, when it is recommended to compare the actual costing with the preliminary costing (Synek 2011).

Preliminary costing

Preliminary costs represent the jobs and planned costs for future performance. They are divided to operational costing, planned costing and the budget costing (Synek 2011).

Operational costing

The operational costing is form according the operational norms. It is valid from the day, when the change in operational process appeared. The operational costing is expressed the predetermined amount of costs in case of keeping the presumption (Král 2010).

Synek (2011) divides the operational costing to the operational costing initial, which is valid on the first day of a year, quarter or month and ordinary operational costing. The difference between both of these is the change of the norms. Operational costing is used for operational management of the company.

Planned costing

It is important in case of repeating the process for a long period of time. Planned costing is done according the detailed constructing and technological preparation, according the consumption and performance norms. In the other steps the norms are adjusted according the innovations and changes (Král 2010).

The knowledge of costs of single commodity is very important for companies. It is well known, that before any decision about the new production the manager must make estimation and decide about the expected unit costs of the new product. In every business plan there must be included the planned costing (Lang 2005).

The costing of the actual costs shows significant shortage, the most important one is that the actual costing method is not actual reflection of the efficiency of the company. The costing of the planned costs tries to get over these failures. The costs are planned in advance for the accounting period and after that, the results are compared and adjusted for the right amount. Then it is analysed by the variance analysis (Lang 2005).

There are three types of variance, which are the price variance, the employment variance and the consumption variance. There are two kinds of planned costing. First is the fixed costing of planned costs. This method is used for planning of costs for certain amount of production and after the production is made a comparison of plan with the real situation. In this method there are not make any adjustments of the employment, so it is not very suitable (Lang 2005).

Other method is the Operative costing of planned costs, in this method the costs are separated to fix and variable costs. After the accounting period, the adjustment of the planned and real employment is made and the planned costs are recalculated. Recalculated planned costs are the fixed costs + the variable costs of the real production (the variable costs can change according the employment). The flexibility in this method has a great advantage for analysis of variance and their cause (Lang 2005).

Synek (2011) explains the planned costing as a costing formed on the base planned norms. The first is formed the yearly planned costing, which corresponds to the plan of performance, costs and profit. The yearly planned costing is distributed to the quarter planned costing. The amount of costs is possible to express by total planned costing or according the variation of initial costing which is in most cases the operational costing.

Budget costing

The main objectives of the budget costing is to give the base for the preliminary evaluation of the effectiveness of the operations, for the proposal of the price in case of the new launching products or for the intercompany need (Synek 2011).

Budget costing is done after all technical specification about the product, but before the constructional and technical preparation for the product. The costing is done base on the of orientation information from similar performance. The aim of the budget costing is to express the costs of the performance as a base for the price quotation. Nowadays with the increase of the competition the main goal of the budget costing is the target conditions, which the company has to fulfil to enter the market and to be successful. This approach is called target costing (Král, 2010).

3.3.4 Costing methods

Synek (2011) explains that the method of costing means the determination of the way, how to assign individual parts of costs to costing unit. Costing methods depend on the subject of costing, which means what is calculated, if it is one type of good or if it is joint production of more goods and how the costs are assigned to the outputs – how the costs are assigned to costing.

The aim of this costing method is to compute the production unit costs. The most important and the most widely used type of costing is the costs calculation with results of defining the costs of single products, service or output which are put on the market. There are many ways how the costing is possible to calculate.

The decision which to choose dependence to what are the objectives of this costing (Hilton 1991).

Simple division method

Simple division method is also called as single stage division method (Lang 2005). This method is used when only one type of the products is produced. The costs of costing units are calculated as the total costs per the period of time divided by the volume of production, which is the number of costing units (Poláčkova 2010). Synek (2011) adds that the simple division method is used mainly in the mass production for example production of beer or soda, coal mining etc.

Stepped division costing method

Stepped costing method is used mainly in production where are more manufacturing stages. Each stage shall make its costing and the unit costs of the output at the end of the production are calculated as the sum of the costs of each stage of production (Synek 2011).

Division costing with proportional numbers

This costing is used when in the company is made more similar outputs which differ only in weight, size, shape, demand of time or quality. The proportional numbers are determined according the proportion of material use, or spend time for production, according the direct wages or price. The volume of production in proportional units is calculated as proportional number times volume of production and sum of each group of outputs. Total costs are divided by the sum of proportional units, and the results are the unit costs of basic output. The costs of the rest of the output are calculated as costs of basic output times the proportional number (Synek 2011).

Joint costing

Joint costing is the method which is used mainly in the agriculture companies, because their production is in most cases the joint production, where is produced simultaneously more than one product.

Joint production is a production process when more products are produced in the situation when one product cannot be produced without another. There arise a joint products and by-products. The difference is in the sales value of the products. The by-product has a minor sales value compare to the joint product. The joint product is called main product, which has significantly higher value than the by-

product, which are incidental to the production. The joint products are crucial in the production (Drury 2012).

The author further explains that the split-off point is the point of separation of the joint products and/or by-products. Until this time the costs of production cannot be assigned to one or the other product, because the production is integrated. After the split-off point, when the products are separated, the costs can be assigned to the single products.

Rayburn (1993) recommends value the by-product by Net market (realizable) value. Their sales value is deducted of the separable costs (production, marketing, administrative costs). Net market value assign to by-products inventory and if the by-product has significant value for inventory or profit, assigning the market value to inventory is preferable. Advantage is reduction of the costs of main products. The net realizable value method is calculated as total costs reduced of the value of whole volume of produced by-product. The rest of the costs are the costs of main production, where is further used the simple division method (Synek 2011).

The equivalent index method is used in case of production two or more main products, it can be intercropping or in case of animal husbandry production of dairy cows, where the main products are the milk and the new born calf. Poláčková (2010) as well as Novák (1997) recommends using the equivalent index method in case of production of cereals. The costs are calculated according the indexes to proportion of total costs to each category of production. These costs are divided by the amount of costing units and the result is the unit costs of each outputs.

The method of quantitative yield of the joint products are based on the physical measures or they are based on the market value of the products. When using the physical Measures method the costs allocation is done according the weight or the volume of the output. This method considers the same benefit of each product for example the production of flour in mills. It means that the costs are proportionally distributed to the products according to their volume or weight (Synek 2011).

The disadvantage of the method is that there is not a relationship between the costs allocation to the goods and its sales value. It means that the by-product which has a minor sales value is assigned the same proportion of costs as the joint products or even higher according to the volume of production. There is not any distinguish between by- products and joint product which was primary the reason for the production (Drury 2012).

3.4 Planned costs and control

In most of the businesses the plan of the costs is the part of financial plan or budget. The budget contents of the plan of the yield, costs and profit, plan of sharing of the profit etc. The plan of outputs, costs and the creation of profit is actually the planned profit and loss statement. The calculation has the connection with the other parts of the plan of the company.

The aim of the planning of the costs is to decrease their amount therefore costs planning are not only the passive reflection of the current situation, but there is the pressure to decrease the costs in all areas of the company's activities. There are some methods, how the reduction of the costs can be achieved (Synek 2013, p98).

Outsourcing

It is setting aside the activities outside of the company with the aim of decreasing the costs, especially the fixed costs by transfer of the work to the third party and increasing the quality by delegating of activities to the specialists. It can be the basic activities, such as handover the production order, research and development, advertisement, accounting, legal consultancy but also subsidiary services such as the cleaning, cafeteria or intercompany education. (Synek 2013, Lang 2005)

The disadvantages are the loss or sacrifice of the know-how – the third party will get to know it. It is common that there usually appear the dependence on the outsourcing and high dependence on the external services. Also there is a threat of division of risk, especially the risk of quality and the supply risks, for instance reliability of delivery and compliance with the time table of the delivery (Lang 2005).

Offshoring

Offshoring is setting aside the activities from the company to the subsidiary company in the countries with the lower costs. Nowadays the countries which are used for offshoring are mainly China, India and new members of European Union (Synek 2013).

Insourcing

This is opposite to the outsourcing; it is utilization of available capacity to take over the external purchase order. The aim is to better use of the fixed costs and increase in the economy and balance the fluctuation in the employment and in-

crease of yield and use the full potential of the company‘s capacity (Synek 2013, Lang 2005).

4 Costing in ZOD Kolinec

The purpose of the costing is cost management, controlling, predicting, it can also serve as a base for the calculation of intercompany price list, etc. In the agriculture the costing is such complicated problem, the most important is to meet two principles. The first is applicability of the costing of the own costs for the management and control of the production. The second principle is the comparability of the own costs with other businesses or the norms (Poláčková 2010).

All information and sources needed for this part of the bachelor thesis is taken from the intercompany documents, profit and loss statements, balance sheets and interview with the managers of the cooperative.

4.1 Characteristics of ZOD Kolinec

ZOD Kolinec is the Agriculture Business Cooperative, which is located in the periphery of the small town Kolinec. It is a middle size business cooperative which manages around one thousand hectares, from which approximately six hundred hectares is arable land. The cooperative is specialized in crop production and animal husbandry and is well known particularly for its poultry breeding. All land is in LFA (Less Favoured Areas) according to European Union Agriculture regulation. LFA is a kind of subsidy which cooperation can claim, the reason for it is, that Agriculture primary production is more complicated in this area. The land is mainly leased. There are forty-two full time employees.

The most important market commodities, from the crop production, are cereals and rape. The cereals are cultivated on four hundred hectares and the rape is cultivated on approximately one hundred and twenty hectares. Other crop production contains of production for cattle, which is cultivating of clover and grassland and maize for production of maize silage.

The animal husbandry includes the cattle and the poultry breeding. The poultry breeding is carried out on two farms. One of them is in Malonice and the second is the farm in Kolinec. The welfare and the modern, high technology equipment, which is used in production, guarantees high level of poultry breeding. The capacity for poultry breeding is two hundred thousand chickens.

