

Information systems in family farm agriculture: monitoring the use of software for financial management of properties

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Abstract

This article aimed to analyze the monitoring of the use of financial management software by family farmers. Data on the use of the software were collected and tabulated from ten producers in the west and northwest region of Paraná, in addition to conducting a semi-structured interview with a field professional from a service cooperative. During the interview, it was identified that the producers' knowledge about finance is basic and superficial. However, even with limited knowledge, producers use the practice of a handwritten cash flow. Finally, it was concluded that the producers lack training and technical depth in the financial management of the property, uncomplicated tools, and that have their operation on mobile devices, however, they demonstrate conditions to use basic controls such as cash flow. It also revealed that producers are not available to acquire information technology resources because they do not have the financial resources to acquire them.

Keywords: Sustainable development; financialization of agriculture; agricultural modernization; land income.

Sistemas de informação na agricultura familiar: acompanhamento do uso de software para gestão financeira das propriedades

Resumo

Este artigo teve como objetivo analisar o acompanhamento do uso do software de gestão financeira pelos agricultores familiares. Os dados de utilização do software foram coletados e tabulados de dez produtores nas regiões oeste e noroeste do Paraná, além da realização de uma entrevista semiestruturada com um profissional de campo de uma cooperativa de serviços. Durante a entrevista foi identificado que o conhecimento dos produtores sobre finanças é básico e superficial. Porém, mesmo com um conhecimento limitado, os



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produtores utilizam-se da prática de um fluxo de caixa manuscrito. Concluiu-se que os produtores carecem de capacitação e aprofundamento técnico na gestão financeira da propriedade, de ferramentas descomplicadas e que possuam seu funcionamento em dispositivos mobile, porém, demonstram condições de utilizar controles básicos como o fluxo de caixa. Também revelou que os produtores não estão disponíveis à aquisição de recursos da tecnologia de informação por não disporem de recursos financeiros para adquirir.

Palavras-chave: Desenvolvimento sustentável; financeirização da agricultura; modernização agrícola; renda da terra.

Sistemas de información en la agricultura familiar: seguimiento del uso de software para la gestión financiera de propiedades

Resumen

Este artículo tuvo como objetivo analizar el seguimiento del uso de software de gestión financiera por parte de los agricultores familiares. Los datos de uso del software fueron recolectados y tabulados de diez productores en las regiones oeste y noroeste de Paraná, además de la realización de una entrevista semiestructurada con un profesional de campo de una cooperativa de servicios. Durante la entrevista se identificó que el conocimiento de finanzas de los productores es básico y superficial. Sin embargo, incluso con conocimientos limitados, los productores utilizan la práctica de un flujo de caja escrito a mano. Se concluyó que los productores carecen de capacitación y profundidad técnica en el manejo financiero de la propiedad, herramientas sencillas que operan en dispositivos móviles, sin embargo, demuestran condiciones para utilizar controles básicos como el flujo de caja. También reveló que los productores no están disponibles para adquirir recursos de tecnología de la información porque no tienen los recursos financieros para adquirirlos.

Palabras-clave: Desarrollo sustentable; financiarización de la agricultura; modernización agrícola; renta de la tierra.

Introduction

It is known that agriculture is one of the main bases of the Brazilian economy, and in this context, a very important actor is family farming, since it has a significant share in the Gross Domestic Product (GDP), besides being the main producer of food (TAGLIAPIETRA, CARNIATTO, BERTOLINI, 2022). Thus, understanding how family farms work and how they are managed is essential for the maintenance of the property, and the consequent permanence of the family on their land (SILVA JUNIOR, et al., 2021).

It is worth pointing out that there are various groups that develop agriculture such as, family farmers, peasants, indigenous people, traditional communities, fishermen, and many other forms and groups of food producers, and from all of them there is potential for transformation in the way food is produced and distributed, which promotes territorial development (FAO, 2019).

Family farming in Brazil is defined by Ordinance No. 234 of April 4, 2017, which establishes it as any productive rural unit, provided that the property is run by the family or individuals without family, with or without eventual aggregates, who explore or combine

factors that have the purpose of subsistence or, still, serving society through products. Despite the definition, the Ordinance delimits what is family farming, since, in order to characterize it a) the actors must live in the same residence; b) they must exploit the same establishment; c) the management of the property must be done exclusively by the family; and, d) the actors depend on the income generated in the rural production family property, even if this occurs inside or outside the establishment (BRASIL, 2017).

Lopes, Basso, and Pauli (2021), comment on several reports about the challenges that family farmers face in the management, mainly on the formation and identification of prices, in addition to access to markets. The authors also point out the importance that the state plays when creating public markets and other stimuli, which allows the inclusion of products from family farming in food security policies.

Despite these stimuli, Kageyama, Bergamasco, and Oliveira (2010) indicate that rural producers need to raise funds in the Brazilian banking system. According to the authors, in 2006, about 18% of rural establishments contracted financing, about 90% of which originated in the national banking system. This implies that only 10% of this volume came from credit cooperatives, which, in general, offer better interest rates and payment terms. This indicates that, even with the government stimuli, there is still much that needs to be done to improve the condition of maintenance and permanence of family farmers on their properties.

Research conducted by Salume, Silva & Christo (2015), indicated that rural producers do not use any kind of financial control, even though this is a necessity for the survival of the property and the family. Still, other authors such as Thomas, Rojo, and Brandalise (2015); Schwert et al. (2015); Paixão et al. (2017), and Dumer et al. (2018), corroborate with the findings of Salume, Silva & Christo (2015), since they identified that several of the wrong decisions made by rural producers are due to the fact that they do not use administrative control mechanisms, which is considered by the authors as negligence.

