**Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development**
**Vol. 24, Issue 2, 2024**
**PRINT ISSN 2284-7995, E-ISSN 2285-3952**

# PROBLEM-SOLVING GROUNDS IN SMALL-SCALE FARMING IN WESTERN ROMANIAN AGRICULTURE

**Cosmin SĂLĂȘAN[1,2], Laura ȘMULEAC[2], Vedran TOMIC[3], Doris FLOARES[2], Alexandra IBRIC[2], Raul PAŞCALĂU[2]**

[1]Universidad Católica del Maule, Facultad de Ciencias Agrarias y Forestales, Escuela de Agronomía, Casilla 7-D, Curicó 3349001, Chile, E-mail: cosminsalasan@gmail.com
[2]University of Life Sciences `King Mihai I` from Timisoara, 119, Calea Aradului, Timisoara, Romania, E-mails: cosminsalasan@gmail.com, laurasmuleac@usvt.ro, dorisfloares@usvt.ro, alexandraibric@usvt.ro, raul.pascalau@usvt.ro
[3]IPN Institute for Science Application in Agriculture, 68b Despota Stefana Blvd, Belgrade, Serbia, E-mail: vtomic@ipn.bg.ac.rs

***Corresponding author***: raul.pascalau@usvt.ro

***Abstract***

*The paper introduces the analysis results over a selected number of small-scale farms in the Western Romanian agriculture, more precisely in the counties of Arad and Timis. The purpose of the investigation is linked to the assessment of need for advisory services input in solving the problems of the farmers, particularly for the ones operating in small farms. Analysing the returned answers in connection with the fields of interest or needed expertise, accounting for the forms of mutual or directional help, compiling any forms of advice inputs, including the specialised structures other than public in absence of a function Farm Advisory Service allow the development of a structured image in terms of current problems, the way of solving and the interactions among the farmers inside or outside their communities. The quantified findings can serve as base for a public policy recommendation in the field of farm advisory as part of the Agriculture Knowledge and Innovation System.*

***Key words*****:** *problem-solving, extension, advisory services*

## INTRODUCTION

The Common Agricultural Policy of the European Union represents the reference system for supporting the needs of the farmers in terms of knowledge and innovation [6]. With the aid of the specifically developed instrument, the Farm Advisory Service [7] it provides for the enlarged farming community the type of subsidized interventions expected individually at the farm level. Romania as a member state had and has access to this type of publicly supported intervention sets and aims for the first time to approach their use as an instrument for the newly shaped Agriculture Knowledge and Innovation System in the current programming period. The use of digital technologies is recognized by the World Bank as one of five key issues in agriculture [23].

The agricultural advisory services were long time apprised in need for a future reevaluation and reform with the aim of better using the available resources for an enhanced impact on the farmers and their communities [1]. Redefining the roles in agricultural extension by using a conceptual framework, [5] identified among other findings that the work is very personal subject linked to the identity for the farmers. After a long and successful set of consultations the FAO launched a Family Farming Knowledge Platform meant to support, inspire and guide the small-scale initiative in their business orientation [8]. Agricultural extension was for many years the work-horse of the agricultural extension and regardless the nature of contributor to the extension work the usual suspect when success is less than expected is represented by the provider of advisory [16].

The most recent developments in information technology brings extensive contributions of the machine learning and artificial intelligence to agricultural extension work and research identifies new specific needs in curricula adaptation for the advisory workers [19]. The

Information and Communication Technologies for agricultural extension had a continuous evolution and adaptation in the effort to meet the agricultural advisory needs [22]. During the COVID-19 health crisis digital agriculture accelerated the digital delivery of extension for smallholder farmers as part of the Rural Poverty Stimulus Facility [11] of International Fund for Agricultural Development. The use of digital advisory services was apprised and assessed as positive by the agricultural extension agents [12]. However, the impact of digital transformation in agriculture cannot be seen as a magic wand [13] as packed with all the benefits there are series of shortcomings. Current extension services use different sets of instruments developed experimentally, tested, validated and incorporated as part of available advisory tools, all based on the benefits they produced [2]. The effects are both positive and efficient with a highlight on localization of the provided technological adaptation or solutions and therefore a higher scale of the impact.