The cattle's breeding includes the cattle for milk production and for the rest is for the beef production. There are approximately four hundred heads of cattle for

beef production. The breeds of livestock for beef production are mostly Charolais and Limousine. The production of milk provides four hundred cows, two hundred and fifty heifers and around a hundred and fifty calves. There is produced approximately eight thousand and tree hundred kilo of milk per year. The dairy breeds of livestock are Holstein.

4.2 Costing system used in ZOD Kolinec

ZOD Kolinec using the special software from the company PROFEX AM, Blatna for costing, it is called ZEIS, and the shortcut means Guaranteed Effective Information System. According the interview with the economists of the cooperative and the user manual of the program, the system consists of many modules which works independently or automatic with modules finance or accounting. The cooperative works with modules wages, animals and finance. The program finance processes register invoices, general accounting document, VAT including tax return, costing lists, orders, inventories, register of assets, accounting including balance sheet, profit and loss statement. The program is complex system for processing all accounting and financial operations in the company. Generally the managers of the cooperative are satisfied with this product, even though they confess that in the system appear some mistakes and before the submission of the accounting documents, the control of the output data is needed and some of the results have to be corrected and complete the costing by hand. While analysing the costing of the company, I have also found some errors, which I consulted with the management of the cooperative.

Intercompany operations

For the costing purpose, the company's costs are separated to certain categories of performance. There are main outputs categories and the auxiliary categories. The main categories are the outputs of Animal husbandry and Crop production, the auxiliary performance are the others, which are essential in the production but they cannot be categorized directly to the one certain output, because their output is used in more than main categories.

The output workroom, is auxiliary output, where are being repaired all the machines and equipment and the costs which arise on that auxiliary output is divided to the main outputs from animal husbandry or from the crop production, according the certain allocation base, in this case the costs are divided according

the type of output which was repaired and how many hours they spend by repairing this machines, according the proportion to which outputs or machines which belongs to the certain output which was repaired.

Other auxiliary output is 809 mineral mixture, the costs which arise on that output are divided to main outputs according the weight of mineral mixtures which is consumed by certain category of animals. The costs of the output 860 power trucks and 892 self-propelled machines are distributed to outputs according the wages of employees working on these machines, for which outputs the job was done. The costs of all the post-harvest treatment, silage, haylage, hay are divided to the corresponding output of the crop production. Overheads and costs of tractors are divided to main outputs according the proportion of direct costs. The costs of combine harvesters, heavy mechanization are distributed to the outputs according the operating hours.

List of all categories of outputs which are used in ZOD Kolinec can be found in the annexe A.

4.3 Costing formula for animal husbandry

To find out the costs of the unit of production, there exist many different methods, how to do it, there is not any obligatory way how to calculate the costing.

The cooperative split up costs in animal husbandry according the outputs to dairy cows, calves from birth up to 6 months old, and young breeding cattle, which is the young cow calf up to two years. The young bulls are sold to the subsidiary Ecological farm.

The general formula used for the costs calculation in ZOD Kolinec for animal husbandry:

$$\begin{aligned}
&Feed\ and\ bedding\ purchased\\
&+\ Feed\ and\ bedding\ owned\\
&+\ Other\ purchased\ material\\
&+Other\ direct\ costs\ and\ services\\
&_____\\
&=Total\ material\ and\ services\\
&+Personal\ expenses\\
&+Depreciation\ of\ adult\ breeding\ animals\\
&+Depreciation\ of\ other\ tangible\ assets\\
&+Internal\ work\ and\ services\\
&+\ Production\ overhead\ expenses\\
&+Overhead\ administrative\ expenses\\
&_____\\
&=\ Total\ costs
\end{aligned} \tag{2}$$

All the items of the formula are described, specified and the application of the formula in the company is analysed. The recommendation of different possibilities is made.

The costs allocation and assigning the costs to the output has been explained in theoretical part, but in the theory it is simple in case of direct costs, but the practical situation is always very different. Especially in the agriculture companies, the system of activities are very different, they are in most cases subordinate to the weather, particularly in the crop production, it causes many problems with different production costs and unpredictable yield every year. The rush in production when the weather is good causes in the cooperative many errors in documents and in assigning the costs. The reason is the absence of importance of the documents in that moment, not thinking about the documents, but about the actual work that needs to be done. These errors are caused by the technician of the certain department, but it is found out only in the end of accounting period and then it can only be corrected by special accounting corrections.

Feed and bedding purchased

The costing item feed and bedding purchased is found in the profit and loss statement of each breeding in time period, in the class number 5 costs/expenses on the account 501050 Consumption of feed and bedding purchased. These are all feed and bedding which had to be bought for certain group of animals in the time period. According the invoice and for which category of the animals the purchase was made the costs are assign to these output. In case of the feed which is for more

than one category of breeding animals, the costs are split according the amount of feed given to each category.

Feed and bedding owned

Feed and bedding owned are not in accounting as increase of the costs on the debit side, but feed and bedding owned is found on the credit side of the revenues, class number 6, on the account 613231 consumption of feed of own production for example hay, silage, grain meal plus 613233 consumption of other owned production for example straw, other bedding, haylage.

Feed and bedding owned are own crop production which is valued by the own costs according the intercompany price list. Most of the owned feed is fed to the all category of the animal husbandry. The costs of these feed are split according the type of feed. The costs of bedding, hay, silage and other roughages are assigned according the feed ratio of each breeding category. The costs of cereals and grain meal are assigned according the weight of it.

Other purchased material

Calculation of the item other purchased material can be done from the profit and loss statement by subtracting the consumption of feed and bedding purchased from total consumption of material.

The other purchased material includes 501080 consumption of spare parts, 501120 usages of working clothes, 501130 consumption of drugs and antiseptic and 501190 consumption of other material.

Other purchased material comprises of all other raw material consumption except the feed and bedding purchased, which has been already put in the costing earlier. Assigning these costs take place after receiving the invoice or after the consumption of the material. For instance the account consumption of spare parts, the material is put to the inventory and the costs are assigned to the output after the consumption of this material. The costs of material are assigned to the output according the spare part which was needed to which production. When the machine for milking was repaired, the costs are assigned to the category dairy cows. If the tractor was repaired, the costs of spare parts are assigned to the auxiliary output tractors. The total costs of the auxiliary outputs are distributed to the outputs of crop production and animal husbandry according the different criteria.

The assigning of costs of consumption of drugs and antiseptic are done according the invoice received, and it is assigned to the category of animals which needed the drugs or antiseptic.

Other direct costs and services

Other direct costs and services cover 502100 consumption of electricity, whole group of 51 Services, accounts 53 taxation and fees, accounts 54 other operational costs and accounts 56 financial costs.

These are all the other goods and services which are needed for production process. The costs of the services are assigned to the output after receiving the invoice, according to the type of service and for which output the service was used. Another type of costs assigned to this account is the insurance. The costs of the insurance are assigned to the output according the insurance contract and invoice paid to insure certain output. The account 54 other operational costs consist of deficit and damages on animals. The costs are assigned to this account according the output, which has been damaged or where the deficit has been made. The account financial costs include the costs of interests and other financial costs, these costs are split to the outputs according the purpose of the loan. For example the loan for the investment to the new trough, because this trough was build for dairy cows, the costs are assigned to the output of dairy cows.

Personal expenses

The item personal expenses contains of all payment to employees in each breeding, these contains the costs of labour on accounts 522100 wages, 524200 social insurance and 524100 health insurance.

The costs of labour are assigned to the outputs according the hours which employees work in certain place for certain output. When the employee is send to do a job, for instance to fed the calves, the costs of the labour which the employee spent by doing this job is assigned to the personal costs of the output calves up to two years old.

Tab. 1 Average number of employees in the observed years

Year	Total number of employees	Supervisors
2009	47	8
2010	43	8
2011	44	9
2012	40	9
2013	43	9

Source: Kohout, František. Supplement to the financial statement for the year 2013

Depreciation of adult breeding animals

According the zoo technological concept, the adult breeding animals are those, which ensure the reproduction of the own herd (Poláčková 2010). For the depreciation is needed to use the accounting depreciation. Valder (2008) explain the process of depreciation as an acquisition price decreased of the presumption of the selling price of the culling, divided the number of the years in the breeding.

Depreciation of adult breeding animals in ZOD Kolinec is administrated on the account 551300 Depreciation of adult animals.

Depreciation of other tangible assets

The depreciation should show the actual amortization of the assets. For costing purpose, is needed to use the accounting depreciation and not the tax depreciation. ZOD Kolinec uses the linear depreciation. The costing includes only the depreciation of tangible assets which is a part of the certain output in the husbandry.

The costing item depreciation of other tangible assets is calculated from the profit and loss statement as 551100 tax depreciation intangible and tangible assets minus the 551900 which is the account of difference to accounting depreciation of tangible and intangible assets.

Internal work and service

The item internal work and services are the costs of the intercompany accounting which includes the 599809 intercompany costs of mineral mixtures, 599850 intercompany costs of repair shop, 599860 intercompany costs of power trucks, 599890 intercompany costs of tractors, 599892 intercompany costs of self-propelled machine and 599893 intercompany costs of heavy mechanization.

Internal work and services are the 599 intercompany costs of each breeding reduced of 599961production overheads and 599970 administrative overheads.

The method of allocation of costs of intercompany work and services to each output depend to each service and work. For instance the cost allocation on the accounts 599860 intercompany costs of power trucks and 599892 intercompany costs of self-propelled machine are based on the wages. For better understanding the system of assigning the costs are done according the employees' wages, who work certain amount of hours on certain output. Assigning the costs to the account 599890 intercompany costs of tractors is done base on the proportion of the total direct costs. It is not the ideal situation because the operations which require higher direct costs automatically have higher proportion of these costs. Assigning the costs to the account 599893 intercompany costs of heavy mechanization are based on the operating hours of each machine working for particular output. The total costs of each machine is assign to output depending on how many hours a certain machine was needed for a certain performance. The costs allocation of account 599809 intercompany costs of mineral mixture depend on the amount of consumption of the home made mixtures by the animals in the category.

