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The Environmental and Educational Topics in Agricultural TV Broadcasts

Abstract

The sustainable use and efficient management of natural resources are reflected in the introduction of modern production practices and agro-ecological measures. The new challenges facing farmers require new approaches to the transfer of agricultural knowledge, technologies and information. Television is an important medium for providing timely information and communication with farmers in developing countries, where other sources of information are less available. Therefore, television represents one of the most relevant sources of raising public awareness and concern for the environment. This paper seeks to investigate whether and to what extent specialised TV programmes for farmers of four national TV networks in Serbia cover topics related to the agro-environment. Content analysis was employed to determine the differences in the offer of environmental and educational contents of *agricultural TV programmes* broadcast by public and commercial television stations in Serbia. Research results reveal significant differences between public and commercial broadcasters in terms of the topics covered, which are especially evident with regard to environmentally and educationally related contents. As the educational value of the content is

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determined by the choice of subjects, a difference in the frequency with which certain groups of subjects are shown speaking in broadcasts is also noted.

Keywords: Agricultural TV programmes, environmental topics, educational topics, farmers, public TV station, commercial TV station.

Introduction

Modern developmental and political concepts impose ever-increasing requirements on agriculture, which, in addition to providing food and raw materials, takes other functions, such as securing food safety, animal welfare, and preservation of the environment. These complex tasks and roles of the agricultural sector require new skills and knowledge to be gained by farmers, who are key players in the process of food production and the management of natural resources. The sustainable use and efficient management of natural resources are reflected in the introduction of modern production practices and agro-ecological measures, whose application is often hampered by the insufficient level of competence of the farmers themselves.

In order to address farmers' need to respond to constant challenges and meet multiple requirements, new approaches to the transfer of agricultural knowledge, technologies and information have emerged, in which TV plays an important role. The knowledge transfer system in agriculture has undergone several ideological, economic, social and technical reforms and changes over the last century (Godin 2005; Knickel 2009; Leeuwis, Cees & van den Ban 2004). Over recent decades, the old linear model of technology transfer (from scientists to the users) has been gradually replaced by more interactive networks; these involve practitioners, education and research institutions and organisations, and the integration of knowledge production, adaptation, advice and education (Jegde, Jegde & Harris 2018). Since the 1990s the system has become more complex, including comprehensive knowledge and diversified participants, and turned to the concept of agricultural knowledge systems (Leeuwis & van den Ban 2004). Nowadays, the innovation of knowledge is a complex system that involves many individual active participants, networks and institutions; it is designed as a successful combination of "hardware" (new technical tools and practices),

"software" (new knowledge and ways of thinking), and a whole network of social institutions and organisational forms (Leeuwis 2013).

Information and communication technologies (ICT) have created an important tool for knowledge sharing, providing users with important and timely information on all relevant aspects of production and post-harvest technologies, markets, prices, and other operators in the food and agricultural value chain (Asenso-Okyere et al. 2008). Nevertheless, traditional media and television in particular remain important sources of raising public awareness and concern for the environment (Murch 1971). Numerous studies recognise the advantages of television as a channel for communication with farmers (FAO 2001, Ghatak 2010, Kappor 2011, Nazari et al. 2011). Buren (2000) believes that the efficiency of television in communicating with farmers stems from the simplicity and easy accessibility of televised information, especially in terms of information related to health, education and innovative agricultural technologies.

However, it should be emphasised that the impact of the media on the audience is the most controversial issue relating to communicative theory, because there is no agreement regarding how and how much the media affect those who use them. There is consensus among communicologists that the media should be treated as a significant actor that has an impact on citizens' awareness and behaviour, but the factors determining that influence remain significantly different. Television is a ubiquitous, generally accepted medium with the greatest impact on the largest audience (McQueen 2000), although its popularity is declining among the post-2000 generation.

As a channel for acquiring knowledge, the superiority of television over other media may be explained by its visual effects, which provide ease of learning (Parthaap & Ponnusamy 2006). That experimental study, conducted in India, included 144 women exposed for several weeks to special programmes on the raising of rabbits, delivered in different media types. It was found that the most effective impact on acquiring knowledge was exerted by television, then newspapers, the Internet and radio. Thus, the mass media are important fora where farmers can acquire new information, knowledge and skills.

As one of the most important factors in learning and socialising in the modern age (Lemiš 2008), television is recognised as an effective means for conveying environment-related content to a large number of people. The study by Akca, who analysed the environmental awareness of inhabitants

in two rural provinces in Turkey, has shown that television and the press are the main sources of information regarding the impact of agricultural production on the environment (Akca 2007).

In general, the role of the media in the development of environmental awareness has increased over the last decades. It is reflected in the increased use of media by social actors involved in environmental protection (Hoerisch 2002; Prathap & Ponnusamy 2006), and the media's increasing interest in environmental issues, through an increasingly diversified media production (Kushwaha 2010; Lokhandwala 2010) and an apparent increase in the audience interested in environmental issues (Lokhandwala 2010).

However, the meaning of television content intended for the general population, in addition to purposes of information and education, must be motivational in order to entice viewers towards personal action and behaviours that are environmentally friendly (Prus 2008).