It is known that the use of management controls is essential for the administration of any enterprise, which is corroborated by Sachs (2008); Jhuniior & Vilela (2018), when they state that its use allows for faster decision making and promotes economic development. An essential element for the maintenance of the business.

Besides the importance of using these elements of control and monitoring, it is necessary that they are associated with an information system that allows its organization effectively, finally, an information system is essential for managers and promote the survival and prosperity of the organization in addition to providing better decisions (JOÃO, 2015).

Within this context, software was developed by Aguiar & Bertolini (2022) aiming at financial controls for the management of family farming properties. SisFarming, elaborated by these authors, contemplates all the stages of construction of the information system that was

produced because there was not adequate software that met the needs of family farmers and that contemplated financial controls.

With the availability of SisFarming, monitoring was carried out to verify the use of the software, which occurred with ten producers in the west and northwest regions of Paraná, indicated by a technical service cooperative and characterized by family farming, collecting information regarding the use and difficulties in operation.

Given the above, it is presented as the objective of this paper to analyze the monitoring data of the use of financial management software by family farmers.

Thus, this research aims to collaborate with studies that will contribute to the knowledge about information systems used in the financial management of family farming, considering the reality and difficulties faced by local producers.

Theoretical review

It is well known that understanding financial management is important for any enterprise. This is corroborated and furthered by Gitman & Zutter (2017), who indicate that knowing about financial management entails understanding management reports, especially financial statement reports, understanding the financial composition of these statements, and understanding the impact of decisions made involving financial indicators.

Complementing this, the authors also point out, with a high degree of importance, that four financial statements must necessarily compose the list of information to support the decision-making process, namely: a) income statement, b) balance sheet, c) statement of changes in equity, and d) cash flow statement (GITMAN & ZUTTER, 2017).

According to Gitman & Zutter (2017), the cash flow report is like a summary of cash entries in each period, moreover, it can provide operational, investment, or even financing information.

Gitman & Zutter (2017) highlight the importance of monitoring operations in the group of financial controls, through financial ratios, since they allow the administrator a view of business performance, once it involves the analysis and interpretation of the results displayed, and thus it is possible to obtain better information for decision making to conduct in the financial and economic management.

As seen, these financial controls are important for business management, and with family farms, it is no different. However, it is necessary to identify which controls and in which way they can contribute to family farmers, highlighting the need to adapt them to their needs.

According to Laudon & Laudon (2014), an information system can be recognized as a set of interrelated components with the ability to collect, process, store, and distribute information capable of supporting decision-making.

The era of computing, created in the second half of the twentieth century with the advent and popularization of computers, provided a revolution with digital technology that transformed information before manual into digital records (ELEUTERIO, 2015). More precisely, between the 1960s and 1970s is that the advances in the electronics industry promote the emergence of Information and Communication Technologies (ICT) (DEPONTI, KIST & MACHADO, 2017).

Also, according to the author, the information is positioned at the following levels: operational, when it is used in day-to-day situations and with immediate effect; tactical, receiving treatment in a detailed way and the combination of diversified sources of information itself and that aims the analysis with broader effects; finally, strategic, where the information is used in more complex situations, with multiple scenarios, trends, and analysis capable of changing the course of an organization (ELEUTERIO, 2015).

Family farming - being a social organization, which aims not only at the subsistence of the farming family, but also food security - benefits from ICT advances, even in the face of difficulties of access, lack of knowledge, or even culture on the part of farmers, improvements are identified in the processes of conducting rural enterprises (DEPONTI, KIST & MACHADO, 2017).

It is also a fact that, in general, Brazilian farmers who demand ICT have a slow introduction to computing and difficulties regarding the use of existing information systems (MENDES, OLIVEIRA & SANTOS, 2011). Besides the barriers established by the lack of financial resources for the acquisition of software (AFFONSO, HASHIMOTO, SANT'ANA, 2015), there is the complexity of the activity that corroborates with the distance of farmers from software capable of promoting aid in the management of properties (ARTUZO, et al., 2016).

Regardless of the size and type of the enterprise, there is the need for management and treatment of information, which in turn is always used to alert, stimulate, provide assertiveness and assist in decision making (ELEUTERIO, 2015).

One of the ways to overcome obstacles and obtain better results is to invest in technical education for workers who deal with technologies. Software development can also facilitate the application, intelligent control and automation of processes, thus promoting a transition to Agriculture 4.0 (SILVA, et al., 2023).

Agriculture 4.0 is a concept that refers to the application of digital technologies such as the Internet of Things (IoT), robotics, artificial intelligence and data analytics to improve efficiency, productivity and sustainability in agriculture. In this way, Agriculture 4.0 can contribute to an effective way of overcoming the barriers and challenges faced when adopting new technologies and promoting the competitiveness of the agricultural sector (SILVA, et al., 2023).

The adoption of advanced technologies contributes to optimizing production and improving efficiency. Agriculture 4.0 also requires a shift in workers' mindsets and skills (HITKA & LIŽBETINOVÁ, 2023).

In this context, the SisFarming software was developed by Aguiar & Bertolini (2022), which includes financial controls such as cash flow, accounts payable and receivable, and cost accounting for the calculation of results in family farming. For the financial management to happen in an adequate way, other functionalities such as customer and supplier records, products, production control, stocks, consumed materials, and purchases are also available for the rural producer.