Production and administrative overhead expenses

The production overhead expenses comprise of the part of production overheads, the account number is 599961. The administrative overheads are found on the account number 599970.

ZOD Kolinec delegate the overhead costs to the operations in the animal husbandry mainly according the proportion of direct costs. This type of splitting of the costs are not ideal because some outputs which require the higher amount of direct cost are disadvantaged by higher amount of overhead costs.

Total costs

Total costs sums up all the items above, as it is evident from the formula above. The total costs which are expressed in monetary units stand for all the sources and production factors needed in production process.

4.4 Analysis of the costing of breeding dairy cows

After calculation of total costs according to the formula above, when all the costs are sum up, the analysis of the further calculation of the unit costs of products in

ZOD Kolinec is done. The suggestions for the costing and analysis of the current costing methods are made.

The costs of the by-products will be subtracted using the so called net realizable value method. The by-products in animal husbandry are liquid manure and farm manure. The technique of the net realizable value method reclines upon the valuation of the by-products by market value or by the intercompany price list (Poláčková, 2010).

ZOD Kolinec uses the intercompany price list, and they valuated the liquid manure by 41 CZK/hl, semi-liquid manure by 41,28CZK/q and the farm manure by 42 CZK/q. The valuation of these by-products has been made on the basis of the calculation of the amount of nitrogen and other nutrients which the by-product contained and compared to the amount of the nutrients in DAM 390, nitrogen industrial fertilizer. The proportional price of the nutrients which was contained in the livestock manure was used for valuation of the manure.

After the subtraction of by-products the outcome is the costs of the main production. The costs of the main products are subtracted from the total production and the result is the profit or loss if the number is negative.

Dependence of the each breeding there is one or two main products. In case of breeding dairy cows, there are two main products, which are milk and calf, to get the costs of each main product; there is a need to do costs allocation and for this purpose, the company uses the index method. For index costing method when there are two main products, there is a need for percentage for each main products. ZOD Kolinec uses the proportion according the final production of these two products. In the table below, there is the real percentage proportion which ZOD Kolinec used in observed years 2009 - 2013. ZOD Kolinec is dividing costs according the proportion of the final production of these main products.

As it is seen from the table two, the proportion differs in each year. The reason is the use of production. The problems of this technique might appear, because the costs are not a real reflection of the production. Therefore in this calculation some errors may occur which are influenced by using this method.

Tab. 2 Percentage proportion of the main products in dairy cow breeding, used for index method

Year	Percentage production of milk	Percentage production of calves	Total production [CZK]	Production of milk [CZK]	Production of new born calves [CZK]
2009	96,75	3,25	24 010 938	23 229 738	798 000
2010	96,80	3,20	22 880 052	22 147 152	732 900
2011	96,59	3,41	21 563 384	20 828 384	735 000
2012	96,86	3,14	25 695 448	24 889 048	806 400
2013	97,10	2,90	25 747 572	25 002 072	745 500

Source: Own processing

Table 3 shows the proportion of costs according the use technique in ZOD Kolinec. The costs of the by-product are subtracted and divided according the proportional indexes calculated in the table 1 above.

To further explain the item production of the new born calves, it is the born calves expressed in monetary unit. Because the breed which the cooperative have is the Black Holsten Cattle, which is the dairy cattle, which means that they are smaller, the weight of one calf is 35 kg.

Tab. 3 *Percentage proportion of the costs of main products in ZOD Kolinec*

Year	Percenta-ge production of milk	Percenta-ge production of calves	Total costs minus the costs of the by-products [CZK]	Proportion of costs to production of milk [CZK]	Proportion of costs to production of calves [CZK]
2009	96,75	3,25	23 980 553,78	23 200 342,34	780 203,79
2010	96,80	3,20	23 474 706,65	22 722 758,51	751 948,14
2011	96,59	3,41	23 896 779,68	23 082 244,58	814 535,10
2012	96,86	3,14	30 310 828,82	29 359 584,37	951 244,45
2013	97,10	2,90	28 764 966,62	27 932 100,41	832 866,21

Source: Own processing

To solve the problem with different rate of percentage proportion for costs division is not easy, Poláčková (2010) introducing in her publication the equivalent index method and she recommends using the fixed indexes, which are proportion of fixed costs of 94% to production of milk and 6% to production of new born calf. The costs of the new born calf increase in relation to birth rate, which is average amount of new born calf divided to hundred of cows. The author further explains, that the amount of costs of the new born calf until put to another breeding category, which is around twenty one days should be increased by the costs of colostrum and the milk consumed by the calves. The costs are not increased in described company, because they are moving the calf straight after their birth to another category, which is "Calves until 6 months old".

According Kavka (2006) The birth rate should be from 0,9 up till 1, which means one calf per one dairy cow per one year. Birth rate equal 1 is optimum situation, but there can also appear a situation, when the birth rate exceed 1, that is the situation when the cow has a twins, this situation is rare, but with the large amount of animals the probability of twins increase. As it is seen from the table 4 and a birth rate, in the cooperative the birth rate also increased above 1 twice in the observed years 2009-2013. It was in the year 2009 and 2012. The other important indicator of livestock efficiency is death rate. The author states that the death rate should not be above 5%. As it is visible from the table 4, the death rate in the cooperative fluctuated around 2%.

Tab. 4 Birth rate and the death rate of calves in the cooperative

Year	number of dairy cows	born calves	birth rate	death calves	death rate	reduced birth rate
2009	374	380	101,6%	8	2,1%	99,5%
2010	376	350	93,1%	9	2,4%	90,7%
2011	363	350	96,4%	5	1,4%	95,0%
2012	377	384	101,9%	10	2,7%	99,2%
2013	381	355	93,2%	4	1,0%	92,1%

Source: Own processing

The table 5 shows the differences in amount of costs per one litre of milk, when the proportional indexes are not calculated according the proportion of production of milk and new born calf, but according the fixed indexes. As it is visible from the

table, the differences are not high, but in the amount which the cooperative it makes a big difference.

Tab. 5 *Comparison of the costs of one litre of milk calculated by method used in ZOD Kolinec with the method which Poláčková advises (94%, 6%)*

Year	Amount of litres of milk	Amount of new born calves	Costs of 1 litre of milk [CZK]	Costs of 1 litre of milk (Poláčková 2010) [CZK]
2009	2 796 148,81	372	8,30	8,06
2010	2 768 009,78	350	8,21	7,97
2011	2 603 678,56	350	8,87	8,63
2012	3 111 411,06	384	9,44	9,16
2013	3 125 577,00	355	8,94	8,65

Source: Own processing

From this point of view, in the table 5 is visible, that the costs are decreased and this step to change the rate of the equivalent indexes to fixed was right, on the other hand, there are the calves, which are more costly now, the differences are higher, and compare to the calculation before, when the price of new born calf was still the same, valued by intercompany prices, at the moment is differ and its much higher.

The table 6 shows the great differences in prices of one calf when using one of other method. It display the percentage difference from approximately 2,2% to 6%, which is increase of costs more than twice.

To compare the significant increase of the price of a calf, with only little change in the costs of milk, the company has to assume the costs difference in higher amount of litres of milk, 0,23 CZK per 1 litre of milk is not a lot, but if there is a 22,47 of litres of milk per one forage day and there are 139100 forage days in the year 2013, which means that the total amount of milk produced in 2013 is 3 125 259 litres of milk. The difference make a 718 809,57 CZK.

The advantage of lower costs of milk visible in the table 4 and the disadvantage of much higher price per one calf in the table 5.

Tab. 6 The comparison of using the fixed of variable indexes per 1 calf for dividing the costs of joint production to the main products.

Year	Amount of new born calves	Costs of 1 calf according the ZOD costing [CZK]	Costs per 1 kg (1 calf=35kg) [CZK]	Costs of 1 calf (used fixed indexes) [CZK]	Costs per 1 kg [CZK]
2009	372	2097,32	59,92	3867,83	110,51
2010	350	2148,42	61,38	4024,24	114,98
2011	350	2327,24	66,49	4096,59	117,05
2012	384	2477,20	70,78	4736,07	135,32
2013	355	2346,10	67,03	4861,68	138,91

Source: Own processing

Percentage proportion of each costing items to total amount of costs

The first step in cost management and the reduction of costs is the analysis of current situation and comparisons in past years.

Mainly for the cost management it is interesting to observe the proportion of each item of costs. To find out what is most costly and then it can help to reduce some costs, then the management can think of how to reduce these costs or to find out if these costs are not too high unnecessary or if there is a chance to decrease them.

The proportions were changing in years, depending on the changes made in production. For better comparison of the percentage proportion of the costs in the table 7, it is important to know the actual amount of costs, to simplified there has been used the costs of 1 litre of milk. The percentage proportions are compared in the years with the actual unit costs, and the changes in the costs are analysed.

Tab. 7 Comparison of the percentage proportion of costs items in years.