Smart farming using tested and validated models may lead to a large range of results when used in small-scale farming given a large number of reasons [18]. Researchers weight the smart agriculture as an urgent need for the developing countries [9] particularly having in view the population growth perspective and the need to improve the developing countries' GDPs. The enhancements and the progress credited to the information technology are definitely beneficial for the agriculture and advisory work yet answering the triple challenge of the agriculture: feeding a growing population, providing a livelihood for farmers, and protecting the environment proves to be a hard nut for the multi-challenge [17]. Although the digital environment can model and solve virtually most problems moral constraints with localized knowledge are required to balance the interventions and their long-term impact in each and every of the three directions.

The sustainability of agriculture as practice is consistently influenced by the university extension activities [3]. Solving problems in sustainable agriculture can be supported by university involvement in training their graduates using digital technologies and based on cases openly available [20]. Small farms are, particularly important for the fresh products in developed countries yet the use of advanced technologies require large investments unavailable for the small-scale operations [4]. Precision farming although a solution for large scale farms is also approachable from the small scale farms perspective if supplementary funding become available to support the adoption [15]. Therefore technological advancement might not always be the solution despite the obvious and proved benefits even in the case of the small-scale farms.

Adopting climate-smart agriculture in small-farms requires extra resources usually provided by extra-income activities developed parallelly to farming in developed countries [14]. The inquiries of the present research identify over 10% of respondents indicating that their household budget would be questionable without the non-agricultural income supplementing the income from farming.

Although there are no conflicts of interest when connecting agricultural advisory services with agri-input business as extra costs are balanced by extra income, the consumers and the environment might suffer and within the public policy framework the situation might lead to issues [21].

The current paper aims to answer the research question related to the current grounds of problem-solving for the small farms in Western Romania. The circumstances of an absent advisory system and the results of surveying small or family farms indicating a large number of structural issues make the inquiry actual and of interest not only for the research yet for policy makers and other private actors. The study will identify and collect answers and opinions on critical elements necessary for proper problem-solving in small farms. Solving problems is considered central to the current operation of the farms as well as for the development options.

## MATERIALS AND METHODS

The approach is supported by questionnaire implementation structured in three parts, a profiling part identifying the production, scale, and the farmer's profile (age, education, farming experience). The second part is dedicated to the problem-solving incorporating the satisfaction self-appraisal for the current situation, the problem-solving effect or satisfaction about the resolution results level, communication and involvement with other farmers, offering help, sources of support and sources of knowledge, and development prospects and priorities. The third part, not used in the present study, collects more precise data about the use of digital technologies, equipment used and applications, general use of digital technologies and applications used in connection with the farming activities.

The sample of small farms used to harvest the answers by questionnaires consists of 119 subjects after cleaning and consolidating the answer database.

Little over 70% of the respondents are male (71%) while the rest is represented by female head of farms, with an age distribution for the entire sample of 64% under the age of 45, while 27% of respondents have 46 to 60 years of age and the rest of 9% have over 60. Also, among the first age share 49% of the total sample are aged of 31-45 years of age and the youngest share, 18-30 years of age represents 15%.

In terms of education, 24% of the respondents have a bachelor or equivalent level, 26% have a master's degree or doctoral studies, 40% have secondary or tertiary short cycles and only 10% have primary education or less.

The land ownership places two thirds of farmers in owned land only, 8% on leased land only and the rest of 27% farming on both own and leased land.

The selection of respondents aimed to place the participating farmers in a classified distribution regarding the farming experience; in this respect, one third of respondents have more than ten years of experience, respectively, 11-20 years; 22% have 6-10 years of experience; 29% have less than 5 years of farming, and the remaining 18% have been farming for more than 20 years.

This sequencing attempts to maintain the specific ratios valid for small farms revealed by earlier research in the field.

The questionnaire structure follows an earlier proved methodology used during the implementation of the WiseFarmer project [10] targeting the critical points regarding the opening for collaboration, typical actions and interventions, main obstacles encountered in ordinary farming activities, the level of satisfaction of the farmers, communication with peers or third parties, their current level of involvement and participation in organised or ad-hoc support organisations.