Method

Regarding the methodological aspects, this research is classified as exploratory descriptive, of a qualitative nature. With the objective of monitoring the use of the information system in the financial management of the properties, a group of ten producers from the western and northwestern regions of Paraná was indicated by a technical cooperative of the region. The producers who agreed to participate in this research were submitted to a screening by the cooperative's technical team, following the principle of having knowledge, even if minimal, about financial control and/or using some information system.

The cooperative mentioned above is characterized as a technical assistance cooperative formed by veterinarians and agronomists, whose business mission is to offer quality, efficiency, and profitability to milk producers and the industry through technical consulting.

The research had cross-sectional data collection, ranging from December 2020 to February 2021. As the data collection coincided with the period of social distance, recommended by the World Health Organization (WHO), as a response to the Covid-19 pandemic. The software used in this research was presented to the manager and the technician, indicated by the cooperative, in person at its headquarters.

The usage data were generated by the software itself and recorded in the logs table, which was later followed up and analyzed in this study from the simulation of its use. This simulation was characterized by the collection of data present in the manual information system (a notebook) used by the selected producers and later launched in the accompanied software considering all its functionalities.

After simulating use, the data contained in the log table was tabulated in Microsoft Excel®, analyzed, and verified which system features and screens met the financial management procedures used by the farmers.

The development of this study also made use of the technique of data collection through semi-structured interviews directed to the field professional, indicated by the service cooperative, acting in the field verifying its perception and vision for having experience regarding the use of management software and financial controls on family farming properties. The interview script is composed of 35 questions that approached the variables indicated in the papers studied, as follows: Information and Communication Technology; Financial Controls/Indicators; Knowledge/Capacity Building. Appendix 1 shows the questions that guided the interview and the authors who support them.

The interview was conducted via videoconference and later transcribed manually, to identify whether the family farmers had previously used any information system for the financial control of the property.

Results and discussion

Ten (10) family farmers were surveyed, and to preserve the identity of the participants, they will be presented as P1 (researched 1), P2 (researched 2), and so on. Table 1 shows the characterization data of the participants of this research.

Table 1: Characterization of producers.

Producer	Location	Total area (hectares)	Area division (hectares)	Production/Cultivation
P1	Matelândia-PR	16	Milk: 0.8 Crop: 3.63	Milk
P2	Iporã-PR	48	Milk: 2.42 Crop: 4.84	Milk
P3	Nova Santa Rosa-PR	9.68	Milk: 4.84 Crop: 3.63 (summer) 8.95 (winter)*	Milk Corn/Soybean for feed
P4	Mercedes-PR	48.40	Milk: 9.90 Crop: 4.84 (summer) 4.84 (winter)	Milk Corn/Soybean for feed
P5	Nova Londrina-PR	38.72	Milk: 38.72	Milk
P6	Nova Santa Rosa-PR	12.58	Milk: 5.07 Crop: 2.62 (summer) 2.90 (winter)	Milk Corn/Soybean for feed
P7	Iporã-PR	12.10	Milk: 6.50 Crop: 3.40 (summer) 3.00 (winter)	Milk/Corn for feed
P8	Palotina-PR	14.52	Milk: 2.60 Crop: 4.84 (winter)	Milk Corn/Soybean for feed
P9	Francisco Alves-PR	6.39	Milk: 11.37* Crop: 6.78 (summer) 6.78 (winter)	Corn for feed

P10	Terra Roxa-PR	7.26	Milk: 4.96 Crop: 1.48 (summer) 1.48 (winter)	Corn/Soybean for feed
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Source: Elaborated by the authors (2022).

It is worth pointing out that P3 and P9 are producers who, to complement the productive area, make use of leases, thus being able to better exploit the space for milk production or farming for animal feed.

Table 2 shows the size of the fiscal module according to its region of origin, these data are provided by the Environmental Institute of Paraná (IAP).

Table 2: Size of the fiscal module of the municipalities of the State of Paraná.

Municipality	Fiscal module in Hectares	Equivalence to 4 fiscal modules in Hectares
Francisco Alves	20	80
Iporã	20	80
Matelândia	18	72
Mercedes	18	72
Nova Londrina	24	96
Nova Santa Rosa	18	72
Palotina	18	72

Source: Adapted from IAP (2014).

It is possible to identify in Tables 1 and 2 that the producers are characterized by strictly family labor, besides the territorial limits that do not exceed the limit of four (4) fiscal modules, an intrinsic requirement in the characterization of family farming. This is in accordance with the current legislation.

It is worth mentioning that the interviewees stated that their source of income is dairy production, and the crop areas indicated in Table 1 are destined for the planting of grains for silage to feed the animals, mainly in winter.

Follow-up results regarding the use of the software

The software used in this research includes financial controls such as cash flow, accounts payable and receivable, and cost accounting for calculating results, indicated in the exploratory survey as suitable for management in family farming. For the financial management to happen in an adequate way, other functionalities such as client, supplier, product, production control, stocks, consumed materials, and purchases are also available for the rural producer.

As commented in section 3 of this study, in the methodology, the data collection period coincided with the COVID-19 pandemic, thus, the manual entries records of the

producers surveyed were collected, scanned, and forwarded to these researchers, by the field professional, so that the data could be analyzed and entered the software developed to validate and monitor its operation. However, it is important to mention that the software was demonstrated in person to the legal representative of the cooperative and the field professional indicated.