Year	2013	2012	2011	2010	2009
Feed and bedding purchased	3,04%	2,46%	2,01%	1,78%	3,04%
Feed and bedding own	33,52%	30,67%	35,52%	47,84%	43,13%
Other purchased material	2,23%	2,13%	2,40%	1,77%	1,42%
Other direct costs and services	13,53%	13,79%	18,61%	14,47%	13,31%
Total material and services	52,32%	49,04%	58,55%	65,85%	60,90%
Personal expenses	9,11%	9,11%	9,81%	11,12%	12,21%
Depreciation of adult breeding animals	5,72%	5,03%	5,92%	6,43%	8,03%
Depreciation of tangible assets	2,43%	2,17%	2,64%	3,00%	2,94%
Internal work and services	21,26%	24,59%	11,73%	2,87%	5,31%
Production overhead expenses	6,42%	6,48%	6,87%	5,94%	7,95%
Overhead administrative expenses	2,74%	3,58%	4,49%	4,78%	2,66%
Costs of 1 litre of milk	**8,94 CZK**	**9,44 CZK**	**8,74 CZK**	**8,21 CZK**	**8,30 CZK**

Source: Own processing

Now it is possible to simplified the costs and observe, how the proportion of costs influence the unit costs of production. The lowest costs of 1 litre of milk was in a year 2010, in amount of 8,21 CZK, which is still higher than the valuation of production which has been consider 8 CZK. If the comparison of each costing item is made, the results are as follows, the important factor of lowering the costs are the fact, that the costs of feed and bedding owned is nearly than 50%, exactly 47,84%, significant difference is in the costs of personal expenses, which is also quite higher than in other years. The feed and bedding purchased and other purchased material are lower compare to other years. The costing item internal work and services are

also very low, in the year 2010, one of the reason is that in the year 2010 the cooperative did not produce the mineral mixtures by themselves, the costs of this items are high, which is visible from the year 2011 when the costing item internal work and services increased a lot.

To answer a question why the unit costs of 1 litre of milk is in the year 9,44 CZK in the year 2012, which increased about 0,70CZK compared to year before and the next year it was also lower about 0,50 CZK per a litre. In case of looking at the percentage proportion of costs the only significant change in percentage proportion are the internal work and services, which increased by12,86% from the year before and the following year again decreased by 3,33%. The change was caused by the above mentioned intercompany costs of mineral mixtures, which production already begin in the year 2011, but was fully employed in year 2012 when the production costs of mineral mixtures increased about 5 039 703,67 CZK. Other change was in purchased material, feed and bedding, it was more of it purchased than in other years and there was less costs of owned material consumed.

4.4.1 Analysing the costing of calves up to 6 months old

In the cooperative, the new born calves are transferred straight after the birth to the category calves. In this category there are calves fed by colostrum, these are so called colostrum nutrition calves, calves fed by milk or milk substitute, these are so called milk nutrition calves and calves fed by hay, these are called weaned and crop nutrition calves. The period of colostrum nutrition of calves last for about 10 days, when the colostrum is slowly changing to milk, as well as the milk of the cow which gives the birth to the calf. It is very important for immunity system of new born calves to get the colostrum as soon as possible after the birth. The calves are fed by milk up to 8 week, when the other feed is also added. After 8 weeks the calves are so called weaned and feed only by crop feed.

The formula and the costing items are the same in all animal husbandry, also the by-product. The first difference from the dairy cows calculated above is in the amount of main products. Calves have only one main product, which is the weight gain.

The live weight is also important for costing, because usually the costing unit is one kilogram of weight gain and one kilogram in live weight. The live weight of the calves is in compare to the production, the production plus the birth value of the animal. In case of kilogram the live weight is the weight gain plus the weight of the animal when they are born that year, which is 35 kilograms per calf, which it

approximately weight when it is born. The live weight in CZK, means the weight gain plus the value of new born calf which was born in that year, the value of 1 kilo of new born calf is 60CZK and one new born calf weight 35 kilograms, which mean that the value of new born calf of that year is 2100 CZK.

Tab. 8 Overview of production of calves in the years

Year	2009	2010	2011	2012	2013
Production number of animals	380	350	350	384	355
Live weight in kg	74 374	72 995	59 730	62 357	65 437
Live weight in CZK	3546330	3468000	2871600	3007665	3131040
Average price per kg of live weight	47,68	47,51	48,08	48,23	47,85
Number of forage days per year	57349	54045	55392	51621	51720
Average number of animals	157	148	152	141	142

Source: Own processing

Table 8 shows the number of new born calves in the years 2009 – 2013, live weight of the animals, price of kilogram of live weight, which appears to be between 45 and 60CZK, because the new born calf is priced by 60CZK/kg and the weight gain is priced by 45CZK/kg. Other item in the table 8 is the average number of animals which is calculated from the forage days.

In the table 9, there are total costs of production of calves, which is a sum of all costs from costing; costs of main production are the total costs reduced of costs of by-product, which is in this case farm manure, same like in all animal husbandry. Costs of 1 kilogram of weight gain is the calculation of unit costs, according the intercompany price list, one kilogram of weight gain of calves is valued to 45CZK, from the table 9 is seen that the costs are slowly growing and for that reason the profit is decreasing and after the loss is increasing. The reasons of decreasing profit and increasing loss can be the increase in the prices for the milk substitute and other purchase feed and material, because the differences in unit costs of costing unit are in feed and bedding purchased but also in feed and bedding owned, which can be the reason of that the calves are drinking more milk instead of milk substitute which price may increase but are cheaper than the real milk. The reason

of giving milk to the calves can be the worse condition of the milk or some illness of the cows. These two were the only 2 costing items where there are visible changes. In recent years, the category of calves occurs in loss, because the calves require a high standard of feed and care and their production are not so high.

Tab. 9 Total costs, production and profit/loss of each year

Year	2009	2010	2011	2012	2013
Total costs	2542548,74	2508017,67	2619076,97	3339056,98	3811401,40
Costs of main production	2255326,81	2224386,16	2328348,33	2930457,76	3537450,62
Costs of 1kg weight gain	36,93	36,60	49,04	59,91	66,73
Total production	2748330	2735100	2136600	2201265	2385540
Total profit/loss	493003,19	227082,33	-482476,97	-1137791,98	-1425861,40
Unit profit/loss	8,07	8,40	-4,04	-14,91	-21,73

Source: Own processing

4.4.2 Analysing the costing category Young breeding cattle up to two years old

Young breeding cattle are young cow calves which are transferred from the category calves up to six months old. These are only the cow calves and after this category they are going to be transferred to the dairy cows. The calves which are bulls are sold to the Eco farm, which is the subsidiary of the cooperative.

In case of young breeding cattle, the costing are the same like in the case of calves, the table 10, below show the profit/loss which the cooperative achieved over the observed years. The biggest difference which there are between the calves and young breeding cattle are in the weight gain, which is smaller, because the cooperative breeds the dairy breed, which is smaller and the weight gain of this breed is also smaller and that is why the cooperative is more time in loss. One kilo-

gram of weight gain in category young cattle is priced by 40 CZK of intercompany price list.

Tab. 10 The results, the costs, production and profit/loss of the output in animal husbandry, category young cattle

Year	2009	2010	2011	2012	2013
Total costs	4071661,53	3160311,93	3636374,58	3468809,96	3243289,49
Cost of main product	3362405,24	2506121,21	3060329,92	3023767,24	2617052,48
Unit costs	54,18	80,78	86,47	76,30	73,44
Total production (weight gain) in kg	62055,00	31023,00	35390,00	39630,00	35635,00
Weight gain in CZK	2482200,00	1240920,00	1415600,00	1585200,00	1425400,00
Profit/Loss	-880205,24	-1265201,21	-1644729,92	-1438567,24	-1191652,48
Unit profit/loss	-14,18	-40,78	-46,47	-36,30	-33,44

Source: Own processing

As seen from the table 10 the cooperative is all observed years in loss, the explanation can be simple, these are not the bulls of beef breed which need the high weight gain, the more the better, but these are dairy breed cow calves for renewal of herd, these are smaller animals because the breed are there is not a need for great big weight gain.

4.4.3 Analysis of the costing in the category Poultry

The production capacity of the poultry breeding is 200 000 chickens in summer, from September until March the capacity is reduced by 53000 due to worse heating isolation in two production halls. The chickens are purchased when they are 1 day old and the weight approximately 40g. The chickens are usually withdrawn and sold to the poultry group Klatovy in 33-35 days and weight 1,96 – 2,10 kg,, approximately 2kg. Unit costs are calculating to one Forage day.

Tab. 11 The comparison of the percentage proportion of costs in category poultry with the average percentage proportion of costs in the category of dairy cows

Year	2009	2010	2011	2012	2013	Average of dairy cows
Feed and bedding purchase	67,53%	68,24%	71,32%	70,35%	72,13%	2,47%
Feed and bedding own	0,98%	0,63%	0,37%	0,41%	0,33%	38,14%
Other purchased material	5,92%	7,15%	6,13%	6,58%	5,59%	1,99%
Other direct costs and services	6,64%	7,27%	8,90%	11,62%	12,74%	14,74%
Total material and services	81,06%	83,29%	86,72%	88,95%	90,78%	57,33%
Personal expenses	5,12%	4,07%	3,18%	2,61%	2,37%	10,27%
Depreciation of tangible assets	3,45%	5,08%	3,07%	2,84%	2,55%	8,86%
Internal work and services	5,60%	0,85%	0,83%	0,85%	0,76%	13,15%
Production overhead expenses	1,77%	1,27%	0,99%	0,60%	0,41%	6,73%
Overhead administrative expenses	3,00%	5,43%	5,22%	4,15%	3,12%	3,65%
Total costs	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

Source: Own processing

Table 11 shows the huge difference in the percentage proportion of unit costs in the category poultry with the others categories, for the visibility, there is added column called average of dairy cows, which is the average percentage proportion of costs in the category dairy cows.

These differences are perfectly obvious, because the category poultry require completely different breeding approach.

Nearly all feed and bedding in the poultry breeding is purchased, there is only little proportion of owned feed and bedding. As the costs of feed and bedding increased from the year 2009 to the year 2013, the costs of feed and bedding decreased evenly. To compare the costs of feed and bedding, in case of poultry breeding costs of feed represent approximately 70% of total costs. Which is a great difference with beef cattle where the proportion of costs are very various and the feed and bedding purchased represent only about 25%, in that category the feed is mainly consumed from own resources which is about 38% of total costs.

