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ENVIRONMENTAL CRIMES IN THE RURAL REGIONS - CASE OF SLOVAKIA

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Abstract

Environmental crime still does not have a single definition and it depends on various factors such as the professional orientation of the researcher, natural resources of the country, or aims of international organisations and institutions. In Slovakia, criminology is not interested in environmental criminality very much; there are only a few publications oriented towards environmental crimes or books of criminology which include environmental criminality. The aim of this paper is to summarize the theoretical approaches to the issue of environmental crimes by various researchers and to identify the activities considered as environmental crimes in Slovakia and to find out whether environmental criminality is more typical for rural areas or urban areas similarly to other kinds of criminality. We investigate the development of environmental crimes in the period 2001- 2015 in Slovakia and in the particular regions (NUTS III) and make predictions for the next five years.

Keywords: *environmental crime, environmental/green criminality, rural region, ecological systems*

1. INTRODUCTION

Environmental criminality is not a typical kind of criminality in the field of criminology. While violent criminality, drugs crime, organized crime or property criminality are quite fixed terms, environmental criminality is still looking for its definition. Lynch and Stretesky (2010) only confirmed these words when they argued that there is no single definition of the term environmental crime, and its use varies depending on a researcher´s theoretical orientation. Clifford and Edwards (1998) defined an environmental crime from the philosophical point of view, as an act committed with the intent to harm or with the potential to cause harm to ecological and /or biological systems and for the purpose of securing business or personal advantage. However, within the legal framework, an environmental crime is any act that violates an environmental protection statute (Clifford, Edwards, 1998; Cohen, 1992). Beirne (1999) wrote about non-speciesist criminology as a non-human–centred orientation, and its uses for studying harm against nonhuman species. There are still only less scientific studies oriented towards environmental crimes. Moreover, there is a problem in English terminology

when using "environmental criminology". There are two meanings of these words. The first one concerns environmental criminology with the specific nature of crime in both time and place (Andresen et al., 2010; Randa, 2014; Wartell, Gallagher, 2012; Wortley, Mazerolle, 2008). The second one considers environmental criminology as a discipline connected with environmental or ecological crime (Edwards et al., 1996; White, 2008). To distinguish these two different aspects of environmental criminology, Herbig and Joubert (2006) introduced the term conservation criminology and Lynch (1990) was the first who used the term green criminology focusing on environmental harm. However, the term green criminology is often criticized because this term may be considered as having political connections with a political party (White, 2008) or green criminology is limited because environmental crimes are not the core focus of criminal justice systems and public concern about crime and safety (Nurse, 2014). In addition, green criminology shows that harming the environment can be either a direct harm (i.e. behaviour that affects the natural environment and its ability to function) or an indirect harm (i.e. damage to the environment that inflicts harm on the species that depend on the environment) (Lynch and Stretesky, 2013).

Apart from national environmental laws, recent decades have indicated the development of an elaborate international legal framework to fight transnational environmental crime (Spapens and White, 2014). Globally, environmental terrorism includes poaching, trafficking of illegal substances, and diverting rivers for water consumption (Gennaro et al., 2005). Environmental crimes, even more than other forms of major criminality, respect no boundaries or national sovereignty of states (De Ruyver et al., 2002). Therefore, environmental crimes are defined also by international or supranational institutions; e.g. Interpol or the European Commission. Environmental crime is a serious and growing international problem, and one which takes many different forms (INTERPOL, 2016). Environmental crime covers acts that breach environmental legislation and cause significant harm or risk to the environment and human health (European Commission, 2016). Hammet and Epstein (1993) divided environmental crimes into three basic categories. The first involves violation of permit conditions or other illegal acts committed by individuals or firms already part of the regulatory scheme. The second category involves acts committed by individuals or firms outside of the regulatory scheme. The third category of environmental crime involves acts that would be illegal regardless of whether the actor was within the regulatory scheme (Hammet, Epstein, 1993). Spapens and White (2014) distinguished some categories of crimes causing harm to humans, fauna and ecosystems; the first category relates to the pollution of the air, land and water (dumping waste or blending it with the other goods, importing and using illicit pesticides); the second category concerns illegal acts that cause direct harm to flora and fauna (e.g. illegal deforestation and the poaching of and trading in protected wildlife). Environmental crimes also include crimes related to dumping toxic waste, air pollution, dangerous consumer products, aquatic pollution, environmental racism, selling hazardous chemicals, employee exposure to hazardous materials, and unsafe work areas (Gennaro et al., 2005). Martini (2012) argues that the European Union and Interpol include within environmental crimes (1) illegal trade