During the registration of the financial notes provided by the rural producers, these researchers came across an unexpected need, an important feature not initially foreseen in the project studied by Aguiar & Bertolini (2022), which was a link between the cash flow and the registration of the chart of accounts. Given this, it was necessary to update the software so that there was a connection between the tables "cash flow" and "chart of accounts", which allowed the entries to be standardized as needed. The plan created is shown in Table 3.

Table 3: Chart of accounts used.

Type	Description	Short Description
Revenue	Billing - calf sales	Calf Sales
Revenue	Billing - milk sales	Milk sales
Revenue	Billing - sale of heifers	Heifer sale
Revenue	Billing - cow sales	Cow sales
Revenue	Billing - other revenues	Other income
Expense	Purchase of fertilizers	Fertilizers
Expense	Acquisition of animals	Animals - purchase
Expense	Lease/rental expenses	Lease/rental
Expense	Technical Assistance expenses	Technical Assistance
Expense	Purchase of oats	Oats - purchase
Expense	Limestone purchase	Limestone - purchase
Expense	Expenses with fuel	Fuel
Expense	Acquisition of new equipment	Equipment - purchase
Expense	Expenses with training and courses	Training/courses
Expense	DARF - Payroll expenses	DARF
Expense	Financial expenses	Financial Expenses
Expense	Acid Detergent - purchase	Acid detergent
Expense	Alkaline detergent - purchase	Alkaline detergent
Expense	Pre-packed detergent - purchase	Detergent Pre
Expense	Electric power	Electric power
Expense	Corn Bran - purchase	Corn bran
Expense	Soybean bran - purchase	Soybean bran
Expense	Hay - purchase	Hay
Expense	Fertilizer - purchase	Fertilizer
Expense	FGTS - payroll expenses	FGTS
Expense	Freight expenses	Freight
Expense	Funrural expenses	Funrural
Expense	GPS - Payroll Expenses	GPS
Expense	Herbicides - purchase	Herbicides
Expense	Insecticides - purchase	Insecticides
Expense	INSS - Payroll Expenses	INSS
Expense	Feeding stuffs - purchase	Feed Inputs
Expense	Internet - expenses	Internet

Expense	Expenses with materials and parts for maintenance	Maintenance Materials/Parts
Expense	Expenses with materials/products for use and consumption	Use and consumption
Expense	Expenses with veterinary drugs	Vet. Medications
Expense	Expenses with labor	Labor
Expense	Corn - purchase	Corn
Expense	Nitrogen - recharge expenses	Nitrogen
Expense	Payment/amortization of financing	Financing
Expense	PIS - payroll expenses	PIS
Expense	Feedlot - purchase	Feedlot
Expense	Feed for cattle - purchase	Cattle feed
Expense	Feed for laying hen - purchase	Layer feed
Expense	Various types of feed - purchase	Various feeds
Expense	Mineral Salt - purchase	Mineral salt
Expense	Salaries - payroll	Salaries
Expense	Insurance costs	Insurance
Expense	Semen - purchase	Semen
Expense	Seeds - purchase	Seeds
Expense	SENAR - contributions	SENAR
Expense	Harvesting - service charges	Harvesting
Expense	Insemination service - expenses	Insemination
Expense	Expenses for cleaning and maintenance services	Cleaning/maintenance
Expense	Expenses for veterinary services	Veterinary Services
Expense	Soybean - purchase	Soybean
Expense	Expenses for purchasing supplements	Supplements
Expense	Expenses with fees and emoluments	Fees and emoluments
Expense	Vaccines - purchase	Vaccines
Expense	Anti-worm treatment - purchase	Vermifuge

Source: Elaborated by the authors (2022).

An interesting issue is that in the producers' notes there was no information about the suppliers of the inputs that were purchased in the period. Still, it was identified that all payments were made at "cash price", and this practice was common to all participants in the research. Thus, the register of accounts payable was not used, and the entries were all made directly in the cash flow.

Another relevant point found is that the rural producers surveyed make the receipt entry of the sale of their products at the end of the month. And the great majority registered it as a check paid by the dairy, responsible for the acquisition of the production. Thus, because there was only one receipt at the end of the month, the use of the accounts receivable module linked to the invoicing of the production was unfeasible. As happened with accounts payable, the revenue data were also entered directly into the cash flow of the property, i.e., again the use of this methodology stands out as a control tool used by farmers.

After all the data entries were completed, a read of the system operations table was performed, in this case, the SisFarming log table.

Regarding the number of periods registered and analyzed, it was observed that there are at least four months of notes, most of the respondents registered between 5 and 6, and one of the producers surveyed registered eleven months of records. Table 4 shows the period of data collected from the notes made by the producers participating in the research.

Table 4: Period of posted data identified.

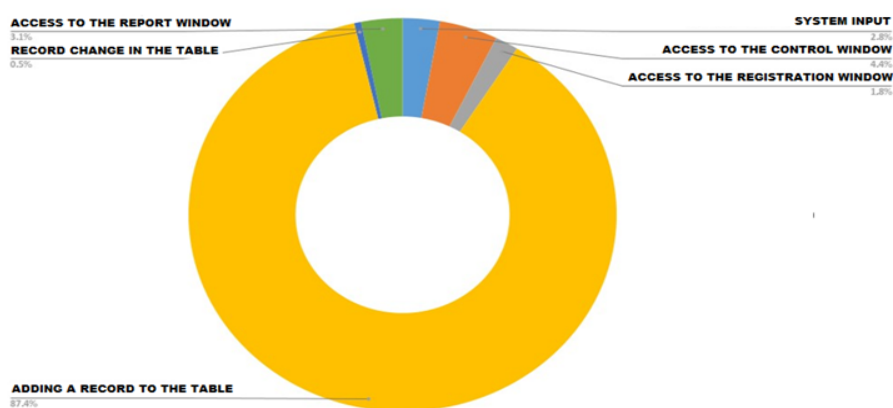
Producer	Start of entries	End of entries	Months entered
P1	September/2020	January/2021	5
P2	October/2020	January/2021	4
P3	August/2020	January/2021	6
P4	September/2020	December/2020	5
P5	October/2020	January/2021	4
P6	March/2020	January/2021	11
P7	September/2020	January/2021	5
P8	September/2020	January/2021	5
P9	October/2020	January/2021	4
P10	October/2020	February/2021	5

Source: Elaborated by the authors (2022).