Due to constantly improvements in better automation of operations the costs of personal expenses are decreasing over the observed years from 5% to 2,4%. These costs are very low in comparison with other categories of animal husbandry, where for example in category dairy cows where the average personal expenses are 10,27% which is four times higher than the costs in the year 2013 in the category poultry.

Tab. 12 Profit of the category poultry

Year	2009	2010	2011	2012	2013
Costs of a forage day [CZK]	0,87	0,88	0,96	1,02	1,09
Production of a forage day [CZK]	1,13	1,13	1,13	1,13	1,13
Profit of a forage day [CZK]	0,26	0,25	0,17	0,11	0,04
Number of forage days	44275438	50579632	50092346	50742079	51278304
Average number of chickens in halls	121303	138574	137239	139019	140489
Total profit [CZK]	11345468,81	12603847,43	8752857,92	5506292,62	2136280,46

Source: Own processing

From table 12 is seen that the cooperative is profitable from the category poultry breeding in whole observed period. The unit costs are in the case of poultry breeding the costs of a forage day.

Tab. 13 The cots and profit of 1 chicken in the weight approximately 2kg and rise in 33 to 35 forage days.

Year	2009	2010	2011	2012	2013
Costs of 1 chicken (33 forage days)	28,83	29,07	31,52	33,71	35,92
Costs of 1 chicken (35forage days)	30,58	30,83	33,43	35,75	38,09
profit of 1 chicken (33forage days)	8,46	8,22	5,77	3,58	1,37
profit of 1 chicken (35forage days)	8,97	8,72	6,12	3,80	1,46

Source: Own processing

For better imagination one chicken is fed from 33 to 35 forage days and weight at the end of the period approximately 2 kilograms, it means, that the costs of 1 chicken is approximately 37CZK in the year 2013 as seen in the table 13. The development of the costs and profit for the observed period is found in the table 13.

4.5 Crop production

ZOD Kolinec primarily grows winter wheat, winter barley, winter triticale, maize, rape, legume and cereal mixture, clover and meadow.

Crop production has some particularity, even though the accounting period in ZOD Kolinec corresponding the calendar year, the production of winter crops starts already in September or October the year before, the costs are calculated to the current year despite it appear in the year before, the reason is because the production finishes in the current year.

The crop production is very influenced by weather that is why the production fluctuates every year. More details can be found in chapter Analysis of the costing output wheat in table 14, yearly comparison of production of wheat.
The costing formula used in ZOD Kolinec:

$$
\begin{aligned}
&Planting\ and\ seeds\ purchased\\
&+\ \text{Fertilizer purchased}\\
&+\ Other\ purchased\ material\\
&+\ Planting\ and\ seeds\ owned\\
&+\ \text{Consumption of owned fertilizer}\\
&+\ \text{Consumption of other owned manufactures}\\
&+\ \text{Chemical protection agents}\\
&+Other\ direct\ costs\ and\ services\\
&\_\_\_\_\_\\
&=\ Total\ material\ and\ services\\
&+Personal\ expenses\\
&+Depreciation\ of\ \ tangible\ assets\\
&+Internal\ work\ and\ services\\
&+\ Production\ overhead\ expenses\\
&+Overhead\ administrative\ expenses\\
&\_\_\_\_\_\\
&=\ \ Total\ costs
\end{aligned}
\tag{3}
$$

Planting and seeds purchased

The costing item planting and seeds purchased contains all costs of seeds which were purchased with aim to gain the yield from the certain output of the crop production. The costs are found on the account number 501010 consumption of purchased planting and seeds.

Fertilizer purchased

All the fertilizer which is purchased to improve the quality of the land is covered in this costing item. The ZOD Kolinec uses mainly nitrogen industrial fertilizer DAM 390, nitrate, limestone etc. All the costs can be found in profit and loss statement of the corresponding output on the account number 501020 consumption of purchased fertilizer.

Other purchased material

The costing item other purchased material should cover consumption of fuel on the account number 501300 and other bought material. In ZOD Kolinec is this item in the most cases zero or negative number. Logically it is impossible, but from the practical point of view, the consumption of fuel in the cooperative is assign to the account intercompany costs of auxiliary output of relevant machine or in some cases to overheads. For agriculture there exists so called "Green fuel" which in practice means the refund of paid tax on the fuel used in the crop production ac-

cording the §57 act about excise tax n. 353/2003 coll. and its amendment from the year 2014. For that reason, the costing item consumption of fuel appear as negative number, because the actual consumption was not added to this account by mistake or because it is not effective to assign each litre of fuel to different output, and it was added to auxiliary output tractors etc. But the tax refund was added to the account 501300, because this money was refund to the respective crop.

Planting and seeds owned

The cooperative uses minimum of owned seeds and planting. In the most of outputs, there are zero costs of this item. ZOD Kolinec employ own resources of seeds only in case of triticale in some years, the reason is the only one, that the purchased seeds ensure better potential for higher yield by its cultivation. The costs are found in profit and loss statement of corresponding output on the account number 613131 consumption of seeds and planting of own production, which is revenue account and the number is negative, means the decrease of the revenues by consumption.

Consumption of owned fertilizer

The by-product from the animal husbandry is manure, which is used as a owned fertilizer for the crop production. The costs are found on the account number 599292 release of manuring.

Consumption of other owned manufactures

The costs on the account number 613133 consumption of owned manure, which is on the credit site of the account, belong to the costing item consumption of other owned manufactures. Consumption of other owned manufactures are in most of the cases zero.

Chemical protection agents

The costing item chemical protection agents contains of all costs of the chemical substances needed for grow and the protection of the relevant crop against mould, weeds, insect etc, which are fungicide, herbicide and insecticide. The costs are found on the account number 501040 consumption of chemical protection substances and other material.

Other direct costs and services

The costing item other direct costs and services include all costs on the account number 518300 agrochemical operations, 518400 work on the land, 518891 ground rent, 518 other services, 548210 insurance of the crop.

Personal expenses

The costs of labour include basic wage on the account number 521100, bonuses on the account 521200 and 521300 and social insurance on the account number 524200 and health insurance on the account number 524100.

The personal expenses are assigned to the outputs according the hours which employees work in certain place for certain output. For instance when the employee is send to plough the field where the cooperative will grow wheat, the costs of the labour which employee spent by doing this job is assigned to the personal costs of the output wheat.

Depreciation of tangible assets

On the account 551depreciation of tangible assets in the crop production of relevant output are assigned the costs of depreciated item, in most cases it is the machine, mechanization or equipment used for the relevant output only! If the machine, mechanization or equipment which is depreciable is used for more than one output, the costs of depreciation are included in the production overheads.

Internal work and services

The costing item internal work and services are calculated as the total intercompany costs reduced by the costs on the account number 599292 release of manuring, 599960 production overhead expenses and the account number 599970 overhead administrative expenses. The costs of internal work and services contains intercompany costs of release of manuring on the account 599297, which are the costs of the machinery and equipment needed for manuring, the costs on the account 599860 intercompany costs of power trucks, 599862 intercompany costs of reclamation technicality, 599876 intercompany costs of composts, 599880 intercompany costs of post-harvest treatment, 599890 intercompany costs of tractors, 599891 intercompany costs of combine harvester, 599892 intercompany costs of self-propelled machine and 599893 intercompany costs of heavy mechanization.

Production overhead expenses
The costs on the account 599960 Production overhead expenses of crop production belong to the costing item of the same name. This is the proportion of production overheads which are assigned to the outputs according the direct costs.

Overhead administrative expenses
The item administrative overheads contain costs which are found on the account number 599970 administrative overheads of the company.

Total costs
The item total costs are the sum of all the costs. This item contains of total costs of whole production of the crop which include the by-product, if there is any. Some crops contain a by-product and some do not. The crops which have a main product and a by-product are wheat, barley, triticale, the main product is 0,1 ton of grain and the by-product is 0,1 ton of straw used either for strewing or for fertilization. The crops which have only a main product are the legume and cereal mixtures, maize for silage, rape, meadows and clover. The main product is 0,1ton of green fodder used for haylage or silage or hay.

4.5.1 Analysis of the costing for the output wheat

Wheat contains a main product, which is 0,1 ton of grain and a by-product which is 0,1 ton of straw, used for strewing.

In the table 14 is shown the different production on 1 ha each year. There are many factors why the crop production differ, one of the most important, which cannot be influenced is the weather, type of soil which is on the owned land and the amount of underground water, which is needed for the proper and right grow of the crops. The factors which are possible to influence is the amount of fertilization, which has to be optimal and if the crop are in danger because of some insect, mould or weeds, there exist herbicide, insecticide or fungicide to protect the crops.

The values in the table 14 are tons and ha, in the profit and loss statement and the costing list of the company the valuation was wrong, using different value per 0,1t than in costing list and for that reason, the values are left in the natural units.

Tab. 14 Yearly comparison of production of wheat (all data are in unit 0,1t)

Year	Total production in 0,1 t	Production of straw in 0,1 t	Production of grain in 0,1t	Amount of ha	Production in 0,1 t for 1 ha	Production of grain for 1 ha	Production of straw in o,1t for 1 ha
2009	17 926,82	8 700,00	9 226,82	168,69	106,27	54,70	51,57
2010	20 308,45	10 154,00	10 154,45	164,45	123,49	61,75	61,75
2011	17 200,00	8 600,00	8 600,00	144,12	119,34	59,67	59,67
2012	7 089,50	3 550,00	3 539,50	64,78	109,44	54,64	54,80
2013	15 409,85	8 200,00	7 209,85	127,54	120,82	56,53	64,29

Source: Own processing

The cooperative uses the net realizable value method for costing of wheat. Net realizable value method uses the value of production of outputs, which is subtracted from the total costs and the rest shall be the costs of main production. Poláčková (2010) recommends using the net index method with fixed indexes 88% for grain and 12% for straw in case of wheat and rye, and 85% costs for of grain and 15% of costs for straw in case of oats and barley.