## RESULTS AND DISCUSSIONS

The most important findings are presented by sequences related to the elements considered critical to the problem-solving process in farming.

Figure 1 below displays the level of satisfaction in relation to the overall economic results from farming to the general working conditions and to the personal life as level of comfort.

The largest number of answers, as illustrated bellow, point towards the "somewhat satisfied" option that indicate that respondents are rather satisfied with their current standing.


Fig. 1. Satisfaction levels regarding economic results, working conditions and personal life
Source: Survey data.

That type of answer was selected by 2/3 of the respondents (66%) for the farming economic results, while for the other two investigated directions respondents only amounted less

than half of the total, respectively 48% for the personal life and 41% for the working conditions. Important observation indicates that positive answering to this question gather systematically more than 90% of answers from 92 to 97% of total describing relative positive grounds for these general three directions.

The next question inquired the sources of professional support for farming, graphically introduced in the Figure 2 bellow.

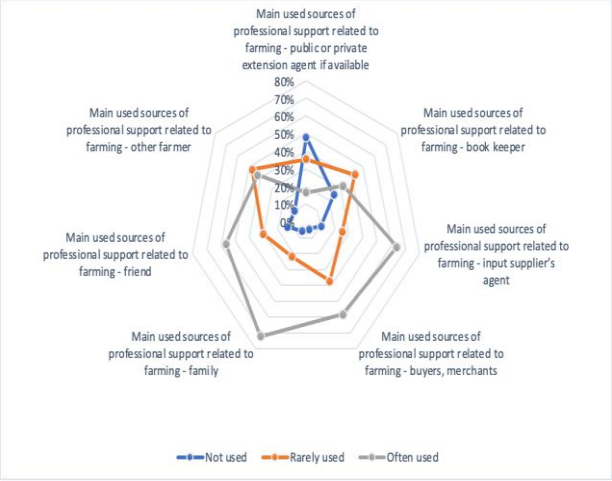


Fig. 2. Sources of professional support for farming
Source: Survey data.

The most often used sources indicate: family for 72%, supplier agents for 64%, buyers and friends for 58%, respectively 57%. If cumulated, both often and rarely, to collect the usage at any level, the buyers come first with 95% of answers, followed by the family with 94%, suppliers with 89% and friends with 87%. Placing the friends on the fourth place could indicate a high level of business maturity, while placing family, respectively the trust level in the previous experience, could indicate a need for stability and risk aversion.

The responses regarding the sharing and discussing the farming issues with other farmers point hardly towards a reduced number of farmers participating, meaning a reduced professional network, most likely including neighbours or friends. The graphic from Figure 3 show a small difference between the categories 1-3 farmers and 4-10 farmers.

In relative figures the highest number of answers (1-3) represents almost half of the options with 47% while the next option (4-10) represents one third of the options with 34% of answers. Sharing concerns and issues with a large number of farmers, such as part of a professional organisation, is however the answers for 14% of the respondents.

Considering the relative aversity for collaboration, this figure is relatively positive and should be considered purely indicative. Supplementary information about structures of professional representation is dealt by another question, as introduced subsequently.

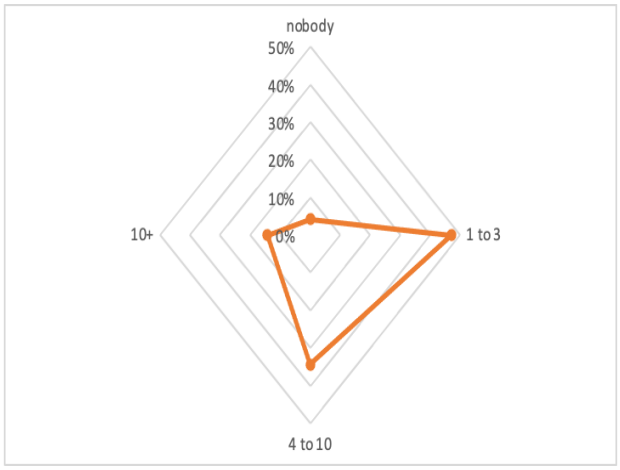


Fig. 3. Discussing farming issues
Source: Survey data.

Membership to a farmer organisation of any type, including the informal organisations, is illustrated in Figure 4 bellow.