in ozone-depleting substances in contravention of the Montreal protocol on Substances that Deplete the Ozone Layer, (2) Dumping and illegal transport of hazardous waste in contravention of the Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and Other Wastes and their Disposal, (3) illegal trade in wildlife in contravention of the Washington Convention on International Trade in endangered Species of Fauna and Flora, (4) illegal, unregulated and unreported fishing in contravention of controls imposed by various regional fisheries management organisations, (5) illegal logging and trade in timber when timber is harvested, transported, bought or sold in violation of national laws. Bricknell (2010) introduced the following activities recognized in Australia as environmental crimes: pollution or other contamination of air, land and water; illegal discharge and dumping of, or trade in, hazardous and other regulated waste; illegal trade in ozone-depleting substances; illegal, unregulated and unreported fishing; illegal trade in protected flora and fauna and harm to biodiversity; illegal logging and timber trade; illegal native vegetation clearance; and water theft. It follows from the above mentioned various categories of environmental crime that there will be differences among the national categories of the states because of varying natural resources (e.g. not all countries have access to the sea); on the other hand, international institutions and organisations try to define common categories of environmental crimes but they are not able to take into account all national specifications and needs of the countries. The aim of the paper is to identify the activities considered as environmental crimes according to the Slovak legislation and to investigate the development of environmental crime during 2001- 2015 in Slovakia and in the particular regions (NUTS III). The first chapter is more theoretical and deals with the legal regulations to identify the environmental crimes. The second chapter investigates the development of environmental criminality and provides a forecast for the next five years; to discover the proportion of environmental criminality within criminality in general in Slovakia during this period of time. The third chapter investigates the environmental criminality in particular regions (NUTS III) in Slovakia. The NUTS III regions are divided into three groups (predominantly urban regions, intermediate regions, predominantly rural regions) for the new programming period 2014-2020 and we investigate whether the environmental criminality is statistically significant different in some of these categories of regions.

2. METHODS

We used the particular legal regulations related to environmental crimes in Slovakia (Criminal Code no. 140/1961 Coll., Criminal Code no. 300/2005 Coll., Order of Minister for Internal Affairs of the Slovak republic no. 77/2005 on procedure of prevention, elimination, revealing and documentation of environmental crimes, procedure of identifying of offenders, of investigation and accelerated investigation) and statistical data accumulated by the Ministry of Internal Affairs of the Slovak Republic for the period 2001-2015. "The regions NUTS III of Slovakia were divided into three groups: (1) Predominantly urban regions – Bratislava region; (2) Intermediate regions – Trenčín region, Žilina region, Košice

region; (3) Predominantly rural regions - Trnava region, Nitra region, Banská Bystrica region and Prešov region" (Programme of rural development in Slovak Republic, 2014, p. 7) As methods, we used time series analysis to provide forecasts by the Statistical Analytical System (SAS), non-parametric method for investigation of the statistical significance differences and index of criminality.

For non-parametric testing, the Kruskal – Wallis test was used characterized as follows:

$$H = \left(\frac{12}{N(N+1)} \right) \sum_{j=1}^{k} \frac{R_j^2}{n_j} - 3(N+1)$$

H = Kruskal – Wallis test characteristics; N = total number of regions (all groups combined); R_j = rank total for each group; n_j = number of regions in each above mentioned group; k = number of groups

For time series analysis, two forms of trend analysis and their combination were used:

(1) Linear trend analysis calculated as follows:

$$y_t = b_0 + b_1 t + \varepsilon_t$$

and log – linear trend analysis, in which the dependent variable changes at an exponential rate over time or constant growth at a particular rate calculated as follows:

$$\ln (y_t) = b_0 + b_1 t + \varepsilon_t$$

Index of environmental criminality calculated as the number of environmental crimes per 1 000 inhabitants of the particular region or country as follows:

$$I_{EC} = \frac{EC}{P} \times 10\,000$$

I_{EC} = index of environmental criminality; EC = number of environmental crimes identified by the first sub-chapter per year and per region/country; P = number of inhabitants in the region/country per year

3. RESULTS

3.1 Environmental criminology and structure of environmental crimes in Slovakia

In Slovakia, the term environmental crime or environmental/green criminology is missing in the criminological publications and text books. However, national institutions reflect the threat of environmental crimes. In Slovakia, the multidisciplinary integrated group of experts was established in 2001, which was oriented towards the illegal trade in protected wildlife; five years later, the powers of this group have been extended to all environmental crimes. It was also important to define environmental crime. According to the national Ministry of Internal Affairs of the Slovak Republic (2016), environmental crime is a crime where the environment or some of its elements (water, soil, air, animals, plants including trees) are an object of the offence. Moreover, there are also other crimes

that are usually considered as environmental crime in more European states including Slovakia, e.g. endangering health by bad food, illegal production or possession of radioactive and nuclear materials and other hazardous materials, cruelty to animals and theft of timber from forest land (Order of Minister for Internal Affairs of Slovak republic, 2005). Kern (2005), a Slovak researcher, considered as environmental crime the following illegal acts: threat to the environment, breaking the law protecting the fauna and flora including the illegal trade in protected wildlife, illegal handling of waste including its import, export or transit, illegal production and possession of nuclear materials and hazardous substances, illegal cutting of trees and illegal trade in timber, breaking the law on water protection, poaching, cruelty to animals, spreading of contagious disease, threat to human health by bad food and other substances.

Because of the substantial issues of environmental crimes that need an individual approach in the investigation and evidence, four specialized sub – groups were created by the Ministry; there are a sub-group for elimination of illegal trade in protected wildlife; sub-group for elimination of illegal acts involving timber; sub-group for elimination of illegal disposal of waste, nuclear and radioactive materials and hazardous substances; and the sub-group for elimination of poaching.