In Serbia, broadcasts focusing on the rural issues and agriculture have been made since the emergence of national television programmes in 1958. The production of these programmes was motivated by a shift in the attitude towards the agricultural sector, whose development received more attention from the state. The modernisation of farms, and facilitated access to new technologies for a large number of small family farms, were supported by special efforts in the education of farmers and the rural population; and television was also involved in the affirmation of positive aspects of the tradition and culture of the village. The broadcast titled *Znanje imanje* ('Knowing-Having'), which has been produced by the Serbian public service broadcaster since 1972 until today, has remained one of the most popular; its high rating was first recorded in the 1974 audience survey (Babić-Erleman 1974). According to the 2012 survey, this broadcast had a better rating (2.4%) than similar programmes on commercial television stations TV B92 (1.8%) and TV Prva (1.2%) (Josifović & Senić 2013). The results of a survey conducted in 2014, comprising a sample of 314 farmers, revealed how much television was still important for the transfer of knowledge and information. In addition, the survey results showed that most respondents (42.4%) considered radio and television as the most important source of information about environmental pollution originating from agricultural production (Šarković 2016).

Given the role that television plays in developing the environmental awareness of farmers and their pro-environmental behaviour, the overall

aim of this paper is to determine the differences in the offer of environmental and educational TV contents among programmes intended for farmers on public and commercial television stations. In order to do so, three specific research objectives have been outlined:

- To determine the content of agricultural TV programmes by topics covered;
- To determine the presence of environment-related TV contents aimed at transferring knowledge to agricultural producers;
- To determine the frequency of environment-related educational content and the type of actors in the educational role, by the type of broadcast producers.

The second part of this paper describes the methodology of the conducted research. The third part offers the interpretation of the research results related to characteristics of environmental and educational TV contents analysed. In the final part, conclusions are presented, which can serve as an important guide in creating media content related to building farmers' environmental awareness.

Method and sample

Specialised TV broadcasts for farmers have been explored using content analysis, as a method for the objective and systematic analysis of the manifest content of communication (Berleson 1952). According to Neuman (1997: 272), content analysis is a research technique for collecting and analysing the "content" of text, which refers to words, meanings, pictures, symbols, ideas, themes, or any message that can be communicated. Many authors (Berelson 1952; GAO 1996; Krippendorff 1980; Weber 1990) claim that content analysis is a systematic and replicable technique for categorising words of text based on explicitly defined rules of coding (Stemler 2000).

Quantitative content analysis has been complemented by qualitative analysis, in order to understand the deeper meaning of analysed content (Maknamar 2005) and the professional competences of journalists involved in their production, as well as the potential effects that the contents had on the audience.

The research framework of this paper is presented in Figure 1.

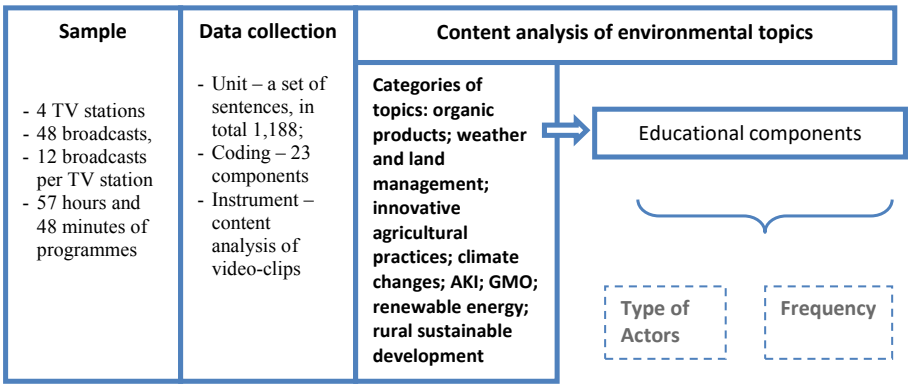

Figure 1. *The research framework of this paper*

The survey sample included four of the most popular programmes for farmers, which are produced by four television stations (one per station). These were the following TV broadcasts: *Znanje imanje* ("Knowing-Having") from RTS (P1 – the national public service broadcaster); *Brazde* ("Furrows") from RTV (P2 – the provincial public broadcaster), *Dobra zemlja* ("Good Land") from TV B92 (C1), and *Domaćin* ("Host") from TV Prva (C2); the last two being from commercial television stations with national broadcast frequency.[1] All four programmes have national coverage, as the national public service broadcaster (RTS) airs its programme *Znanje imanje* ("Knowing-Having"), and the programme *Brazde* ("Furrows") is produced by the provincial public service broadcaster (RTV).

Because the frequencies of broadcasting the selected programmes differed, one broadcast per month from each production was selected for analysis, to avoid unequal representation in different weeks of the month. The corpus consisted of a total of 48 broadcasts: 12 broadcasts from each TV station. A total of 57 hours and 48 minutes of the programmes were analysed (Table 1).

[1] For easier data tracking in tables, the programmes of public service broadcasters are labelled "P1" and "P2", and those of commercial stations "C1" and "C2".