Analyzing the SisFarming log table, which is recorded automatically, it was observed that the system totaled 1,920 operations. This total of operations is the result of the number of entries made or some change in the chart of accounts. The total number of operations also includes the reports generated to compare the system's entries with the manual notes made by the producers.

Complementing this, not only the entries compute an operation, but access actions to the system, to a particular registration screen, an inclusion, alteration, or exclusion of registered data, as well as the opening of any report, generate an operation. Figure 1 shows the operations performed during the research period.

Figure 1: Operations accessed



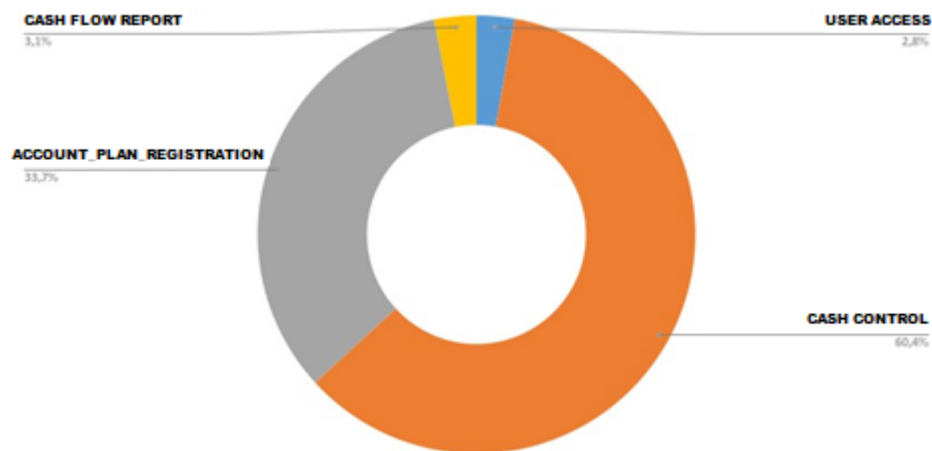
Source: Elaborated by the authors (2022).

To verify the functioning of the system, its daily use was simulated, that is, how the system behaved with several accesses (inputs and outputs), and the use of several producers, each with its specific database. The entries were made month by month, and each month SisFarming was closed and later reopened. Observing Figure 1, it is possible to affirm that the greatest use was made of data entry, representing 87.4% of the total operations performed by SisFarming.

Observing the logs more carefully, one notices the exclusive use of cash flow control. The almost exclusive use of this control is explained by the way of working adopted by the rural family producers since they buy cash price and receive the values of their sales concentrated in the closing of the month of competence.

It was also possible to verify that approximately 1,162 operations, out of a total of 1,920, are exclusive to cash entries. On the other hand, the report for the verification of the cash entries, which allows the visualization of the entries, exits, and final balance of the period, totaled 60 uses. Figure 2 shows the great use of cash flow control as a tool in the financial management of the rural enterprise.

Figure 2: Most used controls.



Source: Elaborated by the authors (2022).

About 33.7% of the operations of the chart of accounts register identified in the system are the result of the registration of the standardized plan offered to the producers, as mentioned above.

Thus, it is verified that the system had its greatest use in cash flow, but the producers surveyed do not have the knowledge to work with cost accounting and indicators, tools available in the system. According to Albuquerque (1985) and Santos & Pinto (2018), it is understood that rural family activities perform multiple functions, like several other

enterprises, such as buying, selling, contracting services, and production. Thus, the basic principles of PODC (Planning, organization, direction, and control) are considered universal, thus, they should be applied in any activity, whether industry, commerce, service provision, or rural production.

Results obtained from the interview

A semi-structured interview was conducted with the field professional appointed by the cooperative to mediate the actions between these researchers and the farmers. This was necessary because, as already mentioned, at the time of data collection we were going through the Covid-19 pandemic. Besides this, another reason to have a mediator between researchers and farmers is that it is common for farmers to see researchers as government enforcement agents, which generates a certain fear of passing on information, especially financial information.

At the first moment, the professional was asked if the surveyed producers use some kind of information and communication technology, to which she pointed out that the use is restricted to cell phones and smartphones, and that, due to the difficulty of internet access, many use their devices only by mobile network, which is in line with what Lizzoni, Feiden & Feiden (2018) report, when they point out the need for the use of mobile software, this feature of availability for the software could favor the use, in addition to the updating of data in real-time.

Complementing this, the interviewee indicated that this feature would be very important and would facilitate acceptance of use since the producer would make the records at the exact moment of the generating event. Similar characteristics were identified in the research of Szabo, Romanova & Bolek (2017) and Nitsenko, Mardani & Streimikis (2019).