Tab. 15 Comparison of two different methods in costing of wheat

Year	total costs in CZK	costs of 1 ha [CZK]	costs of grain(NRV method) per 0,1 t	cost of grain (index method) per 0,1t	costs of straw (index method) per 0,1t
2009	4 780 210,22	28 337,25	480,36	455,91	65,93
2010	3 431 007,74	20 863,53	297,88	297,34	40,55
2011	2 893 313,03	20 075,72	296,43	296,06	40,37
2012	2 409 414,27	37 193,80	640,60	599,04	81,44
2013	3 219 826,10	25 245,62	401,09	393,00	47,12

Source: Own calculation

Other author Novák (1997) divided the cereals to winter crops which have percentage proportion 88% for grain and 12% for straw and the spring crops which have percentage proportion 85% for grain and 15% for straw, this division are

similar because most of the wheat and rye are winter crops but the barley is also a winter crop.

In the case of ZOD Kolinec is the same in case of wheat, because they grow the winter wheat. So the indexes should be 88% for grain and 12% for straw. Because the cooperative does not calculate the costs by this method, the table 15 contain of the difference in the different costing method.

Table 15 includes the comparison of usage of net realizable value method, which is marked as NRV, and the equivalent index method. The costs of 0,1ton of straw in case of net realizable value method are 40CZK, valued by intercompany price list, the same value for every year.

In the years 2010 and 2011 the costs of production are similar using both of these methods. On other hand, the costs in the year 2012 are extremely high, reason is the higher unit costs of seeds, which is 105,89 in the year 2012, and also higher amount of production overheads, and internal work and services because it is calculated base on the direct costs, which including the high amount of costs of seeds.

In the year 2010 the cooperative started using the costs of the crop production of the year 2009 for the intercompany price list. In the year 2009 the valuation of the production is done by the average costs. So in the year 2009 the production is valued by 303,22 CZK per 0,1ton of wheat. From the year 2010 the cooperative wanted to valued the production of 0,1 ton of wheat by the price 480,36, which is also written down in the intercompany price list. By mistake in the intercompany costing lists there is the price of wheat 300CZK per 0,1ton, this price correspond to price of wheat in the year 2008 and before. For this reason, the costing shall be recalculated for the price of 480,36, but the auditors of the cooperative are not satisfied with this price, because it is too high, that is why the new intercompany price will be recommended on the base of comparison of the costs of the observed years and also by making the average from the costs.

The table 16 shows differences in the unit costs of wheat. The total costs of main product and by-product was already mentioned, here is more important the composition of the costs and differences in production of unit of output each year. The costs of the by-products are the same, because the value of the by-product was estimated to the intercompany price of 40CZK per unit.

Tab. 16 Unit costs of wheat in the years 2009 – 2013 in CZK

Year	2009	2010	2011	2012	2013	Average
Planting and seeds purchased	40,42	26,91	41,59	105,89	43,48	**51,66**
Fertilizer purchased	53,55	40,87	45,29	58,19	43,94	**48,37**
Other purchased material	1,14	0,00	0,00	0,00	-0,74	**0,08**
Planting and seeds owned	0,00	0,00	0,00	0,00	0,00	**0,00**
Consumption of owned fertilizer	2,56	9,26	0,00	2,00	1,15	**2,99**
Consumption of other owned manufactures	4,29	0,00	0,00	0,00	0,00	**0,86**
Chemical protection agents	60,90	44,15	42,96	49,15	38,04	**47,04**
Other direct costs and services	47,23	39,84	27,21	61,37	50,94	**45,32**
Total material and services	210,09	161,03	157,04	276,60	176,81	**196,32**
Personal expenses	23,66	21,45	19,61	31,62	16,32	**22,53**
Depreciation of tangible assets	0,00	0,00	0,00	0,00	0,00	**0,00**
Internal work and services	128,20	79,83	86,81	187,16	144,08	**125,22**
Production overhead expenses	148,39	69,25	66,79	177,95	104,34	**113,34**
Overhead administrative expenses	7,74	6,32	6,19	7,38	5,04	**6,53**
Total costs	518,08	337,88	336,43	680,72	446,59	**463,94**
Costs of the by-product	40,00	40,00	40,00	40,00	40,00	**40,00**
Costs of main product	480,36	297,88	296,43	640,60	401,09	**423,27**

Source: Own processing

First, look at the planting and seeds, the owned planting and seeds were not used, it was all bought. The lowest costs of seeds was in the year 2010, only in amount 26,91 CZK per 0,1 ton of grains. The reasons of lower unit costs are the lower usage of seeds per 1 hectare as well as higher production of grain which means good year. On the other hand the year 2012 was extremely costly for growing the wheat. The unit costs of seeds was 105,89 which is nearly four times more than in the

year 2010. From the comparison of these two years it is obvious, that the costs of crop production are changing can it can be influenced only partly.

On the base of comparison of unit costs of winter wheat, it can be said, that in the year 2012 the production was worse than in other years, and because of lower production of grains the unit costs were higher, opposite was a year 2010.

Reason for the poor production of wheat in the year 2012 can be several, there was dry spring, in the year 2012, which can partly cause the worse yield, as well as it might come to frost damage in the winter 2011/2012 etc.

4.5.2 Analysis of the costing for the output maize

The cooperative grow maize for silage for own consumption. By silage the cooperative feed category of dairy cows and young cow calves from animal husbandry.

The costing unit for costing of maize is 0,1 ton of green fodder. The unit costs of 0,1ton of maize include the costs of cultivation, seeding, harvesting, but the costs which are connected with the production of silage are calculated separately on the auxiliary output silage.

Table 17 shows the unit costs of each costing item and the differences in years. The highest amount of total costs are in the year 2013 in amount 150,51 CZK per 0,1 ton of green fodder of maize. In the year 2012 the amount of total costs was on its minimum per observed years, the total costs in the year 2012 was 84,96 CZK per 0,1 ton of green fodder of maize. To analyse these two years it is needed to look at each costing item and compare it with the rest of the years. In case of purchased seeds, in the year 2013 are significantly higher than in other year, in the year 2012 the costs of seeds are second highest amount in observed years. The other great big difference is in amount of costs of internal work and service, which is apparently the highest in the year 2013, it is higher about 11,48CZK than in the year 2012, but it is not the lowest amount of costs of internal work and services, that appear in the year 2009 in amount only 7,56 CZK. The reason is different cultivation and harvesting methods and the costs of tractors, power tracks, reclamation technicality and composts were much lower than in the other years. Other difference is in the production overheads, which are second highest in the year 2013 and the lowest in the year 2012, it correspond to direct costs which are in the same proportion.

In the end of the year 2009 the cooperative decided to change intercompany price list which meant in nearly all cases the price increase. But in the processing

there appear some error, so that the intercompany price list has changed but the valuation of production stayed the same.

In the table 17 in the row total production of a unit of output which is 0,1 ton of green fodder there is a value 96, 58 this value is the old intercompany price list used at last in the year 2008. Because there is analysis of years 2009-2013 the error cannot be corrected in accounting documents but as seen in the table 17, the company observed nearly all years in loss except in the year 2012, but if the intercompany price list was changed, the results would be better.

Tab. 17 The unit costs of of production of maize for silage in 0,1 tom of green fodder, in CZK

Year	2009	2010	2011	2012	2013
Planting and seeds purchased	8,17	10,56	8,64	11,06	14,33
Fertilizer purchased	5,03	5,52	4,12	5,58	7,22
Other purchased material	0,00	0,00	0,00	0,00	-0,71
Planting and seeds owned	0,00	0,00	0,00	0,00	0,00
Consumption of owned fertilizer	0,94	4,09	0,00	0,74	0,53
Consumption of other owned manufactures	39,05	44,53	53,43	27,80	48,76
Chemical protection agents	5,30	4,21	3,81	5,31	14,60
Other direct costs and services	0,95	0,83	5,96	5,32	4,04
Total material and services	59,44	69,75	75,95	55,81	88,77
Personal expenses	3,70	5,23	3,71	2,74	2,68
Depreciation of tangible assets	0,00	0,00	0,00	0,00	0,00
Internal work and services	7,56	13,84	19,34	14,09	25,58
Production overhead expenses	35,18	15,32	13,09	9,64	31,87
Overhead administrative expenses	3,01	1,42	1,05	2,68	1,62
Total costs	108,89	105,56	113,14	84,96	150,51
Total production	96,58	96,58	96,58	96,58	96,58
Profit/Loss	-12,31	-8,98	-16,56	11,62	-53,93

Source: Own processing

In the table 18, there is shown the change of unit of profit, if the prices were as they should be. The year 2009 has zero profit, because the price was decided to be the costs of the production of year 2009. For better determination of errors which were made in the table there are also shown amount of total production and the total profit in observed years.

Tab. 18 Determination of profit/loss if the production would be priced on the base of price list which is 108,89 CZK-

	2009	**2010**	**2011**	**2012**	**2013**
Total costs	108,89	105,56	113,14	84,96	150,51
Unit production	108,89	108,89	108,89	108,89	108,89
Total production	3538776,18	3484333,47	3894831,51	3941652,24	4235642,87
Profit/ loss	0,00	106 343,57	-152 169,00	866 088,32	-1 619 289,52
Unit Profit/Loss	0,00	3,32	-4,25	23,93	-41,63

Source: Own processing

After consultation with management of the cooperative, and analysis of the costs the decision of the correction of the prices was made. The price made on the base of one year is not optimal, because the production is changing a lot, that is why for evaluation of production was used the weighted average of total costs in the years 2009 – 2013. This price is recommended to be used for following years.