Table 1. *Sample of broadcasts*

Type of producer	Broadcast title	Annual number of broadcasts	Broadcaster	Broadcast duration	Sample	Total
Public TV	P1	23	RTS	60 minutes	1 of 2 per month	12
	P2	24	RTV	60 minutes	1 of 2 per month	12
Commercial TV	C1	48	B92	120 minutes	1 of 4 per month	12
	C2	49	TV Prva	60 minutes	1 of 4 per month	12

The unit of analysis was a set of sentences coherently covering one specific topic within a single TV report. One TV report, therefore, could have several units of analysis. A total of 1,188 units were analysed, as follows: 498 units in broadcasts of RTS (P1), 265 units in broadcasts of RTV (P2), 277 units in broadcasts of TV B92 (C1) and 148 units in broadcasts of TV Prva (C2) (Table 1).

The following categories of content analysis were used:

- The type of actor as the source of information or opinions (actors from government – central and local; from the economy – individual producers, public companies, private companies; from other areas of activities – education, culture; and from civil society – NGOs, citizens, experts, etc.);
- Function of actors' discourse (informative, educational, promotional);
- Topical focus of actors' discourse (agricultural policy, modernisation, plant protection, overall situation in agriculture, current developments in agriculture in the region, the country, the company or the farm, rural life, etc.).

After identification of the research problem and sample for analysis, the original research instrument with the classification of the categories for analysis (codebook) was developed, as well as the codebook for qualitative analysis. The classification of the analysis units into the selected categories was then performed using this instrument. Each unit of analysis (the

coherent speech of one actor on one topic) was classified according to the topic, the function of speech, and the presence of environment-related contents.

The research focused on identifying two types of contents:

1. Contents related to environment, in the widest possible meaning,
2. Environment-related contents presented with the aim of education.

The results of the analysis provided an insight into the concept of analysing TV broadcasts and their thematic structure; into the spectrum of social positions from which the environmental issues were presented; and the type of speech delivered by the actors from these social positions. The conclusions about the potential impact of these programmes on environmental awareness were drawn on the basis of a comparison of the media presentation of relevant topics on different television stations, and identifying the differences between them.

Results and Discussion

1. Actors – Sources of information and opinions

The most important characteristics of the contents of the TV broadcasts were demonstrated by the actors who talked live in the programmes, and the topics they talked about. The choice of these actors is part of the professional competences of journalists, and part of the selection matrix that is used as a tool by the media, according to their editorial orientations. In their usual work, journalists deal with many actors whose activities or opinions are of significance to the audience, to the broadcast's aims, or to specific target groups; however, they are forced to give publicity to some of them rather than others. When analysing the model of journalistic selection, it is particularly important to define which actors, among the range available, are allowed by journalists to speak directly to the audience – that is, to appear live in a broadcast.

The aim of analysis was to determine the hierarchical scale of the actors who appeared in the broadcast and what kind of treatment they received, in terms of who appeared most often and most rarely, because the scope and type of publicity may affect the meaning of the information provided. Furthermore, the analysis sought to determine which of actors talked of

Table 2. *Frequency of actors' appearances*

Type of actor	Public TV				Commercial TV			
	P1		P2		C1		C2	
	Number of appearances	%	Number of appearances	%	Number of appearances	%	Number of appearances	%
Agricultural producers	156	31.3	125	47.2	111	40.1	61	41.2
Experts	62	12.5	42	15.8	20	7.2	19	12.8
Authorities	65	13.1	35	13.2	20	7.2	14	9.5
International and ex-YU actors	24	4.8	4	1.5	12	4.3	1	0.6
Economic actors from the private sector	71	14.3	21	7.9	63	22.7	5	3.4
Representatives of cooperatives and cooperative unions	12	2.4	13	4.9	3	1.1	1	0.7
Journalists	55	11.0	15	5.7	36	13	43	29.1
Economic actors from the public sector	13	2.6	9	3.4	4	1.4	2	1.3
Representatives of NGOs	9	1.8	1	0.4	1	0.4	0	0
Actors from the area of culture	20	4.0	0	0	1	0.4	1	0.7
Citizens	11	2.2	0	0	6	2.2	1	0.7
Total	498	100	265	100	277	100	148	100

which topics, i.e. how certain topics were legitimised by the choice of actors who discussed them. In each of the analysed broadcasts, a large number of actors were registered, who appeared as carriers of the action or attitude, i.e. as sources of information (Table 2). The number of actors appearing live on the screen per broadcast ranged from 12 (C2) to 41 (P1). All four analysed broadcasts featured a very diverse range of social actors in their items.

All analysed broadcasts most often featured individual agricultural producers as the carriers of action or holders of opinions (Table 2). This shows that all broadcasts sought to attract the attention of their target audience by presenting other agricultural producers and their visions of the topics being discussed. Selected farmers talked most of their practical experiences; therefore, the media functions of signifying and making sense in all TV stations were performed predominantly through presenting practical, individual cases. These are successful and reputable farmers, who talk about their own, mostly positive, manufacturing and business experiences. In public service broadcasts, they are often asked about cooperation with local government, and are noticeably included in contents that discuss subsidies and product prices.

Examples:
Broadcast P1 – Farmer: "My family farm has a dairy worth EUR 6,000; half of the funds were provided by the municipality, with interest-free lending with a deferred period of one year."

Broadcast P1 – (Local government donated heifers to ten farms selling milk to a local dairy.) Farmer: "I got a heifer from the local government that will provide me with more milk and higher income."