It was described that family farmers have difficulty in using computerized controls in financial management, and this may occur due to the complexity of its use, or even, due to the amount required for the acquisition of software, which makes its purchase and maintenance unfeasible. This reality is in line with the findings of Affonso, Hashimoto & Sant'Ana (2015), who point out the need to have viable alternatives to motivate the use of computerized management. The family farmers who perform some kind of financial control do so in a totally manual way, that is, without employing any kind of information technology, contrary to what Szabo, Romanova & Bolek (2017) say.

Regarding the obstacles in the use of technological tools for the financial management of family farms, as already discussed, it was identified that producers only use smartphones as a communication and information tool, not using information systems because of the acquisition and maintenance costs, and because of complexity. The

interviewee also reported that waste could be avoided if family farmers used computerized control systems. These realities corroborate the findings of Affonso, Hashimoto & Sant'Ana (2015).

The mediating technician was asked if the use of ICT in rural properties would allow positive results to be obtained, and she said yes since, with better information, producers have more subsidies for decision making, not only for them but also for the professionals who provide advisory services to the properties. These results are in line with the work of Artuzo, Jandrey & Kalsing (2016), and Lizzoni, Feiden & Feiden (2018).

About the use of ICT in rural properties, Artuzo, Jandrey & Kalsing (2016), and Passion, Lopes & Costa (2017), point out that the use is related to the size of the property and production. However, information was found that is contrary to what the authors pointed out, as the interviewee points out that this varies from region to region served by the service cooperative, such as the example of a producer surveyed who, alone, produces 1,800 liters of milk per day, and only has a cell phone, in the words of the interviewee "very old," i.e., he does not even have a smartphone. Another producer assisted by the cooperative, even having only 5 cows and milk, performs reproductive control in a smartphone application, and according to her: "he works well with the application."

In the sequence, the interviewee was asked about the reasons that could lead family farmers to use ICT more, such as the perception of improved results, and if the main obstacles to acceptance in the use of computerized controls are linked to little or no information about ICTs, the complexity of agricultural and livestock activities, or the difficulties in implementing management controls. Questions found by Jandrey & Kalsing (2016).

The field technician pointed out that the reality is that few producers use ICTs, and when they do it, it is only for reproductive control of dairy cattle, and she emphasizes that the producers that use them do not abandon the software (application). She also explains that there are agricultural activities that are complex and there is a lack of technical knowledge among producers. Besides, there is a scarcity of information about the software that can facilitate this kind of management, also, the complexity of computerizing the whole process of the rural family property.

These statements are in line with those from Haberli Jr., Oliveira & Yanaze (2015) when they indicate that the computerized systems should be adjusted to the producer since only then there will be acceptance and use on their part. The interviewee reinforces these statements since she informs that any change to be implemented on the property should facilitate, otherwise farmers do not adhere.

In the interview, it was clear that the family farmers surveyed are not willing to change and invest in management control technology, and they are unwilling to obtain new control devices and software. This refutes what Tyrychtr, Ulman & Voltrovský (2015), and

Szabo, Romanova & Bolek (2017) point out, who state that farmers are willing to invest in technologies.

Furthermore, it was identified that the family farmers surveyed understand that there is a need for financial controls, as pointed out by Tyrychtr, Ulman & Voltrovský (2015). However, they stated that the complexity and excessive workload of the activity they perform on their properties demands full-time dedication, with no time left for the performance of other functions. The lack of time is an element explained by Seramim & Rojo (2016).

When asked if the management software could cooperate with better results for family farmers, the field technician reported that not only the results, but the improvement would be reflected throughout the process. This assertion is in line with Kozachenko, Panadiy & Chudak (2019), who discuss the need for software that can control the allocation and apportionment of machinery costs to production, which would make the distribution of costs fairer in the pricing of products.

The field professional was asked if the rural family producers use any financial control, to which she said no, also revealing that out of a total of 297 producers assisted by the cooperative, only 15 of them make notes on their finances, consolidating the findings of Paixão, Lopes & Costa (2017), who state that producers do not make financial controls.

Other relevant points were indicated by the field technician: (a) the issue of using financial controls is not subject to the size of the property, in her perspective, the larger the extension, the greater the difficulty of implementation will also be, given the volume of information and inputs, which is contrary to what Paixão, Lopes & Costa (2017) state since, according to the authors, the smaller the property the greater would be the interest for financial control; b) on the use of spreadsheets or notebooks, it is estimated by the interviewee, since these notes play a very important role in helping the technicians and universities that provide services to producers, enabling them to use simple control mechanisms. This second point corroborates what Paixão, Lopes & Costa (2017) indicate, showing the importance of the use, even those made manually, of control mechanisms in property management. However, it is exactly at this point that the difficulty and shortage of producers are found, which can be changed through capacity building and training that provides them with skills for property management. This is corroborated by Seramim & Rojo (2016), Lizzoni, Feiden & Feiden (2018).

It is noteworthy that, from the interviewee's perspective, the lack of management on the property is not closely linked to the level of education of producers, since she attends semi-literate farmers who have an interest in knowing the result of the production. This reflects Tyrychtr, Ulman & Voltrovský (2015), Salume, Silva & Christo (2015), who state that the responsibility of making the notes falls on the family member with higher education to carry out controls and reports.

When asked about the likelihood of family farmers abandoning their activities if they knew the exact profit of their production, the interviewee said that some producers comment that **"if they make the notes of the milk production, then they would stop because they believe that milk is not profitable"** (our emphasis). Despite this type of comment, the field technician points out that her experience shows the opposite since, by using management controls, even if manual, she has been encouraging small producers to invest and increase their production because the results are positive. This corroborates the findings of Seramim & Rojo (2016), about the impact on production, and those of Affonso, Hashimoto & Sant'ana (2015), Moreira, Melo & Carvalho (2016), about the increase in production based on the positive result.