According to the Slovak Criminal Code, the Criminal Offences against the Environment are in title two of chapter six; however, crimes in other chapters are also considered as environmental crimes. It means that environmental crimes are not identical with criminal offences against the environment, but environmental crimes are considered more extensive. We consider as environmental crimes according to the Law no. 300/2005 Coll. Criminal Code the following 15 offences presented in table 1 (left side). However, the Criminal Code was changed in 2005 and came into effect on 1st January 2006. Before 2006, the old Criminal Code no. 140/1961 Coll. had been valid (Table 1 right side).

Table 1. *Environmental crime according to the Slovak Criminal Codes*

New Criminal Code No. 300 /2005 Coll.	**Old Criminal Code No. 140/1961 Coll.**
1st chapter: criminal offences against life and limb	
§[1] 168 – 169 Endangering Health due to Decayed Foodstuffs and Other Items	§ 193 and 194 Endangering Health due to Decayed Foodstuffs and Other Items
4th chapter criminal offences against property	
§ 212 (2d) theft of harvest from a land belonging to the agricultural land fund, or wood from a land belonging to the forest land fund, or fish from the pond under intensive rearing conditions	§ 247 theft of harvest from a land belonging to the agricultural land fund, or wood from a land belonging to the forest land fund, or fish from the pond under intensive rearing conditions

1 § - paragraph; the Slovakian laws are divided into paragraphs; we do not use the articles like e.g. EU law.

6th chapter criminal offences against public safety and criminal offences against the environment	
§ 298 – 299 illicit manufacturing and possession of nuclear materials, radioactive substances, hazardous chemicals and hazardous biological agents and toxins	§ 187a - 188 illicit manufacturing and possession of nuclear materials, radioactive substances, hazardous chemicals and hazardous biological agents and toxins
§ 300 – 301 endangering and damaging the environment	§ 181a - 181b endangering the environment
§ 302 unauthorised handling of waste	§ 181f unauthorised handling of waste
	§ 181e unauthorised import, export or transit of wastes
§ 302a unauthorised discharging of pollutive substances	
§ 303 - 304 breach of water and air protection regulations	§ 181g breach of water protection regulations
§304a unauthorised manufacturing and handling of substances damaging ozone sphere	
§ 305 breach of plant and animal species protection regulations	§ 181c breach of plant and animal species protection regulations
§ 306 breach of trees and shrubbery protection regulations	
§ 307 – 308 spreading on a contagious disease of animals and plants	
§ 309 escape of genetically modified organisms	
§ 310 poaching	§ 181d poaching
9th chapter criminal offences against other rights and freedoms	
§ 378 inflicting cruelty to animals	§ 203 inflicting cruelty to animals
§ 378a neglect of care for animals	

Source: Self elaboration according to the Codes

After comparison of the old and new Criminal Code, there were missing criminal offences such as unauthorized discharge of pollutive substances, unauthorized manufacturing and handling of substances damaging the ozone layer, breach of trees and shrubbery protection regulations, spreading of contagious diseases of animals and plants, escape of genetically modified organisms and neglect of care for animals as well as breach of air protection regulations. On the other hand, unauthorized import, export or transit of wastes is missing in the new criminal code. It is included under the unauthorized handling of waste.
We follow the period from 2001 to 2015; therefore both Criminal Codes are relevant. However, the missing criminal offences in the period 2001 – 2005 do not change the results too much because of their infrequent occurrence. Their share of total environ-

mental criminality is too small or none (e.g. there is no crime recorded under the paragraphs 304a and 309; there are only two crimes under the paragraph 302a), three crimes under paragraphs 307 and 308, seven crimes under paragraph 378a) and 136 crimes under paragraph 306 during the validity of the new Criminal Code). The share of the latter two crimes is quite a lot higher but the crimes under paragraph 378a) constitute only 0,02 % of the total environmental criminality and crimes under paragraph 306 only 0, 55 % during the period 2006 – 2015 when the new Criminal Code was valid. According to the statistical data from the Slovak Ministry of Internal Affairs and above mentioned data, most newly defined environmental crimes, (e.g. § 302a, § 304a, § 307 – 308, § 309, § 378a) are not recorded. There are two possible reasons for this. Firstly, it was not necessary to define the new environmental crimes because they are not committed in Slovakia. Secondly, they are committed but it is the weakness of the criminal police and other state bodies interested in the criminal procedure that they are not able to identify the newly defined environmental crimes very well. However, if the newly environmental crimes defined in the Criminal Code are not enforced, their importance in the Criminal Code will decrease for environment protection. The structure of environmental criminality is documented in table 2 (period of the old Criminal Code), and 3 (period of the new Criminal Code).