Broadcast P2 – (Livestock farming.) Farmer: "Fourteen years ago I started with two sows, now I have about 400. I used to lease the land, now I have my 38 ha, I accept expert advice. With the current price, pig production is worth it. But it is more difficult for people; it is easier to grow grain than to feed pigs every day. Agriculture is cost-effective and can make a good living."

In commercial television broadcasts, farmers are often more likely to express their dissatisfaction with state policy in the agrarian sector. In

addition to their positive experiences, they also spoke about the problems they face. These relate to the leasing of state land, the problems of farmers' health insurance, the low cost of buying meat and fruit, and exercising the right to subsidies.

Example:
Broadcast C1 – Farmer from Vojvodina: "We did not receive subsidies for agricultural machinery. Will we get them at all? We are bothered by the careless attitude towards small farms and demand that they are properly handled. We didn't even get what we needed to get a subsidy for this year, not to mention drought compensation."

Other significantly represented groups of actors were experts, authorities, private-sector actors and journalists. The frequency of their appearances differed in the broadcasts, with some giving preference to economic actors, and others to experts or journalists.

The most important differences in the programmes of public versus commercial broadcasts were recorded in the treatment of government actors, experts and private-sector economic actors, as well as in the role of journalists. Actors from central and local authorities appeared more frequently in public service broadcasts than in commercial broadcasts (Table 2). This shows that public service broadcasters legitimised their contents with the authority of the governmental institutions more often than commercial broadcasters did.

In public service broadcasts, the authorities usually appeared in reports that refer to important events, and to organisations in which they themselves participate. They spoke positively about the measures that the state offers to support agricultural production in certain sectors.

Example:
Broadcast P1 – (State Secretary at the Ministry of Agriculture visits the International Agricultural Fair in Novi Sad): "This year, we employed 1,700 agricultural engineers, around 800,000 families are engaged in agriculture in Serbia, 20% of exported products are food; and this is much more than an economic issue. Next year, subsidies for animal husbandry will increase in Serbia, and we will be able to use 40 million euros from the EU to spend on improving the production of meat and milk, fruits and vegetables."

Experts often appeared in all broadcasts, but received different treatments. This can be explained as follows. In public service broadcasts, the experts' position was shown as inviolable: they appeared on their own, with the authority of expertise, and spoke only to the audience directly. Special treatment of experts is the heritage of the old concept of these broadcasts, in which modernisation efforts came from experts. In the new concept of public service broadcasts, experts often provide original, expert information that cannot be given by other actors. A characteristic of the public service broadcasting stations P1 and P2 is the constant cooperation with experts from the Institute for the Application of Science in Agriculture, and the Agriculture Faculty, Belgrade. They usually spoke in an advisory manner about the application of agro-technical measures, preparation of fodder, or good agricultural practice. They often dealt with topics that are intended for a wider audience, such as genetically modified organisms.

Examples:
Broadcast P1– Expert from the Institute for the Application of Agricultural Science, Belgrade: "Agrotechnical measures are especially responsible for the cultivation of maize. The proportion of protein in the maize kernel determines its value in animal nutrition; if the maize kernel's protein content was increased by 1%, it would significantly improve the quality of animal food and bring great financial gains." The following speech explained what agrotechnical measures can be applied.

Broadcast P1 – Expert from the Institute for the Application of Science in Agriculture: "What is a microbiological fertiliser and when it is used? Can it replace mineral fertiliser?" The expert states which types of microbiological fertilisers exist, but does not state any commercial names or show any preparations.

Broadcast P2 – Faculty of Agriculture, Novi Sad: "This is an experimental farm for the application of modern technologies in potato production, which guarantees quality and high yields. This requires the right choice of varieties, balanced use of fertilisers and the application of modern agro-technical measures." The following speech explains the choice of varieties and fertilisers.

In commercial broadcasts, experts were often led by the hosts to present relevant information to the audience, or were put in the role of promoting commercial products. These contributors often came from the same institutions as experts in public service broadcasts, but they mostly delivered promotional messages.

Examples:
Broadcast C1 – Professor at the Faculty of Agriculture in Belgrade: "We have linked science and production together. This microbiological fertiliser is a completely natural preparation (product demonstration), has been rigorously tested and certified for use in organic and traditional production. This preparation is great for use in growing vegetables." Another interviewee in the same appendix is an agricultural producer who praises the same preparation.

Broadcast C2 – Retired Professor at the Faculty of Agriculture Novi Sad: Talks about the proper use of plant protection products, and explains how they should be used. At the end, the expert shows a branded preparation that is recommended to be used with manure.

Examples of product advertising, which are not clearly labelled as advertising features, can cause the audience to affirmatively relate to the product, because it does not regard them with the caution with which it receives direct advertising messages.

There was also a difference in the treatment of actors from the private sector. In public service broadcasts, these were various economic actors (farm and food industry managers, bank and insurance association representatives, etc.). In commercial TV broadcasts, where this group of actors was more often present, these were mainly representatives who promoted the products of companies in which they worked or which they represented. These broadcasts practised hidden advertising, with informative reports not being properly separated from the promotional ones.

Journalists (authors of TV reports) and programme hosts were a more significant source of information and attitudes in commercial rather than in public programmes for farmers. Public broadcasters placed the role of journalists in second place, emphasising their professional neutrality as the priority; while commercial stations sought to promote the concept

of engaged journalists who openly advocated the interests of the target audience. In commercial television programmes, farmers were frequent guests and talked about their problems.