As stated by the interviewee, the cooperative's technicians require family farmers to make administrative notes and controls, encouraging them to have information about expenses and income always updated. The technician affirms that this charge is necessary, because, otherwise, the producers will not do any kind of control. This statement is in line with the findings of Silva & Gazolla (2016), Thomas, Rojo & Brandalise (2017), demonstrating the absence of management in rural properties. As already discussed, it is notorious the difference between producers who make use of controls and those who do not. This second group, i.e., those who do not do any kind of control, do not know basic information about their activities, such as, how much a certain input or medicine was used during the period.

This lack of controls makes producers alienated as to the gain or not of their activities as indicated by Haberli Jr, Oliveira & Yanaze (2015), Tyrychtr, Ulman & Voltrovský (2015), Salume, Silva & Christo (2015), Biazio, Dani & Eckert (2015), Zambon & Bee (2016), Silva & Gazolla (2016), Moreira, Melo & Carvalho (2016), Seramim & Rojo (2016), Paixão, Lopes & Costa (2017), that the lack of financial information makes them believe that the production is in constant loss, believing at most in the condition of a balance between inputs and outputs.

About the calculation of expenses, the interviewee was asked how much control of costs and expenses could contribute to the management of the property. In line with the notes of Schwert, Cruz & Rossato (2015), the field technician states that the property would have much to gain since, with this, it could find a break-even point of the activity. She also mentioned that side activities, within the rural property, contribute financially, paying, for example, leases and/or financing. This is proven by Dumer, Silva Junior & Silva (2018), when they state that by combining the main activity with other crops it is possible to improve the profitability of the property.

The field professional also highlights that she is unaware of financial control that is ideal for the small rural producer, in line with what Salume, Silva & Christo (2015) say, and

that the number of rural producers who do some financial control on their property is very small.

Regarding which financial control would be more practical for producers, the field technician indicated that the cash flow is what contributes the most, due to the way they work since, as already commented, the payments of purchases are in cash, most of the time, and the purchases made in installments are posted in future boxes, which corroborates the statements of Thomas, Rojo & Brandalise (2017) about the contribution of cash flow.

The entries made by the rural family producers are checked by the cooperative's technicians who regularly visit the properties. At these moments, the technicians make the adjustments that are necessary, in addition to contributions made for the producer to clearly understand what is happening on his/her property. These contributions involve not only a better understanding of the information for decision making but also the identification of possible flaws in the process, such as, for example, the excessive use of medication in dairy cows and the forecast of increased future expenses. This is in line with the findings of Seramim & Rojo (2016).

About the labor used in the property's activities, it was asked whether the producers establish any cost value for the family labor employed on the property. What was found agrees with what was exposed by Sololoski, Grzebieluckas & Santos (2017), that the family farmer does not consider their labor in the process, seeing as profit the simple fact that they are not paying labor to third parties.

The last question made to the field professional was in relation to the time of return on investment in the property, i.e., if she knows that any producer makes an analysis of the time of return on the investment made. Her statement was clear and direct: **"they don't do it; they also have no idea how to make this calculation"** (our emphasis). This finding reinforces the findings made by Sololoski, Grzebieluckas & Santos (2017) and Soschinski, Schlotefeldt & Basso (2018).

Final remarks

With this research, it was possible to verify, as raised by the research and confirmed in the interview, that the producers do not have the knowledge to work with cost accounting and indicators, tools available in the system. During the interview, it was found the opportunity to develop a mobile platform software, i.e., technology that can be used on a smartphone, easy to use, with features for cash flow management and free access. These features could stimulate family farmers to control their finances.

It was evident in this study that monitoring the use of the software demonstrated that cash flow control is the tool used by family farmers as a financial management tool. This

finding was also identified in the interview with the technician in charge and is in line with the findings of several authors researched in this study. This is because it is a simpler control to be performed, which may be a factor of greater acceptance by producers. However, despite being simpler, and requiring less training, in the interview, it was identified that due to the way the respondents develop their activities, this control is the most indicated, since they make payments for purchases in cash, and the sales receipts, since they are for a single "customer", happen at the end of the current month, which makes the implementation of control of future payments and receipts unfeasible.

The authors surveyed in this study indicate the use of other controls such as cost accounting and performance indicators, however, according to the interviewee, their use requires the training of family farmers, which demands time they pointed out they do not have. Thus, it was also found in the table of logs that these control functions were not used at any time during the monitoring of the use of SisFarming, since the notes used for recording/releasing in the software, were limited to elements of cash flow.

It is worth mentioning that, despite the use of cash flow, family farmers do not make use of the analysis of the determination of the cash flow balance, i.e., they do not consider the result of the cash flow as explicit operating profit or even loss of the activity performed. It is also valid to reinforce the discovery made in this research as to the use of cash flow control was performed in a totally manual information system, that is, in handwritten form, and later launched in the accompanying software.

Thus, it is concluded that both the monitoring data collected and the information identified during the interview with the technician corroborate the statement that producers have difficulty using software, not only management software, but technological tools in general. In time, it is suggested research that follows the development and use of software in the mobile platform, with the control of cash flow integrated with the automatic capture of data related to electronic invoices of products and services issued during the acquisition by the producer, facilitating and reducing the number of entries and calculation of the results of the operation performed in rural enterprises.