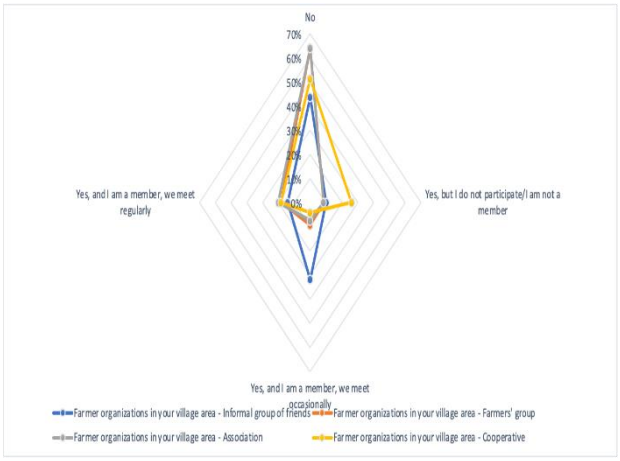


Fig. 4. Acting in farmer's organisations
Source: Survey data.

Most answers related to the involvement to any organisation type are negative regardless their formal or informal nature.

Systematically, more than half of the respondents, indicate that they do not belong or attend any of the categories, where 54% do not belong to an informal structure or group, 72% are not members of a farmers' group or association and 77% are not part of a cooperative.

These answers and quantified figures might appear large, particularly in the context of the Romanian agriculture, however, the other part of the respondents are members of such formal or informal groups or associations and cooperatives, attending on regular basis or less frequent their meetings. For this second part the relative distribution accounts 46% members in informal farmer groups, 28% members of formal farmer groups and with the same share members of associations and 22% members of cooperatives.

The immediate and direct relation with other farmers, namely providing help to other farmers is graphically introduce in Figure 5.

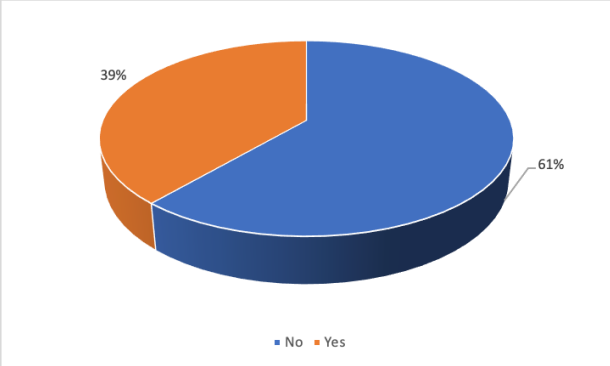


Fig. 5. Providing help to other farmers
Source: Survey data.

The number of farmers usually providing help to fellow farmers is relatively large where 61% are usually not doing it. Still the 39% of those helping the other farmers in their community is a consistently high share. We might expect other reasons such as distance, production type, scale or intensity to be responsible for this segregation as well.

Since no advisory system or other kind of expertise sharing is in place currently, the enquiry about the knowledge sharing sources where the farmers participate returned split answers as pictured in Figure 6 bellow.

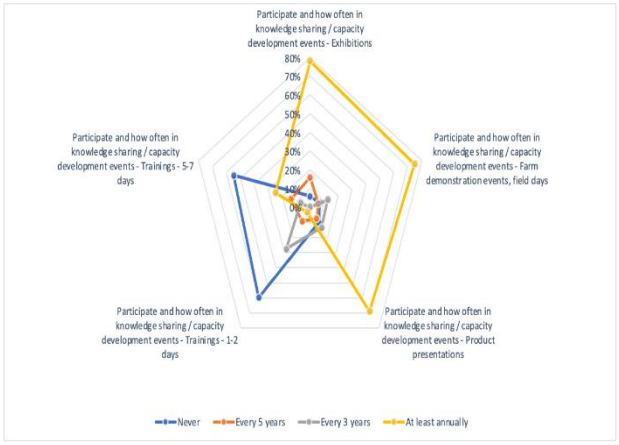


Fig. 6. Participation to knowledge sharing events
Source: Survey data.