Examples:
Broadcast C1 – Farmers ask why there is no domestic production of agricultural machinery. The journalist is shown in front of the agricultural machinery factory, which is not working. Journalist: "Farmers do not have domestically produced agricultural machines, the factory is collapsing and the state has invested money. The state gives subsidies for the purchase of domestic machinery, so that the factory will not fail." He promises to continue research.

Broadcast C2 – President of the Association of Serbian Farmers: "About 70% of farmers do not have a certified health record because they have had a debt in the ten previous years, and ask for it to be written off. If this does not happen within ten days, we will block insurance branches."

In addition to the advertising segments, which were present in all analysed programmes, commercial broadcasts contained TV reports in which journalists or presenters appeared as promoters of certain products, or as carriers of hidden advertising.

Examples:
Broadcast C1 – The journalist in the field shows a preparation that is used as a microbiological fertiliser. "Harvest residues in the field must not be burned, because it is very harmful. It is best to use this preparation, and then plough the field. But this is better than anything else" (image of commercial preparation).

Broadcast C1 – "These hybrids have excellent germination and it is important when you buy that in a bag with 30,000 seeds you have a germination rate of 98%. Here's the phone number you can call" (image of commercial preparation).

The intrusive engagement of journalists as promoters of agricultural development, and especially as protectors of agricultural producers' interests,

combined with the violation of professional norms for commercial interests, has negative consequences for the rural population's perception of the social role of journalists. The audience is taught that journalists' bias is accepted as a normal pattern of their professional behaviour.

Topical focus of the broadcasts

The thematic analysis of TV programmes relied on the classification of content into eight topical areas, within which environment-related contents were registered as sub-topics. The classification comprised the following topical areas (Table 3):

1. *Government agricultural policy* (agricultural development strategy, legal solutions, distribution of subsidies, rent of agricultural land, etc.);
2. *Seasonal events and activities* (sowing, harvesting, local events, etc.);
3. *Technological innovation* (modernisation of production, innovations, environmental protection, renewable energy sources, organic agriculture);
4. *Situation and development of agriculture in the region, country, company or farm* (systemic problems, examples of practices at different levels);
5. *Innovative agro-technical practices* (preparation of soil for sowing, selection of cultivars, nutrition and fertilisation, protection and nurturing of plants, preparation of animal feed);
6. *Relations with the EU* (cooperation with the EU, adoption of the EU acquis, impact of the accession process on agricultural policy, etc.);
7. *Activities of different institutions and organisations of importance for agriculture* (cooperatives and associations of producers, NGOs, local cultural, educational and social institutions).[2]

[2] This category includes local institutions such as museums, galleries, agricultural schools, and other institutions that encourage the strengthening of social and economic capacities or local and regional partnerships; as well as NGOs that assist in the cooperation of agricultural producers, protection of geographical origin, and launching of rural tourism or organic production.

Table 3. *Frequency of topics covered*

Topic	Public TV				Commercial TV			
	P1		P2		C1		C2	
	Number of mentions	%	Number of mentions	%	Number of mentions	%	Number of mentions	%
Situation and development of agriculture in the region, country, company or farm	134	26.9	47	17.7	70	25.3	34	23.0
Current events	62	12.5	66	24.9	37	13.4	14	9.5
Innovative agro-technical practices	31	6.2	22	8.3	48	17.3	43	29.0
Technological innovation	62	12.4	25	9.4	27	9.7	15	10.1
Rural life	47	9.4	5	1.9	6	2.2	8	5.4
Agricultural policy	64	12.8	86	32.5	36	13.0	16	10.8
Activities of institutions and organisations	62	12.4	8	3.0	31	11.2	1	0.7
Relations with the EU	24	4.8	6	2.3	13	4.7	5	3.4
Other topics	12	2.4	0	0	9	3.2	12	8.1
Total	498	100	265	100	277	100	148	100

8. Problems of rural life and/or examples of good practices in rural communities.

The analysed broadcasts showed differences in their topical focus, revealing new differences between TV programmes for farmers on public and commercial broadcasters. The thematic structure of public service broadcasts was dominated by *Situation and development of agriculture in the region, country, company or farm*, *Seasonal events and activities* and *Government agricultural policy.* Commercial television stations emphasised two topical areas, the *Innovative agro-technical practice* and the *Situation and development of agriculture in the region, country, company or farm* (Table 3). Commercial broadcasts also included many advertising items related to *Innovative agro-technical practices,* which were not analysed.

3. Presence and type of environmental contents

The analysed broadcasts did not deal with environmental issues as a separate topic; these issues were mentioned within some other topics covered in TV stories. To facilitate the analysis, environment-related contents were therefore separated as sub-topics within methodologically identified topical groups.

Environmental contents were identified as the following:

- Environmental problems in rural areas caused by unsuitable agricultural practices, with reference to their consequences and potential solutions;
- Communal problems in local communities (selection of wastes with a special focus on hazardous chemical waste, construction of dumps and rendering plants, wastewater), because such problems are very pronounced in rural areas; and
- Sustainable agriculture rural development – the development of the rural area while preserving its natural resources and biodiversity (rural tourism, preservation of autochthonous breeds, multifunctional households in rural areas).