Table 2. *Structure of environmental criminality in Slovakia according to the Criminal Code no. 140/1961 Coll.*

Environmental crime (in % of total environmental crimes in the particular year)	Year		
	2001	2003	2005
§ 193-194	0,17	0,11	0,07
§ 247 (2d)	46,69	64,14	67,28
§ 187a – 188	0,52	0,41	0,17
§ 181a – 181b	0,46	0,88	1,22
§ 181f	0,06	0,03	0,03
§ 181e	0,00	0,03	0,21
§ 181g	0,00	0,06	0,00
§ 181c	1,61	3,54	5,40
§ 181d	50,03	30,11	25,03
§ 203	0,46	0,69	0,59

Source: Own calculating

The most frequent kinds of environmental crimes between 2001 and 2005 were thefts of crops from land belonging to the agricultural land fund, or wood from land belonging to the forest land fund, or fish from ponds under intensive rearing conditions (app.

59, 37 % of all environmental crimes in average), poaching (35, 05%) and breach of plant and animal species protection regulations (3, 52 %).

Table 3. *Structure of environmental criminality in Slovakia according to the Criminal Code no. 300/2005 Coll*

Environmental crime (in % of total environmental crimes in the particular year)	Year			
	2006	2009	2012	2015
§168-169	0,48	0,08	0,21	0,19
§212(2d)	72,03	64,16	65,42	70,58
§298-299	0,45	0,16	0,30	0,33
§300-301	1,23	0,64	0,76	0,70
§302	0,41	1,05	2,80	3,57
§302a	0,00	0,00	0,04	0,00
§303-304	0,04	0,04	0,21	0,05
§304a	0,00	0,00	0,00	0,00
§305	3,01	7,84	7,26	7,42
§306	0,48	0,80	0,51	0,85
§307-308	0,00	0,00	0,00	0,00
§309	0,00	0,00	0,00	0,00
§310	21,09	24,30	21,58	15,18
§378	0,78	0,93	0,76	1,13
§378a	0,00	0,00	0,13	0,00

Source: own calculating

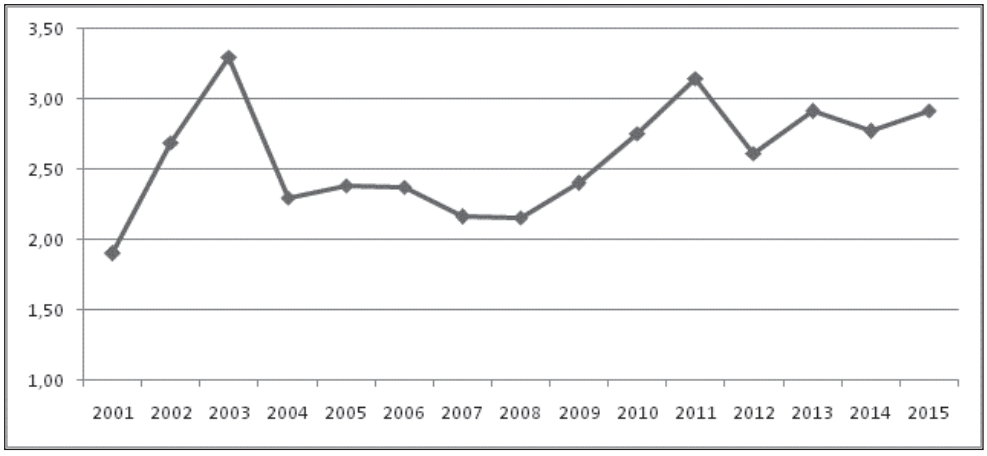
According to table 3, the most frequent kinds of environmental crimes between 2006 and 2015 were thefts of crops from land belonging to the agricultural land fund, or wood from land belonging to the forest land fund, or fish from ponds under intensive rearing conditions (app. 68, 05 % of all environmental crimes in average), poaching (20, 54%) and breach of plant and animal species protection regulations (6, 39 %). It means the order of particular kinds of environmental crimes was not changed by the adoption of new Criminal Code.

According to the results of comparison of environmental crimes in both Criminal Codes as well as the statistical data on the environmental crimes in both periods, we are able to compare the situation before and after adoption of the new Criminal Code. On the other hand, the new Criminal Code did not cause any change in the structure of environmental crimes committed according to the statistical data. Therefore, we take into account the whole period 2001 – 2015 in further analysis. In addition, the structural analysis of environmental crimes (§ 212 (2d); § 310; § 305; § 302; § 378) shows that

the four specialized sub–groups oriented towards § 305; § 306; §302 and § 298-299; and § 310 is quite equivalent to the most frequent environmental crimes. Thefts according to § 212 (2d) and cruelty to animals do not need special knowledge or a special approach to the investigation of such crimes. On the other hand, specialised teams will be necessary mainly for the investigation of newly defined environmental crimes (e.g. § 193-194, § 302a, § 304a, § 307-308; § 309 or § 378a) where special knowledge and skills are necessary. According to the statistical data, there is no registered newly defined environmental crime or only a few registered ones. There are two possible reasons for this that was mentioned also above. We do not accept the first one that there was no newly defined environmental crime committed in Slovakia. If we take into account that most of these newly defined environmental crimes were brought into the Criminal Code by its amendments, we can state that the need to add these crimes was the result of social needs. It means there is an occurrence of these crimes in Slovakia. The second reason is more probable, that it is the weakness of the criminal police and other state bodies interested in the criminal procedure that they are not able to identify the newly defined environmental crimes very well. Therefore special sub-groups of environmental police need to be created. At least, the very close cooperation of the police with the special state bodies that have enough special skills and knowledge related to the topic (such as Slovak Trade Inspection, Public Health Authority of the Slovak Republic, State Veterinary and Food Administration of the Slovak Republic, etc.) is also necessary.