This study corroborates data on the use of financial controls by family farmers, their availability of financial resources to acquire technological tools, and their willingness to use more elaborate controls.

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Appendix 1 - Interview script

Authors	Issue
Topic: Information and Communication Technology	
LIZZONI, FEIDEN & FEIDEN, 2018.	Do farmers make use of any kind of information technology (ICT)?
	Would the farmers like to make use of an online tool?
AFFONSO, HASHIMOTO & SANT'ANA, 2015.	Is it difficult to acquire software for financial control?
	Does the farmer have difficulty in using software for financial control?
	Do they believe that the use of a tool avoids waste of resources?
ARTUZO, JANDREY & KALSING, 2016; LIZZONI, FEIDEN & FEIDEN, 2018.	Does the use of information technology (ICT) on the farm favor better controls and results?
ARTUZO, JANDREY & KALSING, 2016; PAIXÃO, LOPES & COSTA, 2017.	Is the size of the farm related to the use of ICT?
ARTUZO, JANDREY & KALSING, 2016.	Is the increase in the use of ICT related to the perception of improved results?
	Is the difficulty in using computerized control tools linked to the complexity of the farming activity?
	Is the lack of information by the producer linked to the lack of ICT and management controls?
HABERLI JR., OLIVEIRA & YANAZE, 2015.	Does the ability of the tool to adjust to the farmer favor its use?
TYRYCHTR, ULMAN & VOLTROVSKÝ, 2015; SZABO, ROMANOVA & BOLEK, 2017.	Are farmers willing and interested to invest in mobile devices?
TYRYCHTR, ULMAN & VOLTROVSKÝ, 2015.	Are farmers aware of the need to use computerized control tools?
SZABO, ROMANOVA & BOLEK, 2017.	Do farmers make use of any information technology?
SZABO, ROMANOVA & BOLEK, 2017; NITSENKO, MARDANI & STREIMIKIS, 2019.	Is there a preference for using local or online software?
KOZACHENKO, PANADIY & CHUDAK, 2019.	Do they believe that some kind of software can help with management?
Topic: Financial Controls/Indicators	
PAIXÃO, LOPES & COSTA, 2017.	Do farmers make use of financial controls?
AFFONSO, HASHIMOTO & SANT'ANA, 2015; MOREIRA, MELO & CARVALHO,	Do they believe that activity reports allow for more assertive decision-making?

2016.	
LIZZONI, FEIDEN & FEIDEN, 2018.	Do the farmers have difficulty in pointing out the financial aspects of the property?
PAIXÃO, LOPES & COSTA, 2017.	Do small properties have difficulty in the financial organization?
	Do those who do not use management software make use, at least, of spreadsheets or notebooks?
HABERLI JR., OLIVEIRA & YANAZE, 2015; TYRYCHTR, ULMAN & VOLTROVSKÝ, 2015; SALUME, SILVA & CHRISTO, 2015; BIAZIO, DANI & ECKERT, 2015; ZAMBON & BEE, 2016; SILVA & GAZOLLA, 2016; MOREIRA, MELO & CARVALHO, 2016; SERAMIM & ROJO, 2016; PAIXÃO, LOPES & COSTA, 2017; DUMER, SILVA JR. & SILVA, 2018.	Do farmers know and analyze production costs and expenses?
SALUME, SILVA & CHRISTO, 2015.	
SERAMIM & ROJO, 2016.	Are there no adequate financial controls for small producers?
	Are the labor activities performed very time-consuming, with no time remaining for the use of controls in management?
SCHWERT, CRUZ & ROSSATO, 2015.	Will knowing the real cost of production discourage operations or cultivation?
SILVA & GAZOLLA, 2016; THOMAS, ROJO & BRANDALISE, 2017.	Would the calculation of production costs contribute to management?
SCHWERT, CRUZ & ROSSATO, 2015; ZAMBON & BEE, 2016; SERAMIM & ROJO, 2016; THOMAS, ROJO & BRANDALISE, 2017; ROSA, SOARES & IUDÍCIBUS, 2018.	Does the cash flow control contribute to the expenses forecast?
SOLOLOSKI, GRZEBIELUCKAS & SANTOS, 2017; SOSCHINSKI, SCHLOTEFELDT & BASSO, 2018.	Is there any calculation of return on investment?
SOLOLOSKI, GRZEBIELUCKAS & SANTOS, 2017.	Do the producers do any measurement of labor?
DUMER, SILVA JR. & SILVA, 2018.	Do they think it is important to know the property's break-even point?
Topic: Knowledge/Training	
LIZZONI, FEIDEN & FEIDEN, 2018.	Does the farmer receive any kind of assistance for financial planning?
	Does the farmer lack the knowledge for financial control?
TYRYCHTR, ULMAN & VOLTROVSKÝ, 2015; SALUME, SILVA & CHRISTO, 2015.	Is the use of computerized tools linked to the level of education?
SERAMIM & ROJO, 2016.	Does the technical follow-up strongly help to determine the results?

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The scientific contributions present in the article “Information systems in family agriculture: monitoring the use of software for financial management of properties” built together by the authors. The author **Evandro Mendes de Aguiar** was responsible for the theoretical-conceptual development, for data acquisition and its interpretation and analysis, as well as preparation and writing of the manuscript. The authors **Sandra Mara Stocker Lago, Giani Carla Ito, Geysler Rogis Flor Bertolini** will be responsible for the conception and design, critical review of the manuscript, technical procedures and translation of the article.

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