When analysing environmental content by a thematic area, we obtained the following insights. The largest number of environmental issues were covered within the topical areas of *Technological innovation* and *Innovative agro-technical practices*. As environmental practices are scarce in Serbia,

these contents were considered innovative in this research, and were most often recorded in the above thematic areas. The ecological content was aimed at promoting good agricultural practices, innovative biomass processing technologies, and capacity building for the use of renewable energy sources, reduced tillage, etc. These contents were related to good agricultural practice (organised collection and storage of pesticide packaging as hazardous waste); capacity building for the use of renewable energy sources; and innovations that were individually applied by producers in farms, and which contributed to environmental protection (e.g. innovative machines for the cultivation of land, collection and processing of biomass).

Environmental issues within the topical area S*ituation and development of agriculture in the region, country, company or farm* dealt with the development of certain agricultural sub-sectors such as fishery and goat farming, which significantly contributed to sustainable rural development in marginalised areas. This thematic group also informed about agriculture in protected areas and the preservation of protected species and autochthonous cultivars. Within the same topical area, there were also issues related to the problem of building regional landfills.

In addition, environmental contents were recorded within the topical areas *Relations with the EU* and *Activities of different organisations in the agricultural sector*. These mainly referred to European examples of supporting sustainable development, as well as to the activities of appropriate organisations for the protection of traditional products, promotion of protected areas, education on organic production, and preservation of cultural heritage and traditions.

Table 4. *Environmental contents in agricultural broadcasts*

Actors	Environmental contents (number of mentions/appearances)			
	Public TV		Commercial TV	
	P1	P2	C1	C2
Farmers	25	12	13	4
Authorities	15	3	4	-
Journalists	7		2	2
Experts	19	9	3	7

Table 4. *Environmental contents in agricultural broadcasts*

Actors	Environmental contents (number of mentions/appearances)			
	Public TV		Commercial TV	
	P1	P2	C1	C2
Economic actors from private sector	3	2	-	-
NGO	3	1	-	2
International and ex-YU actors	6			
Actors from the area of culture and education	4			
Inhabitants of rural areas	2	-	2	-
Representatives of COOPs and Coop Unions	1			
Economic actors from the public sector	1	1		
Total	86	28	24	15

All the analysed broadcasts dealt with environmental content within similar topics:

- Organic agriculture on rural farms
- Rural tourism
- Renewable energy sources-
- Branding of traditional high-quality products
- Preservation of indigenous cereals and fruits
- Preservation of indigenous livestock breeds

In the P1 broadcasts, 86 (17.2%) (Table 4) of the total of 498 registered topics referred to some aspect of the environment. However, although they were relatively often covered, environmental topics were mostly presented superficially, through simple reporting forms concerning individual positive examples, without paying enough attention to strategic topics and issues. Most often these topics were discussed by individual agricultural producers (29%, i.e. 25 times out of 86), followed by experts (22.1%, i.e. 19 times out of 86), and representatives of central and local authorities (17.4%, i.e.

15 times out of 86). Overall, every third actor (in the capacity of the source of information) in the environmental contents was an individual farmer, every fourth or fifth was an expert, every sixth was a representative of the authorities, and every twelfth was a journalist (8.3%, i.e. 7 times out of 86) (Table 4). Environmental topics were rarely presented in an analytical and complex way, through topical packages. Nevertheless, even so few reports clearly demonstrated the benefits of dealing analytically with the topic.

In the P2 broadcast, environmental contents were represented in 10.6% of the total number of topics (28 out of 265 total registered topics); in other words, they formed a ninth of the topics of mentioned by all the actors who talked of environmental issues, of whom the largest percentage (42.8%) were farmers (Table 4). Environmental issues were mostly addressed in the context of rural development (tourism, multifunctional agricultural farms and preservation of autochthonous breeds) and organic agriculture. There was little talk of the importance of organic agriculture for the protection of the environment and the production of healthy and safe food, which would be important for the development of environmental awareness. Instead, this topic was discussed from the producers' perspective and their problems in the production and certification of products, wich only indirectly implied the importance of organic agriculture.

In the C1 broadcast (Table 4), environmental contents were represented in 8.7% of the total number of topics (24 out of 277). Every second actor who talked about environmental topics was a farmer (54.2%). As in other broadcasts, environmental issues were also discussed here within the topical areas of the *Situation and development of agriculture in the region, country, company or farm*, *Technological innovation* and *Innovative agro--technical practices*. The environmental dimension of rural development was addressed through examples of rural tourism and multifunctional households. Environmental protection was directly addressed in the reports dealing with building a regional landfill and recycling centre. Although both initiatives were of great importance, they were addressed from the perspective of dissatisfied citizens, but not because of their importance in relation to preserving the environment and improving the living conditions of citizens.

In the C2 broadcast (Table 4), 10% of topical contents dealt with some aspect of environmental protection (15 of a total of 149 topics). Environmental issues were often discussed by experts (46%), followed by

farmers (26.8%). Within the framework of environmental contents of great importance, the topics that prevailed were related to organic production and integral production in fruit growing, and the protection and preservation of indigenous breeds of sheep and cattle. The professional handling of environmental topics mostly took the form of reporting, without an analytical approach. Environmental topics were addressed by agricultural producers, representatives of non-governmental organisations engaged in organic production, as well as by journalists. Journalists discussed topics from the studio, without a visual illustration of topics; this certainly diminished the attractiveness of the topical content.