Half of the respondents acknowledged that they never attend trainings (57%) of any duration, not even short ones (60%). However, 25% of farmers do attend 5-7 days trainings annually, age and education leading to this split. A more intricate contact to knowledge is preferred, where 78% of respondents attend agricultural exhibitions, 75% participate to demonstrations and filed days and 69% participate to product presentations.

The current situation of problem-solving was investigated in three main directions: production, market access and agricultural administration (Figure 7).

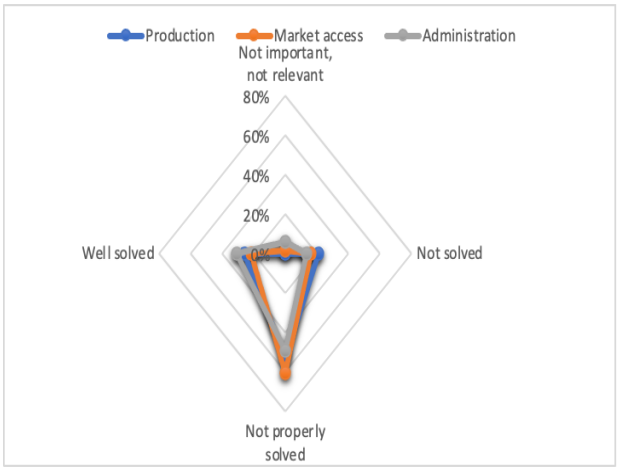


Fig. 7. Problems solved at farm level
Source: Survey data.

The large majority of answers to all three inquired directions point to the "not properly solved" answer. In detailed shares that translates into 61% of answers for market access, 53% for production and 50% for

agricultural administration. If compiled with the "not solved" answers the above shares become more important, respectively, 76% for market access, 74% for production problems and 63% for agricultural administration.

There is also a sufficient share of more successful farmers answering for 31% of well solved problems with administration, 26% for production issues at farm level and 22% regarding the market access for their products.

Collecting the answers for the farming perspective and the priorities on medium term of five years led to a relatively dispersed set of answers as illustrated in Figure 8.

Quitting farming is almost not an option as 77% of farmers consider that not important while an extra 13% give it a low importance. The age distribution of the sample is to a certain extent responsible for these answers and at the same time highlights the commitment of those younger farmers to continue.

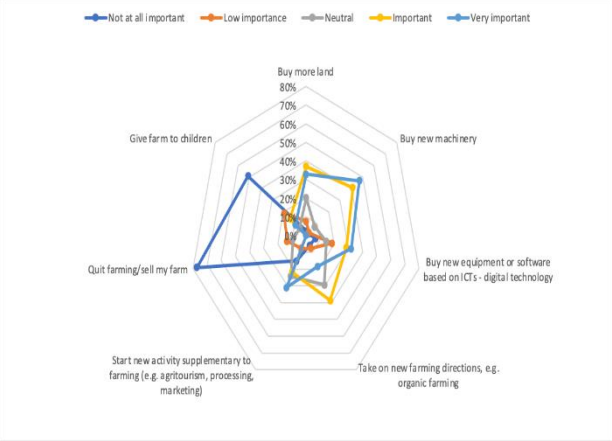


Fig. 8. Farming priorities for the near future
Source: Survey data.

Starting a new activity or diversifying the farm economic activities seems a valid option for slightly more than half of the farmers (53%). Switching to new farming directions, such as organic farming is appealing for even more farmers as 57% indicate that as a potential priority for the next half decade. Modernising and extending the mechanical capacity of the farms is the most popular priority option with 88% of farmers choosing the respective direction. The digital technologies as new addition to the farm becomes a priority for 61% of farmers indicating a high interest for both hardware and software solutions capable of increasing their competitiveness. Extending the land ownership by purchasing more land remains an important option and a priority for the large majority of farmers (70%) even if the market remains saturated and at high price levels in the region while the offers are scarce and expensive.

The most important options considered for increasing the competitiveness of the farms indicate that collaboration with other farmers in sharing machinery and equipment is shared by most of the respondents, 69%. Two very important findings were revealed by this inquiry: the first is that 61% of the interviewed farmers are ready to improve their knowledge and skills, and the second relates to the fact that 52% feel the need to improve the farming activities by using digital technologies.