3.2 Development of environmental criminality in Slovakia

The major proportions of total criminality consist of the best known kinds of criminality, such as violent, economic or property criminality. However, environmental crimes comprise only a small part of the total criminality in Slovakia, app. 3 %. The results are documented in figure 1 for the whole period of time 2001-2015.



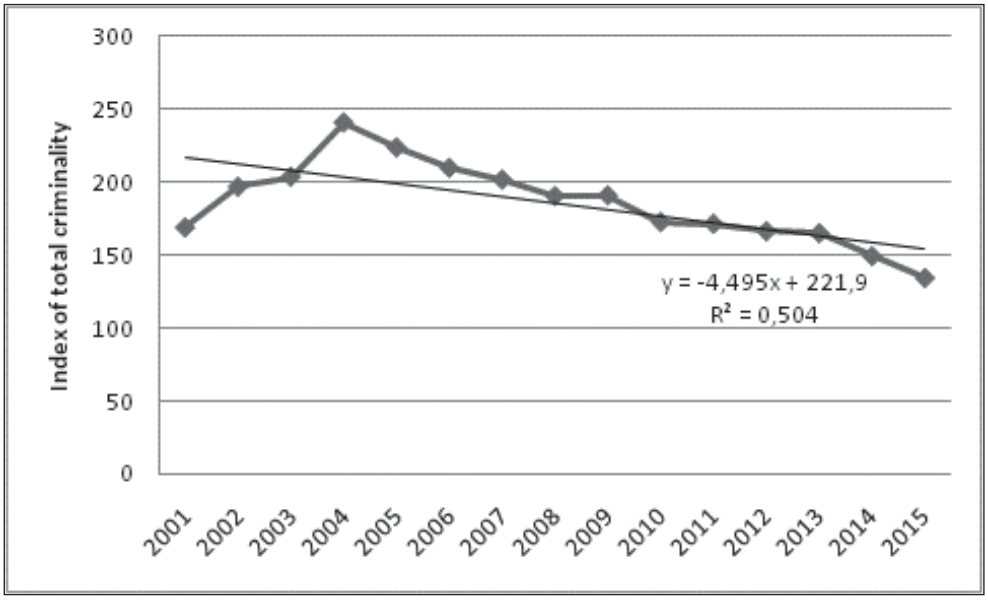
Source: Own calculations

Figure 1. *Share of environmental crimes on the total criminality in Slovakia during 2001 – 2015.*

Figure 1 proves that the share of environmental criminality of total criminality is very small. That is one of the reasons why environmental criminality is not the focus of criminologists, sociologists and other researchers. On the other hand, environmental crimes are problems not only in the state where they are committed. Environmental pollution and damage to the environment usually continue abroad and environmental crimes have a negative impact for other states. In addition, environmental crimes have a negative impact on other people in the country; they are one of the few crimes that threaten and damage also the health and lives of all people. That is also the reason why environmental crimes and their prevention should be the focus of researchers from various fields of studies.

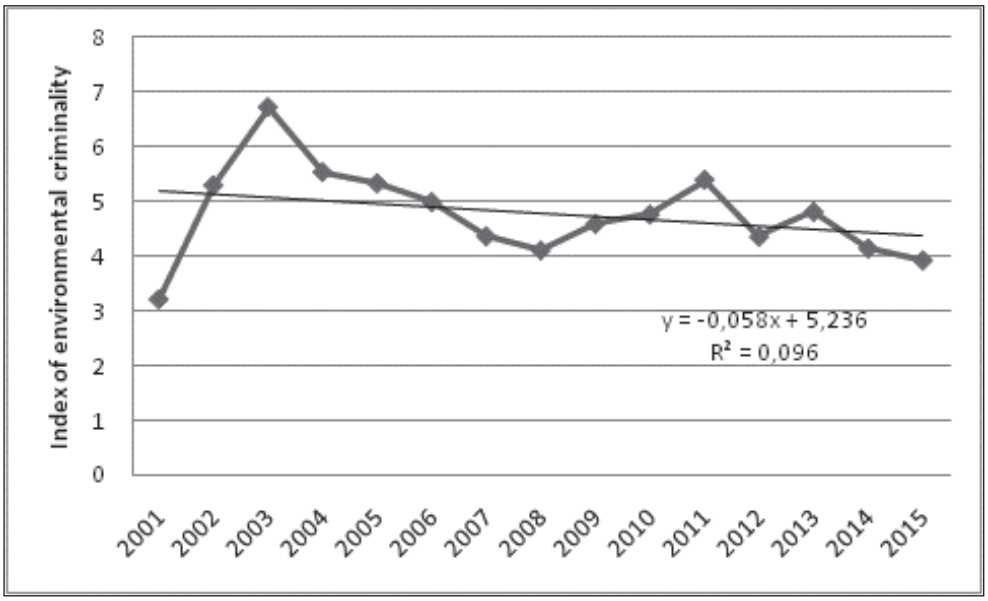
The development of total criminality and environmental criminality is quite similar, mainly the decreasing trend from the long-term point of view. The Pearson correlation coefficient between total criminality and environmental criminality is r = 0, 574 with the p-value = 0, 025. The correlation coefficient is statistically significant and it indicates a moderate positive association of total criminality and environmental criminality.