4. Educational contents on environmental issues

The research began from the hypothesis that the contents which combined a topical orientation toward environmental protection and the educational function of speech of the actors, were the most effective for spreading environmental awareness of the inhabitants of rural areas in Serbia. The analysis was therefore directed to identifying these contents in each individual TV programme.

The educational function of the speech was observed in the contents whose main purpose was to provide expert information and advice from expert sources, such as experts in agriculture from scientific or academic institutions, and the extension service providers from the state Institute for Science Application in Agriculture, who appeared without the intention to promote commercial products.

In addition to academic experts, several other actors appeared in public service broadcasts, speaking in an educational way; these included one expert in the area of culture and education, one actor from the public sector, two representatives of the government, and one journalist. This was not the case with commercial television broadcasts.

In the P1 broadcasts, educational contents on environmental issues made up a small part of the material: within 86 environmental units, there were 15 cases presenting these environmental issues in an educational way (Table 5). Out of the total number of topics (498), every sixth topic was environment-related (86), but only every thirty-third was both environmental and educational (15 cases, 3%). The most common issues

in environmental-educational contents were organic agriculture, the preparation of soil for sowing, and preparation of animal feeds, accompanied with the recommended agro-ecological measures.

Table 5. *Educational contents on environmental issues in agricultural broadcasts*

Actors	Educational-environmental contents (number of appearances/mentions)			
	Public TV		Commercial TV	
	P1	P2	C1	C2
Experts	13	9	3	7
Authorities	-	2	-	-
Journalists	1	-	-	-
Actors from the area of culture and education	1	-	-	-
Representatives of public companies	-	1	-	-
Total	15	12	3	7

These contents expertly and instructively pointed out the phases of organic production, and plant protection products used in organic production; they also provided a precise explanation of the importance of silage quality and soil analysis, as a recommendation contributing to the preservation of the environment in rural areas.

Examples:
Broadcast P1 – Expert from the Institute of Agricultural Science Application, Belgrade: "Seed potatoes for organic production are best grown at a height of over (altitudes above) 1,000 metres. The most important things are good nutrition and application of liquid biodynamic fertilisers, because this can reduce the consequences caused by a viral disease. This type of fertiliser is applied over the leaves in three repetitions" (explanation of fertiliser preparation).

Broadcast P1 – Visit to Güssing (Gussing) a small town in North Austria where renewable energy production was initiated in a short period of

time. Mayor of Güssing:" About 1,100 people work in the sector today. Thirty power plants, biomass energy and photovoltaic installations were built. Güssing has become a recipe for success, and annually 15,000 people undergo specialisation training at the European Renewable Energy Centre". Representative of Serbia: "In Serbia, farmers usually burn biomass in the field. In the municipality of Bogatić, we have 192,000 tons of biomass on 25,000 ha of land. We have the ability to produce biogas and heat. In the village we also have thermal water springs with a temperature of 78 degrees C, with which we could heat households and start spa tourism. The contribution continues in Serbia, where capacities of thermal sources and biomass are unused". The journalist continues the report with information on plans to be implemented in this sector through European funds by 2020.

Educational contents on environmental topics in the P2 broadcast were rare as well. Less than half of environmental topics (28) were presented in an educational way (12, 4.5%) (Table 5). Out of the total number of topics (265), every twenty-second topic was both environmentally and educationally related. They dealt with organic agriculture, renewable energy sources and irrigation, as well as recommendations regarding modern cultural methods contributing to soil conservation and the production of healthy and safe food (reduced soil tillage, vegetable cultivation with the use of organic fertilisers, etc.).

Example: A comprehensive content aimed at raising farmers' awareness of the use of biomass from agriculture:

Broadcast P2 – Expert: Institute of Field and Vegetable Crops, Novi Sad: "It is much better and more cost-effective to use biomass than to burn it in the field. This reduces the biological potential of the soil and pollutes the environment. Increasing renewables in total production is a prerequisite for joining the EU."
Expert: Institute Vinča, Belgrade: "The pumps we have designed are solar-powered, and this would be of great benefit to agriculture, because using biomass could produce cheap energy."

In the C1 broadcast, out of a total of 24 units of environmental content, those with a notable educational function were identified only three times, i.e. in

less than 1% of the total number of topics (277) (Table 5). They included expert advice on using the by-products from the strong alcoholic beverage industry as an additive to animal feed, advice on adequate fertilisation and plant nutrition at a precise time, and information on the significance of soil analysis and other actions that should be carried out for the purpose of a simultaneous increase in yield and environmental protection.

Example:
Broadcast C1 – Alcoholic beverage industry: opportunities to use by-products from the alcohol industry. Expert: "So far, the disposal of these by-products has caused an environmental problem and required additional funding. We have shown that grape and apple residues can be used for animal feed. We have involved 80 farmers in this project, who have mastered the preparation process and hopefully will continue to do so."

In the C2 broadcast, out of a total of 15 environmental cases, 7 dealt with environmental issues in an educational way, i.e. every twelfth (4.7%) topic of the total number (149) (Table 5). Some of the content was highly original, such as adapting to European regulations regarding the use of pesticides and the use of organic plant protection products. The actors featured were researchers from various institutes. In addition to field reports, these contents appeared in the genre form of studio interviews, which did not provide the viewers with an effective presentation of the content being discussed.