Tab. 19 Determination of profit/loss using for valuation of production the weighted average of costs

	2009	**2010**	**2011**	**2012**	**2013**
Total costs	108,89	105,56	113,14	84,96	150,51
Total production	112,61	112,61	112,61	112,61	112,61
Profit/Loss	3,72	7,05	-0,53	27,65	-37,90

Source: Own processing

The table 19 shows the results, after applying the price of production as weighted average of costs.

Tab. 20 The production and costs of a hectare.

year	2009	2010	2011	2012	2013
Number of ha	109,41	114,33	110,35	121,98	158,00
Production per 1 ha in ton	297,05	279,89	324,15	296,77	246,20
Production per 1ha in CZK	32 344,17	30 476,11	35 295,26	32 313,92	26 807,87
Costs of 1 ha	32 344,17	29 545,96	36 674,22	25 213,67	37 056,53
Profit/loss per 1 ha	0,00	930,15	-1 378,97	7 100,25	-10 248,67

Source: own processing

In table 20 there are demonstrated the production per 1 hectare in tons and in CZK used price of 108,89 CZK per 0,1 ton of green fodder of maize for production of silage, the costs per 1 hectare of maize and the profit/ loss per 1 hectare of green fodder of maize.

As seen in table 20 the production is changing a lot over the years. The value of 1 ha of maize fluctuate from 26 807,87 in the year 2013 up to 35 295,26 in the year 2011. The interesting results of these comparison is that despite of price of 1 hectare in both of these years the cooperative is in loss, because the costs are in both cases higher than the production. The costs are in fact also fluctuating, more about the costs and their proportion was already mentioned above.

The maximal profit which the cooperative gains from production of maize per 1 hectare was in the year 2012. As mentioned in the chapter Analysis of the costing of the output wheat, the production depends on many different factors. In the case of wheat the year 2012 was very bad; in the case of maize this year was successful.

4.5.3 Analysis of the costing for the output rape

Up to the year 2009, the cooperative was using the rape straw for animal husbandry, that is why they were using for the costing the net realizable value method. From the year 2010, they stop using the straw and that is why the method of costing was changed to the simple division method.

Tab. 21 Harvested amount of hectares in observed years

Year	2009	2010	2011	2012	2013
Rape	92,58	111,45	154,97	121,04	140,08

Source: Own processing

Table 21 shows the development of harvested hectares over the observed years. Amount of harvested hectares increased from 92,58 in the year 2009 to 140,08 in the year 2013. The one of the reason can be profitability of production of rape, which is seen in table 25. There is also and again problem with the value of production which is instead of 1322,56 CZK according the intercompany price list 1439,40 CZK. The price 1439,40 was used in the year 2008, and by error, it stayed in the system, The strange thing is that in the year 2009 the price which was used was in amount 1401,28 CZK.

Table 22 shows the differences in production using different prices. In the year 2009 the price of production which was used was in amount of 1401,28 CZK. From the year 2010 up to year 2013 the price of quintal in amount 1439,40 which should be 1322,40 instead. In the table 22 this two prices was compared with the third price which is 1254,59 which is a price of weighted average of costs per observed years. Different amount of profit which is caused by this changes in the production are also compared in the table 22. The prices are decreasing, that is why the profit is also decreasing.

According the intercompany documents the cooperative was in loss only in the year 2012 when there was a problem with black frost by which the rape was damaged and from this reason the production was lower than in other years.

The average price causes the loss for cooperative more often, in the year 2013, when the production of tons of rape was good and the cooperative was normally in profit, after applying the average price of quintal of rape, they are in loss, it must be said, that this loss is only approximately 4CZK per quintal which make loss in amount 16 515,81CZK.

Tab. 22 Comparison of different intercompany prices for unit of production and profit/loss of a each year

Year	2009	2010	2011	2012	2013
Total costs	4436312,40	2627618,97	6106638,43	6228872,00	5221182,42
Unit costs	1378,55	810,74	993,30	1831,78	1258,57
amount of ha	92,58	111,45	154,97	121,04	140,08
costs per 1 ha	47918,69	23576,66	39405,29	51461,27	37272,86
production in 0,1t	3218,09	3241,00	6147,84	3400,45	4148,50
production in CZK (actual)	4509445,16	4665095,40	8849200,90	4894607,73	5971350,90
production in CZK (1322,56)	4256117,11	4286416,96	8130887,27	4497299,15	5486640,16
production in CZK (1254,59)	4037383,53	4066126,19	7713018,59	4266170,57	5204666,62
profit (unit production actual)	73132,76	2037476,43	2742562,47	-1334264,27	750168,48
profit (unit production 1322,56)	-180195,29	1658797,99	2024248,84	-1731572,85	265457,74
profit (unit production 1254,59)	-398928,87	1438507,22	1606380,16	-1962701,43	-16515,81

Source: Own processing

Costs per a hectare were in the year 2012 considerably higher in the year 2012 and the production was the lowest per observed years, which is seen in the table 23, the reasons are already mentioned above. The opposite was a year 2011 when the production was the highest, exactly 11,58q more than in the year 2012.

Tab. 23 Production in quintal per a hectare

Year	2009	2010	2011	2012	2013
Production in 0,1t per a hectare	34,76	29,08	39,67	28,09	29,62

Source: Own processing

Table 24 shows the results from the table 22, the maximal differences in production using only the different prices, the differences of the price 1439,40 CZK/0,1t which is now used with the recommended price of 1254,59 CZK per 0,1 ton of grain. And the actual differences of profit which is the differences of used price 1439,40 with the correct price taken from the intercompany price list for the observed years which is 1322,56 CZK/q.

Tab. 24 The differences of prices in the production of rape

Year	2009	2010	2011	2012	2013
Maximal differences in production	472 061,62	598 969,21	1 136 182,31	628 437,16	766 684,29
Actual differences in profit	253 328,04	378 678,44	718 313,63	397 308,58	484 710,74

Source: Own processing

In case of comparison the unit costs per each costing item in observed years 2009 – 2013 as seen in table 25. It has already been said about the usage of straw in the year 2009 only and about the black frost and its damages on the rape in the year 2012. The situation is similar as observed in the case of wheat, the poor year 2012 and successful year 2010. The same situation is here, when the lowest total costs appeared in the year 2010.

Despite the problems in the year 2012, the costs of seeds are not the highest, but the difference with the lowest costs of seeds is more than 50CZK. In the year 2010 the cooperative used owned fertilization in significantly higher amount than in other years.

Great differences are in the amount of overhead administrative expenses, as well as in production overheads. The differences in production overheads are more than 400 CZK between the lowest and the highest amount, both values are certainly far from average.

Tab. 25 The unit costs of each costing item in the production of rape in the years 2009-2013

Year	2009	2010	2011	2012	2013
Planting and seeds purchased	27,78	10,80	39,81	68,32	68,45
Fertilizer purchased	208,03	204,58	121,04	233,84	156,81
Other purchased material	0,00	0,00	0,00	0,00	-6,34
Planting and seeds owned	0,00	0,00	0,00	0,00	0,00
Consumption of owned fertilizer	4,02	19,66	0,00	3,89	2,20
Consumption of other owned manufactures	64,30	92,07	149,37	127,03	0,00
Chemical protection agents	200,81	178,39	146,76	262,77	252,98
Other direct costs and services	116,99	83,08	84,46	144,56	103,61
Total material and services	621,94	588,58	541,43	840,40	577,71
Personal expenses	38,06	33,04	24,23	35,86	26,55
Depreciation of tangible assets	0,00	0,00	0,00	0,00	0,00
Internal work and services	323,01	140,59	212,81	425,85	349,24
Production overhead expenses	383,99	47,49	202,55	503,99	292,55
Overhead administrative expenses	11,56	1,05	12,28	25,68	12,53
Total costs	1 378,55	810,74	993,30	1 831,78	1 258,57
Costs of the by-product	40,00	0,00	0,00	0,00	0,00
Costs of main product	1 322,56	810,74	993,30	1 831,78	1 258,57
Total production	1 457,27	1 439,40	1 439,40	1 439,40	1 439,40
Production of by-product	40,00	0,00	0,00	0,00	0,00
Production of main product	1 401,28	1 439,40	1 439,40	1 439,40	1 439,40
Profit/Loss	78,72	628,66	446,10	-392,38	180,83

Source: Own processing

4.5.4 Analysis of the costing for the output triticale

There is the third crop in a category of winter crops which prove the pattern already discussed above about the so called bad year 2012 and successful year 2010, the year 2011 was also good – can be said on the second place compared these five years and these crops, and the year 2009 and 2013 are the average years. The costs are detailer described in the table 26.

Tab. 26 Comparison of unit costs of each costing item of production of 0,1 ton of grain in years 2009-2013

Year	2009	2010	2011	2012	2013
Planting and seeds purchased	33,35	29,22	29,26	40,86	30,83
Fertilizer purchased	30,53	16,76	34,82	58,60	37,53
Other purchased material	0,00	0,00	0,00	0,00	0,00
Planting and seeds owned	0,00	0,00	0,00	0,00	6,41
Consumption of owned fertilizer	2,47	11,36	0,00	2,35	1,39
Consumption of other owned manufactures	42,77	0,00	0,00	0,00	0,00
Chemical protection agents	22,99	42,54	46,96	43,57	22,19
Other direct costs and services	13,41	22,94	39,06	72,64	36,21
Total material and services	145,51	122,83	150,10	218,01	134,57
Personal expenses	18,86	14,00	14,50	18,90	22,59
Depreciation of tangible assets	0,00	0,00	0,00	0,00	0,00
Internal work and services	73,96	67,69	61,82	123,57	122,65
Production overhead expenses	109,72	66,20	57,40	83,51	100,95
Overhead administrative expenses	4,34	6,32	6,71	8,43	5,54
Total costs	352,40	277,03	290,53	452,42	386,30
Costs of the by-product	40,00	40,00	40,00	40,00	40,00
Costs of main product	319,31	229,03	250,58	419,82	362,24

Source: Own processing

4.6 Planned costs and control

ZOD Kolinec supplies outsourcing and insourcing to optimize the costs and better utilization the capacity and machinery and potential of labour.