However, the occurrence of environmental criminality is more dynamic than the occurrence of total criminality because there is higher fluctuation of data related to environmental criminality (figure 2 and 3).



Source: Own calculation

Figure 2. *Development of total criminality in Slovakia 2001- 2015.*



Source: Own calculation

Figure 3. *Development of environmental criminality in Slovakia 2001- 2015.*

The probability of a further decreasing trend is proved by the model of time series analysis that enables us to predict the development of environmental criminality in the next five years.

Table 4. *Forecast of development of the environmental criminality in Slovakia based on the historical data 2003 - 2015*

	1st model			2nd model			3rd model		
Year	Predicted value	Upper 95% confidence	Lower 95% confidence	Predicted value	Upper 95% confidence	Lower 95% confidence	Predicted value	Upper 95% confidence	Lower 95% confidence
2016	2013	2472	1638	1933	2502	1363	1973	2326	1619
2017	1985	2451	1608	1859	2448	1270	1922	2285	1560
2018	1998	2501	1596	1818	2463	1172	1908	2302	1513
2019	2007	2533	1590	1812	2470	1154	1909	2315	1504
2020	1990	2529	1566	1792	2463	1122	1891	2304	1478

Source: Own processing

The forecast models were developed by the statistical analytical system (SAS) and the SAS Time Series Forecasting System was used to predict the development of environmental criminality in Slovakia, given the historical data of the absolute number of environmental crimes in the period of 2003– 2015 (the years 2001 and 2002 were excluded because of extreme values). We choose top three models: (1) the log – linear trend; (2) the linear trend; (3) the combination of both above mentioned models. The results of prediction are documented in table 4.

All three models were compared by Mean Absolute Percent Error (MAPE), R-Square, Akaike Information Criterion and Schwarz – Bayssian Information Criterion (Cipra, 1986; Arlt, Arltová, 2009; Spyros et al. 1989). The results are presented in table 5.

Table 5. *Selected indicators for evaluation of model´s quality*

Models	MAPE	R-Square	Akaike Criterion	Schwarz – Bayssian Criterion
1st model	7,044	0,637	153,984	157,373
2nd model	7,493	0,628	154,312	157,702
3rd model	7,269	0,635	146,056	147,185

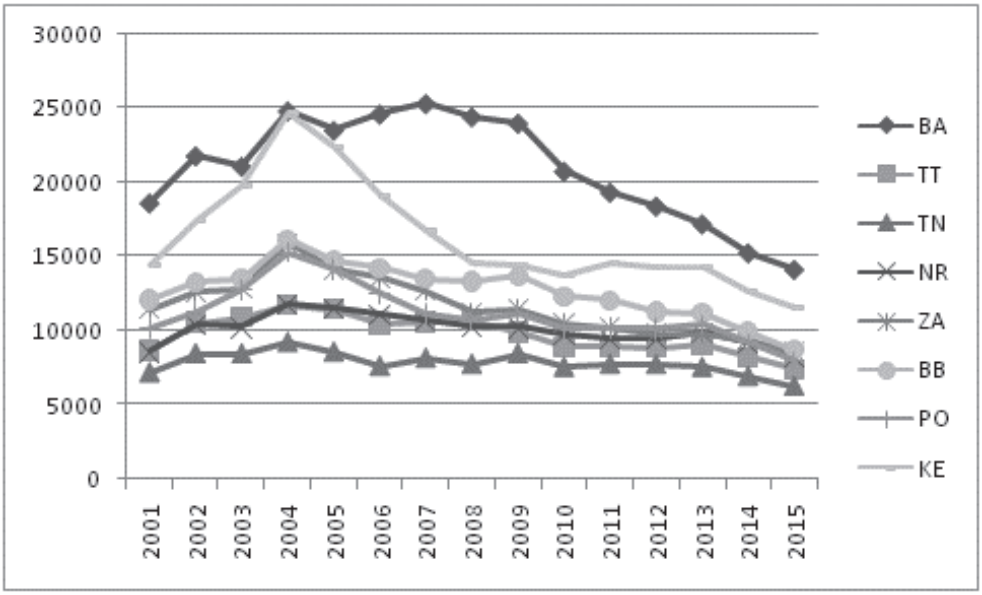
Source: Own processing

MAPE criterion measures the size of the error in percentage terms. The model is acceptable if the MAPE criterion is less than 10. We chose the model with the smallest value of MAPE and all three models have MAPE of about 7, which is acceptable for predicting. The values of Akaike criterion and Schwarz – Bayssian criterion are useful when comparing more models. The model with the lowest value is the best model among all compared models. In table 5, there are three best models according to these criteria. The R-square characteristic is only about 60 percent. We also found models with higher R-square but the MAPE-value was not acceptable because of a value higher than 10.
According to the results of table 4, there are only small differences in the models; however, we can state that the third model is the best for providing a prediction of environmental criminality development. The third model has the best values of Akaike and Schwarz – Bayssian criterions. The MAPE value and R-Square are the best in the first model; however the differences of these indicators are small between the first and the third model. We can take into account also the lower and upper confidence of the predicted values. In the third model, there is the smallest interval of confidence. According to the above compared criteria we prefer the predicted values of the third model as the most reliable ones.
The worst model for predicting is the second one because of the largest interval of confidence and because of the worst values of all indicators for model evaluation (MAPE, R-Square, Akaike and Schwarz – Bayssian criterion).