Example:
Broadcast C2 – The forecasting service for plant protection (decision support system) analyses the weather conditions and predicts the movement of pests.
Expert: "This service collects insect and pest data to analyse in relation to weather conditions, and sends information on their movement to farmers. In this way, the use of plant protection chemicals is reduced, production is reduced, and health-safe food standards are achieved. We provide forecasts of insects' and pests' movement. It is affected by the weather conditions: the humidity of the air and soil, temperature and other weather parameters. This is especially important for organic production because it uses special preparations to be applied when the weather is favourable."

Farmer: "I use the information provided by the forecasting service for plant protection, which I get through my mobile phone. I am involved in the organic production of apples and pears, and this information helps me a lot. I use the plant protection products used in organic production at the time when the weather conditions are most favourable and when these agents have the highest efficiency."

Conclusion

Television has the power to form a system of values, to affect behaviour, and to represent the inexhaustible potential of knowledge and information in the world around us (Miletić, 2005). The results obtained by the analysis of empirical data on specialised TV programmes for farmers, on four TV networks, confirmed the general hypothesis of the research. Specifically, in the case of Serbia, the possibilities of television's positive influence on the development of the rural population's environmental awareness, in order to promote sustainable rural development as one of the country's development opportunities, were not utilised.

There is no specialised broadcast on national TV stations that is directly dedicated to environmental issues, with the aim of developing environmental awareness of the population; despite the state's proclaimed high commitment to raising the population's awareness of the necessity for environmental protection.

National TV stations also have no specialised educational programmes for the rural population, with the aim of influencing their pro-environmental behaviour. The most similar to these are the specialised informative and educational broadcasts on agriculture directed at farmers, which are broadcast with sufficient frequency by the republic's public service broadcaster RTS (P1), a regional public service broadcaster RTV (P2), and commercial stations TV B92 (C1) and TV Prva (C2). Only the RTS (P1) broadcast, taking into account its contents, is intended for the broader audience; that is, the inhabitants of villages, and not only farmers.

Environmental issues were rarely reported among the numerous topics these broadcasts dealt with. Their share in the total number of topics ranged from 8.7% to 17.2% (Fig. 2).

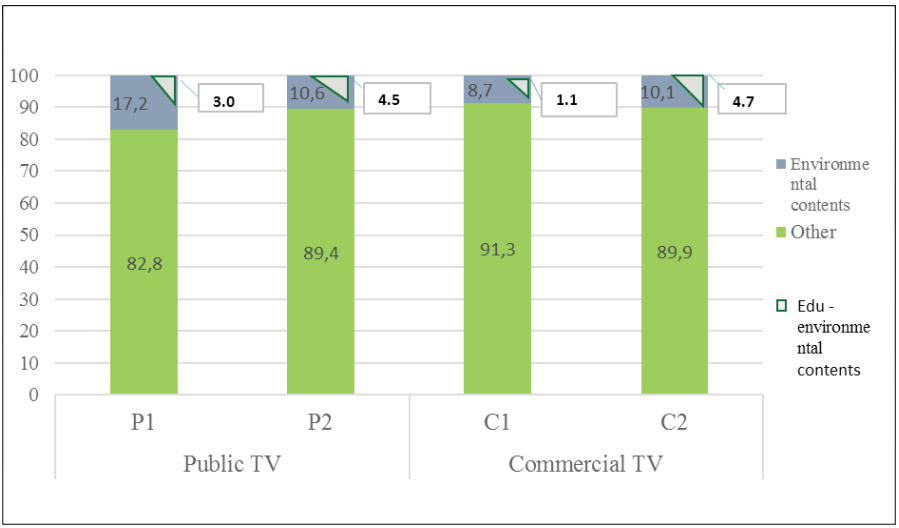

Figure 2. *Percentage of topics covered, environmental and educational-environmental contents in agricultural broadcasts (%)*

Environment-related contents were not very diverse, and mainly referred to organic agriculture, preservation of autochthonous breeds and cultivars, as well as to sustainable rural development through rural tourism. The coverage of environmental topics was limited to simple genre forms, which lacked an analytical approach or employed visually unattractive interviews. They were often presented through positive examples of the practice of individual farms and local government plans.

Educational contents on environmental issues were also weakly present in these programmes, from 1.1% to 4.7% of the total number of topics (Fig. 2). They were mainly related to the participation of experts in the programme. Within the public TV broadcasts, independent experts often provided expert advice and recommendations, whereas commercial TV broadcasts frequently hosted representatives of commercial producers (plant protection products, seeds or mechanisation) who, in the role of experts, actually promoted commercial interests of these manufacturers, rather than the interests of viewers and the public interest of developing environmental awareness.

The mixing of commercial and educational contents often occurred in specialised agricultural broadcasts on the commercial stations. Reports with a promotional purpose can affect farmers' knowledge, but they can also mislead farmers by providing insufficient information on the harmful environmental and human health consequences of using the advertised chemicals incorrectly.

The editorial policy of the media that produce specialised TV broadcasts for the inhabitants of rural areas does not seem to recognise the development of environmental awareness as a public interest to be fulfilled, nor does it seem that the editors of these media see the development of environmental awareness as their task.

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