Although not very popular as options collaborating with other farmers for better prices collected 43% of answers while collaboration for more integrated use of land was a condition seen by 36% of the farmers.

## CONCLUSIONS

The development processes in farms, including the small-scale or family farms, are basically supported either by supplying for the needs, either by solving the problems encountered. Targeting the second aspect and investigating the current status for the small farms in Western Romania as research question led to a series of interesting findings.

The problem-solving for small farms remains at a moderate and rather safe level of satisfaction. The low use of advisory services given their unavailability and the exposure to a potential biased advice for buyers or suppliers forces the farmers to use the local knowledge accumulated in the family and to a lesser extent the advice from friends. This situation depicts aversion to risk and need for safe operation with potential less positive implications over the competitiveness increase. The relatively important shares of farmers targeting as priorities for their farms' development the acquisition of new

knowledge and skills, and equally the adoption of new digital technologies aims precisely to a safe development in absence of impartial advice on the regional and local markets. The needs for a consolidated and functional Agricultural Knowledge and Innovation System become obvious after the long period when Farm Advisory Service as part of the Common Agricultural Policy was missing in Romania.

Linked to this absence and the reserved position of farmers is the expression of satisfaction related to the problem-solving level regarding the main directions of the farms' operation. The lack of satisfaction and the estimation of rather unsolved issues at the farm level reflects the poor knowledge and innovation levels used under risk aversity conditions. This cross-reference link indicates a close causativeness and calls for a shared responsibility from the public agricultural administration and farming communities.

The priorities drawn by the respondents are well connected to the modern agriculture requirements, to the market trends and orientations, to the need of adaptation to respond to different crisis challenges. It can be assumed, reading the general orientations and prioritisation that these farms well were advised and benefited from long-term counselling activities. In reality, the forms that are the most consumed for knowledge transfer are the mass advisory work originating from private input providers. The access to new knowledge and the observed technological transfer results are potentially supplemented by the use of digital technologies for information. These paths could further be enforced by advice-accompanying activities related to the relevant and safe sources securing a safer and faster way to the relevant information.

The explored grounds in terms of problem-solving appear solid and favourable for future development; no immediate risks are identified as the answers to development priorities indicate. The policy makers can find useful quantified and their significance in the present dataset and their interpretation knowing the efforts to enable the new Agriculture Knowledge and Innovation System.

The limitations of the present paper relate to the relatively small size of the sample. An expanded sample with national coverage incorporating more regional features, segmented by production types and intensity level could operate investigating links between multiple questions to reveal extra-findings and validate them by statistical significance. Supplementary, a higher level of detail related to the problems and the problem-solving processes can be incorporated allowing for a finer observation of specific difficulties. Of high interest for the extension activities of all connected actors can be the source of the encountered problems, including the structural issues. Also, the digital technologies component, not used in the present paper can contribute to both, problem-solving and deeper understanding of causality relations.

## ACKNOWLEDGEMENTS

Acknowledgement: Support was also received by the project Horizon Europe (HORIZON) 101071300 - Sustainable Horizons -European Universities designing the horizons of sustainability (SHEs).

## REFERENCES

[1]Anderson, J. R. (n.d.). Agricultural Advisory Services. Background paper for the world development report 2008. World Bank. https://documents1.worldbank.org/curated/en/490981468338348743/pdf/413540Anderson1AdvisoryServices01PUBLIC1.pdf, Accessed on 16.04.2024.

[2]Behera, B., Mallick, B., Ayushree, B., Singh, P., 2024, From Tradition to Transformation: The History of Agricultural Extension (pp. 11–21).