Based on the results we can expect a further decreasing trend of environmental criminality in Slovakia.

3.3 Environmental crimes in the particular regions of Slovakia

The research of criminality is concentrated mainly in the urban areas where the amount of crime is higher than in the rural ones, because the rural areas are regarded as isolated and less populated areas; therefore the researchers do not assume the high intensity of crimes of interest for their research studies (Ďurkovičová et al., 2014). Although crimes against the environment do occur in urban areas, due to the isolation of many rural areas, environmental crime in the countryside can be particularly problematic (Weisheit, Donnermeyer, 2000).The concentration of total criminality in the areas of bigger cities is proved also by figure 4. According to figure 4, the most crimes were committed in Bratislava region and Košice region, i.e. in the regions with the biggest cities (Bratislava and Košice).



* BA – Bratislava region; TT – Trnava region; TN – Trenčín region; NR – Nitra region; ZA – Žilina region; BB – Banská Bystrica region; PO – Prešov region; KE – Košice region. Source: Ministry of Internal Affairs of Slovak Republic, 2001-2015

Figure 4. *Development of the total criminality in the particular regions (NUTS III) of Slovakia.*

Nowadays, criminality occurs also in the rural areas mainly because of reduced isolation from the urban areas. There are some research papers on rural crimes (Marshall, Johnson, 2005; Weisheit, Donnermeyeer, 2000; Michálek, 2010). The British researchers (Marshall, Johnson, 2005) describe the rural specific crimes and one of these rural crime

groups is environmental crimes. Such crimes include fly tipping, dumping of toxic waste, and illegal clearing of trees. It is estimated that simply clearing up other people's waste costs each farm an average of £300 a year. Wildlife crime encompasses a range of offences including trading in endangered species, poaching, and acts of animal cruelty such as badger baiting, and cock and dog fighting (Marshall, Johnson, 2005).
Slovakia is characterized by the broad diversity of the countryside (Michálek, 2010). According to the Programme of rural development in the Slovak Republic (2014), there are three types of regions (NUTS III). The first one is predominantly urban regions which includes only the Bratislava region. The second one is intermediate regions which include Trenčín region, Žilina region, and Košice region. The last one is predominantly rural regions which include Trnava region, Nitra region, Banská Bystrica region and Prešov region. By the above mentioned references to rural and urban criminality, we posit a hypothesis that environmental criminality as a part of rural criminality is more typical and occurs more in the predominantly rural regions than in the other two types of region (predominantly urban regions and intermediate regions). We take into account three groups of regions and their criminality during the period 2001 – 2015 in each region. However, we take into account the index of environmental criminality, not the absolute numbers of environmental criminality for better comparison. For testing of this hypothesis, we investigate statistically significant differences among the regions in environmental criminality by non-parametric test (Kruskal – Wallis test) because the number of observations for parametric tests is too small. The results are documented in table 6.

Table 6. *Differences of environmental criminality among the regions of Slovakia*

Region	Mean	Variance	p-value	K-W test statistic
Predominantly urban regions (1)	1,975	0,397	< 0,0000	27,364
Intermediate regions (2)	4,549	11,364		
Predominantly rural regions (3)	5,133	4,962		

Source: Own calculations

According to the results of statistical testing, there are statistically significant differences among the types of regions; p-value is smaller than 0, 05. In addition, according to the multiple range tests, there are statistically significant differences between the predominantly urban region and the other ones; however, there is no statistically significant difference between predominantly rural and intermediate regions. The result of the multiple range testis documented in table 7.

Table 7. *Multiple range test results*

Region	Mean	Homogenous Groups	
Predominantly urban regions (1)	1,975	X	
Intermediate regions (2)	4,549		X
Predominantly rural regions (3)	5,133		X

Source: Own calculations

According to the above mentioned analysis, we can state that environmental criminality is committed more in the rural areas than in the urban ones in spite of the fact that total criminality is notoriously higher in the urban areas.

4. DISCUSSION

Environmental criminality is one of the important kinds of rural criminality. Therefore, prevention of environmental criminality needs a special approach in comparison to the prevention measures against the traditional kinds of criminality typical of urban areas. Because of these arguments, environmental criminality cannot remain integrated among the other kinds of criminality (such as property criminality, criminality against human health, etc.) but it needs to be researched as a separate type of criminality with special measures for its prevention.

In addition, the research approach to environmental criminality is necessary because environmental crimes are a problem not only in the state where they are committed but are a global problem. The environmental pollution or damage to environmental resources does not usually stop at the state boundaries. So, environmental crimes have an impact also for other states. Moreover, environmental crimes have a negative impact on other people in the country; they are one of the few crimes that threaten and damage also the health and lives of all people.