The services of outsourcing are cafeteria services, services of auditor, special agency which train the employee of the cooperative to occupational health and safety.

Insourcing is the service which ZOD offer to others. These services are provided mainly to their subsidiary company, but also others farmers in the regions or municipality. These services for the subsidiary company is renting of the buildings, land and other tangible assets like mechanization and machines, so called methodical assistance which is service of accounting, technician and agronomist. The cooperative also provide to the subsidiary company the services of harvesting of hay, silage and haylage. For other companies the cooperative offer the services of harvesting of wheat or maize for silage.

5 Discussion

In ZOD Kolinec they are already using costing methods, after analysing the methods which they use, there appear some errors and possibility of different solutions.

Before the costing can start, there is a need to determine the outputs in the production and assigning all the costs to these outputs. There are usually main outputs, which corresponds with the production and also auxiliary outputs, to which the costs are assigned, the costs of these auxiliary outputs might be after redistributed to the main production outputs.

The assigning the costs can be sometimes problem, because there is a need to find the right costing allocation base, especially for the indirect costs. The cooperative assigned the overhead costs according the proportion of direct costs, this is a disadvantage for the poultry production, because of a high percentage of overheads, because the proportion of direct costs are very high compare to other category of animal husbandry, thus the poultry production is assigned a large amount of overhead costs. Other methods which might be use are to allocate the costs according the direct wages. This solution would have opposite character and it would give to poultry breeding a great advantage because their wage costs are minimal compare to other outputs. On the other hand it is not very damaging and the poultry breeding are not much burden with the overhead costs, because the breeding is very satisfactory and generate a great profit to the cooperative. As it is seen it is not a simple decision of the management, how to determine the allocation base for the overheads.

From the analysis of costing method in category dairy cows, it is apparent that the cooperative using the combined methods of net realizable value method for subtracting the by-product and some kind of index method for division of costs of milk and new born calf. The cooperative uses the variable indexes which are dependant on production. After a valuation of own production, on the base of percentage proportion of production of these two products, they distributed the costs in the same proportion. The cooperative usually gets to the percentage proportion approximately 96,5 : 3,5. Poláčková (2010) recommends to use also the index methods and to set fixed indexes 94:6 for proportion of costs 94% of costs to assign to production of milk and 6% to assign to new born calves. After recalculation of both techniques, the results are as follows, the obvious situation of decreased costs of milk after costing with recommended method and of course increase of the

costs of new born calves. On the first view, would be too easy to say, that compare to the first method the author recommended method of fixed indexes are too disadvantageous for calves. The differences in both of these methods are too big, by using this method the costs of a calf increase nearly twice. But on the other hand it is needed to say, that the proportion of costs does not depend on the proportion of production in joint production.

In the costing in the category calves up to 6 months old and young breeding cattle, the methods are similar. There has been used the method of net realizable value for subtracting the by-product which is a farm manure and the rest of the costs are the costs of the main production which are the costs of a kilogram of weight gain. The value of weight gain is according intercompany price list 45CZK per kilogram in the category calves up to 6 months old and 40CZK in the category of young breeding cattle. The costs of one kilogram of weight gain in the category calves up to 6 months old in the years 2009 -2013 are fluctuating from 36,93 CZK up to 66,73CZK. The average costs of one kilogram of weight gain are 51,13 CZK. The costs of calves are slowly increasing, from that reason the profit is decreasing and finally the production occur in loss when the costs exceed the value. From the year 2011 to the year 2013 the cooperative is in loss, the reason is that the category of calves is demanding for higher standard of welfare and feed, also it is more labour demanding than the comparable category. The category young breeding cattle is in whole observed period in loss, the reason is the higher costs than the value of the production. The own production shall be valued by own costs according the accounting Act § 25. It means that the intercompany price list shall be reconstruct and the price shall be changed, the recommendation is to value the price of one kilogram of weight gain in average amount of costs from the observed period, which is 74,23 CZK.

While analysing the crop production there appear another differences in costing in the cooperative with the standard recommendation of the literature. These are the cooperative uses the net realizable value method in costing of crop production, they subtract the value of by-product which is in this case the straw by the value of 40CZK per quintal and the rest are the costs of the main production. The recommended method is the index method with indexes of 88:12 which is 88% of costs should be assigned to the production of main product of grain and the 12% are the costs of straw. In this case the differences were not that big. In the years with a good amount of production there were the costs distributed simultaneously using both of these methods, which were in the years 2010 and 2011. In the year

2012 the difference was maximal because this year was a poor production because of the frost damage of 100 hectares of wheat and the rest of production was very weak and partly damaged so the production from the rest was not satisfactory. To compare the whole winter crop production in the year 2012, there is a need to say, that the production and the year was very poor and dissatisfactory for the cooperative. In the case of maize the year 2012 was surprisingly very satisfactory, in only the year 2012 from whole observed period of years the cooperative was in profit according their costing. The reason is obvious, the maize is the spring crop, thus it was not damaged by the black frost and the rest of the year was good for maize.

Recording to the valuation of own production in the cooperative there appear some errors in the costing and profit and loss statements. The whole crop production is by mistake valued by error values, there are old values, used according the intercompany price list at last with yearly delay, or some strange average prices. In the 2009 the cooperative redid their intercompany price list and they used the costs of that year. After the analysis of the changes and the influence, the recommendation would be to make an average price for the crop production from a sample of years. The average price was made according the costing and it is recommended to use it in the crop production. This was a welcome change which the cooperative are pleased to insert into their costing system.

According to all solutions the recommendation for the cooperative is to use the equivalent index method for crop production, where there is a production of 2 products, grains and straw, from my perspective, it would lead to optimization and better distribution of costs. As it is seen from the tables in the practical part, the costs were distributed simultaneously in the years when the production was optimal or satisfactory. The year 2012, when the production was poor, the grain were burdened with much higher costs and the costs of straw are still the same, when it was used the net realizable value method, that is not the right solution, because, if the production is poor, the costs burden shall be increased in both production units in the same proportion.

Further the recommendation is to divide the costs of auxiliary outputs tractors to the main outputs according the wages, as well as other machinery, not according the direct costs, because these correspond to the better use of tractors and assigning the costs is more precise. Of course, this method is more demanding for time, but thank to its precision, it is worth it.

After the consultation with the management of the cooperative, the recommendation of the changes of the costing system was positively accepted. In the case of equivalent index method in the crop production where the recommendation is to use the indexes 88:12 for winter crops and 85:15 for spring crop, the costs burden is better distributed while the equivalent index method is used, because the costs of both products are distributed in the same proportion in every year, hence the management agreed with this method.

In the category dairy cows and the distribution of costs to milk and to calves used in the cooperative is very different from the recommendation and despite the expectations, the change was welcomed, while the management was pleased to use the recommended methodology for costs distribution for milk and calves, because thank to this methodology their prices of calves will change and the cooperative will not sell their calves underselling.

6 Conclusion

The costing in the agriculture company is very specific because the production is not predictable and the costs are never the same. The reason is simple, the agricultural companies have to work with weather and current weather conditions are different especially these days, the production is very difficult and very specific, nobody can predict the situation even a couple of weeks in advanced. Sometimes it is difficult to predict even an hour in advanced, especially in some cases of cultivating processes, when the weather has to be stable otherwise the results are not achieved.

The bachelor thesis covered the topic of costs management in ZOD Kolinec. The objectives was to analyse the costing system used in the cooperative, examine the assigning the costs to outputs and determine the effectiveness and efficiency of the processes. The practical part shows the comparison of the methods used and recommended and the difference over the years. The production was divided to the crop production and the animal husbandry.

In case of animal husbandry the problem appears in the category dairy cows, where there is a joint production of one by-product and two main products. The problem was in using of different index method in case of dividing the costs of these two main products. The cooperative works with the indexes according the production, the recommendation of the methodology according Poláčková (2010) is very different. Despite these facts, the company is glad for these given recommendations and willing to use them.

In case of crop production the situation is very different. The main issue is with the unit costs of each year, because they significantly differ due to influence of the crops by the weather conditions. These influences have a huge impact on the production and because it is weather there is impossibility to change these factors.

The company uses a different costing method than it is recommended. It is the net realizable value method, in case of the satisfactory production of the year, the costs are very similar, but in case of worse year, the costs burden is only on grain, and the costs of straw are the same, which does not correspond to real situation that is why the equivalent index method was recommended.

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Annexe

A The output accounts used in the ZOD Kolinec

Crop production	
100	Wheat
104	Barley
105	Oats and legume-cereal mixture
109	Triticale
120	Peas (Legume-cereal mixtures)
134	Mustard (intercrop)
181	Maize
187	Rape
189	Other (Legume- cereal mixtures)
191	Clover
290	Meadow
Animal husbandry	
700	Dairy cows
702	Calves up to 6 months old
703	Young breeding cattle
705	High-pregnant heifer
710	Cows - beef
733	Poultry
782	Dogs
Auxiliary outputs	
0	output (for corrections)
292	fertilization
297	Hanging machines of Crop production
Outputs number 400 - 600 are auxiliary outputs for the grow of the winter crops - the costs has to move to the next year.	
809	Mineral mixture

850	Workroom
860	Power trucks
862	Reclamation technicality
865	Silage
866	Haylage
867	Production of Hay
876	Composting
880	Post-harvest treatment
890	Tractors
891	Combine harvesters
892	Self-propelled machine
893	Heavy mechanization
900	Production of meals
945	The building
960	Overheads in Crop production
961	Overheads in Animal husbandry
962	Overheads - other activities
970	Administrative overheads
975	Social and health insurance
978	The inventory sold
999	Subsidies