[3]Dai, Z., Wang, Q., Jiang, J., Lu, Y., 2024, Influence of university agricultural technology extension on efficient and sustainable agriculture. Scientific Reports, 14. doi: 10.1038/s41598-024-55641-1

[4]Dhillon, R., Moncur, Q., 2023, Small-Scale Farming: A Review of Challenges and Potential Opportunities Offered by Technological Advancements. Sustainability, 15, 15478. doi: 10.3390/su152115478

[5]Dockès, A.-C., Chauvat, S., Correa, P., Turlot, A., Nettle, R., 2018, Advice and advisory roles about work on farms. A review. Agronomy for Sustainable Development, 39(1), 2. doi: 10.1007/s13593-018-0547-x

[6]European Commission, 2024, Common agricultural policy, https://agriculture.ec.europa.eu/common-agricultural-policy_en, Accessed on 16.04.2024.
[7]European Commission, 2024 (March 13). Farm Advisory Service, FAS, 2024, https://agriculture.ec.europa.eu/farming/fas_en, Accessed on 16.04.2024.
[8]FAO, Agricultural advisory services (n.d.). https://www.fao.org/familyfarming/detail/en/c/102755/, Accessed on 16.04.2024.
[9]Goel, R. K., Yadav, C. S., Vishnoi, S., Rastogi, R., 2021, Smart agriculture – Urgent need of the day in developing countries. Sustainable Computing: Informatics and Systems, 30, 100512. doi: 10.1016/j.suscom.2021.100512
[10]Home Wisefarmer | WiseFarmer - Erasmus+ project 2019-1-HU01-KA204-061083. (n.d.). https://www.wisefarmer.eu/, Accessed on 16.04.2024.
[11]IFAD, Digital Agricultural Advisory Services for Smallholder Farmers in the Context of COVID-19. (n.d.). https://www.ifad.org/en/web/operations/-/digital-agricultural-advisory-services-for-smallholder-farmers-in-the-context-of-covid-19, Accessed on 16.04.2024.
[12]Khalaf, A., Al-Mashhadani, A., 2023, Requirements for Using Digital Agricultural Extension in Providing Extension Service from Viewpoint of Agricultural Extension Agents. IOP Conference Series: Earth and Environmental Science, 1259, 012134. doi: 10.1088/1755-1315/1259/1/012134
[13]Lioutas, E. D., Charatsari, C., De Rosa, M., 2021, Digitalization of agriculture: A way to solve the food problem or a trolley dilemma? Technology in Society, 67, 101744. doi: 10.1016/j.techsoc.2021.101744
[14]Mizik, T., 2021, Climate-Smart Agriculture on Small-Scale Farms: A Systematic Literature Review. Agronomy, 11, 1096. doi: 10.3390/agronomy11061096
[15]Mizik, T., 2023, How can precision farming work on a small scale? A systematic literature review. Precision Agriculture, 24(1), 384–406. doi: 10.1007/s11119-022-09934-y
[16]Mutimba, J., 2024, Agricultural extension debatable issues. African Journal of Food, Agriculture, Nutrition and Development, 24, 25662–25676. doi: 10.18697/ajfand.128.24275
[17]OECD, Three key challenges facing agriculture and how to start solving them, https://www.oecd.org/agriculture/key-challenges-agriculture-how-solve/, Accessed on 16.04.2024.
[18]O'Grady, M. J., O'Hare, G. M. P., 2017, Modelling the smart farm. Information Processing in Agriculture, *4*(3), 179–187. doi: 10.1016/j.inpa.2017.05.001
[19]Rony, Z., Heryadi, D., 2024, Agricultural extension: is it still relevant? Jurnal Studi Komunikasi (Indonesian Journal of Communications Studies), 8, 072–081. doi: 10.25139/jsk.v8i1.8057
[20]Solving Problems in Sustainable Agriculture | National Agricultural Library. (n.d.). https://www.nal.usda.gov/research-tools/food-safety-research-projects/solving-problems-sustainable-agriculture, Accessed on 16.04.2024
[21]Wan, M., Gu, R., Zhang, T., Zhang, Y., Ji, H., Wang, B., Qiao, Y., Toepfer, S., 2019, Conflicts of Interests When Connecting Agricultural Advisory Services with Agri-Input Businesses. Agriculture, 9(10), 218. doi: 10.3390/agriculture9100218
[22]Welk, L., 2023, Democratizing messaging? The role of ICTs in agriculture extension (0 ed.). Washington, DC: International Food Policy Research Institute. doi: 10.2499/p15738coll2.136968
[23]World Bank, 2021, 5 Key Issues in Agriculture in 2021. (n.d.)., https://www.worldbank.org/en/news/feature/2021/12/16/5-key-issues-in-agriculture-in-2021, Accessed on 16.04.2024.