There are only a few studies that are interested in criminality from the quantitative point of view (e.g. Sachsida et al., 2010; Baltagi, 2006); still more difficult is to find a paper about rural criminality (e.g. Michálek, 2010, Marshall, Johnson, 2005; Weisheit, Donnermeyeer, 2000). Papers related to environmental criminality in the meaning of crime against the environment occur only very rarely (Bricknell, 2010; Clifford, Edwards, 1998; Kern, 2005); moreover, they are oriented more towards the psychological, legal or sociological field of studies without quantitative research. However, research into environmental criminality in the rural areas is still missing. Therefore we try to discover whether research into environmental criminality is necessary, on the one hand, by the comparison of total and environmental criminality and on the other hand by finding the differences between environmental criminality in rural and urban regions. The sta-

tistical tests confirm that there are statistically significant differences. Environmental criminality is committed more in the rural areas than in the urban ones in spite of the fact that total criminality is notoriously higher in the urban areas. It could signal that environmental rural criminality should be a special subject of research to find adequate special preventive measures. The prevention of environmental criminality needs a special approach in comparison to the prevention measures against the traditional kinds of criminality typical of urban areas. That is also the reason why environmental crime and its prevention should be the focus of researchers and experts from various fields of studies.

5. CONCLUSIONS

The aim of the paper is to identify the activities considered as environmental crimes according to the Slovak legislation and to investigate the development of environmental crimes during 2001- 2015 in Slovakia and to identify the significant differences in environmental criminality in urban and rural regions of Slovakia. We used the particular legal regulations related to environmental crimes in Slovakia and statistical data accumulated by the Ministry of Internal Affairs of the Slovak Republic for the period 2001-2015.

Both trends, the trend of total criminality and trend of environmental criminality, are decreasing and we can expect a further decreasing trend in environmental criminality in Slovakia according to the results of forecasting models. In spite of the decreasing trend, the number of environmental crimes is still high and for its further elimination special preventive measures are necessary.

According to the results the environmental criminality occurs more often in the rural areas than in the urban ones. The results support the view that environmental criminality is a serious problem of rural areas and needs a special approach to preventive measures for its elimination.

Environmental criminality needs to be researched as a separate type of criminality within criminology as well as other fields of environmental studies.

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EKOLOŠKI KRIMINAL U RURALNIM PODRUČJIMA - PRIMJER SLOVAČKE

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Sažetak

Još uvijek nema jednoznačnog određenja pojma ekološkog kriminala pa njegova definicija nerijetko ovisi o različitim činiteljima kao što su struka istraživača koji se ovom pojavom bave, vrste prirodnih resursa zemlje koju se istražuje ili ciljevi međunarodnih organizacija i institucija. Kriminologija u Slovačkoj ne pridaje mnogo pažnje ekološkom kriminalu pa je iz područja kriminologije objavljen mali broj publikacija i knjiga koje se bave ekološkim kriminalom. Cilj je ovog rada sažeti teorijske pristupe različitih autora o ekološkom kriminalu, identificirati aktivnosti koje se u Slovačkoj smatraju ekološkim kriminalom te otkriti je li ekološki kriminal češća pojava u ruralnim ili urbanim područjima u odnosu na ostale vrste kriminala. Istražit ćemo primjere ekološkog kriminala u odabranim regijama Slovačke (NUTS III) između 2001. i 2015. godine te napraviti predviđanje stanja za sljedećih pet godina.

Ključne riječi: *ekološki kriminal, ekološki/zeleni kriminalitet, ruralna područja, ekološki sustavi*

UMWELTKRIMINALITÄT IN LÄNDLICHEN BEREICHEN AM BEISPIEL DER SLOWAKEI

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Zusammenfassung

Es gibt immer noch keine eindeutige Bestimmung des Begriffes Umweltkriminalität, sodass dessen Definition nicht selten von verschiedenen Faktoren abhängt, wie z. B. vom Beruf der Forscher, die sich damit befassen, von der Art der Ressourcen des Landes, das erforscht wird, oder von Zielen internationaler Organisationen und Institutionen. In der Slowakei legt die Kriminologie keinen großen Wert auf die Umweltkriminalität, sodass im Bereich der Kriminologie nur eine kleine Anzahl der Publikationen und Bücher zum Thema Umweltkriminalität bisher veröffentlicht wurde. Das Ziel dieser Arbeit ist, theoretische Ansätze verschiedener Autoren über die Umweltkriminalität zusammenzufassen und die Aktivitäten identifizieren, die in der Slowakei für Umweltkriminalität gehalten werden, sowie zu entdecken, ob die Umweltkriminalität öfter in ländlichen oder in urbanen Bereichen im Bezug auf andere Arten der Kriminalität vorkommt. Wir werden dieBeispiele der Umweltkriminalität in gewählten Regionen der Slowakei (NUTS III) zwischen 2001 und 2015 untersuchen und eine Lageprognose für die nächsten fünf Jahre erstellen.

Schlüsselwörter: *Umweltkriminalität, Ökokriminalität, ländliche Bereiche, Ökosysteme*