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Letter to Editor

Environmental Security Policy - Morphological - Functional Analysis, Alternatives and Optimization of the Choice of Solutions

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Abstract

A new approach to justification for policy decisions in the environmental security is proposed and reasoned. The grounds and dependencies between environmental risk, environmental security policy and environmental ideology were revealed. An algorithm to form a system of alternative solutions is presented. A method for selection of political decisions based on environmental risk and costs to achieve it is proposed.

Keywords: *Analysis; Environment; Policy; Security; Solution.*

The risk, personal safety and the security of the people in their environment is a primary necessity and is the reason for the existence of the environmental security policy. It is also part of the national security system regardless the state government, the ruling parties or the coalitions.

The environment cannot be only a one-party objective. It belongs to all people on Earth and regardless of their political orientation; the environment is a vital necessity for all. Bearing this in mind, the environmental security, environmental ideology and the environmental risk are not a priority only of the "green" parties, as some researchers want to prove (Anderson, 2003). The environmental ideology or as it is also called, the "green" ideology is in parallel to the other main ideologies within the political spectrum such as nationalism, conservatism, liberalism, feminism, socialism, etc. It is part of the programs of the left, right and centre parties that follow the needs of the society for safe and secure environment. To put it in other words, the "green" ideology and its two variations-ecologism and environmentalism (Tomov, 2005; Baxter, 2000), is, to a greater or lesser degree, a priority for every party. That is why; the political decisions concerning the environmental security should be based on the "green" ideology and the environmental risk.

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The objective of the present report is to offer a new approach for the motivation of the political decisions in the field of environmental security. In order to do that, three main tasks shall be solved:

1. To reveal the grounds and the relation between *Environmental Policy→Environmental Ideology→Environmental Risk*;
2. To formulate a system of alternative solutions based on the interaction and the impact of the environmental risk and the environmental ideology;
3. To present an algorithm for the choice of political decisions regarding the environmental security.

In order to rationalize the decision-making process, a method is proposed based on three working phases corresponding to the problems mentioned above.

The first phase is a functional and structural analysis, the second-formulation of alternative solutions and the third-choice of political decisions. The morphological-functional analysis is done in two consecutive stages. First, identification of the structure of the three components-*Environmental Policy (ENP)*, *Environmental Ideology (ENI)* and

Environmental Risk (ENR). The second stage defines the functions of these morphological components. Up to now, they were treated as "stand-alone" elements (Vladimirov, 2009; 2012; 2014; Todorova, 2005; 2014; Anderson, 2003). New results from our researches (Vladimirov, 2009; 2012; 2014; Todorova, 2014; Tomov, 2005; Anderson, 2003) show that they should be treated as multi-functional because they are simultaneously part of different processes, included in different conditions and happening under different circumstances.

According to our investigations, the environmental ideology *ENI* has four morphological components (Baxter, 2000). First, it is the theory, or the *Environmental Theory*. The descriptive, forecast and normative functions of the environmental theory are not fully developed and defined. (Baxter, 2000). What is more, the ideology`s objectives, its detailed examination, verification and authenticity are not fully examined. The second component of the environmental ideology is the *Environmental Doctrine*.

We can reason that with the claim that the ideology`s purpose is for it to be used for social and political orientation, to form Weltanschauung of certain social groups. (Baxter, 2000). *Value and Ideal* are the third component. They form the ideological norm, they describe, explain and interpret the social reality and, at the same time, they assess the political reality and the attitude of certain groups in the society towards it. The fourth component includes *Projects and Programs* for political action. It is characterized with the attitude and the orientation towards the present and the future.

The morphology of the environmental ideology calls for establishing and revealing its functions within the society. The first function is *Integration* (Fig.1). Its aim is to unite the supporters of the ideology in order to influence the society and later to become part of all other ideologies and/or political programs, i.e. to become part of the every-day, social life. The second function is *Forecasting*, since it forms models and scenarios for the future of the environment and its relation to the society. The third function is *Verification* (Fig.1). The environmental ideology is the basis for developing the methodology, concepts, methods and means to prove or dismiss hypotheses, the roles of the social groups in establishing the truth about the environment and its condition. The fourth function is *Socialization* (Fig.1). It impacts the minds of the people in a purposeful, systematic and coherent way. The idea here is for the ideology to create political culture, political beliefs and political stance in the society. The process of socialization as such means that an individual acquires skills for life within the society. This process is similar to that of education, but it happens in a certain way under the supervision of a teacher or a person of authority (Anderson, 2003). The socialization aims at reaching certain results and at constructing behavior patterns that are welcomed and approved by the society. These patterns should be followed and encouraged. The socialization may become a disorganized and random process in certain situations or because of certain events in the society. In such cases the results may be welcomed or not, contrary to what society approves. Under the influence of the social environment, people may acquire and adopt such methods and means for reaching one`s own goals that are not accepted by the society. The fifth function is *Mobilization* (Fig.1). It is the ability to reconstruct the value orientation of people, to guide their thoughts and feelings towards certain direction, to activate and encourage certain behavior and/or activities. The sixth function is *Psychological Influence* (Fig.1). The ideology affects the psyche of social groups, and the impact the ideology has on the population is a result of this function. In order to reach the necessary level of effect, the causal relation should be found and the basic reasons should be disclosed.

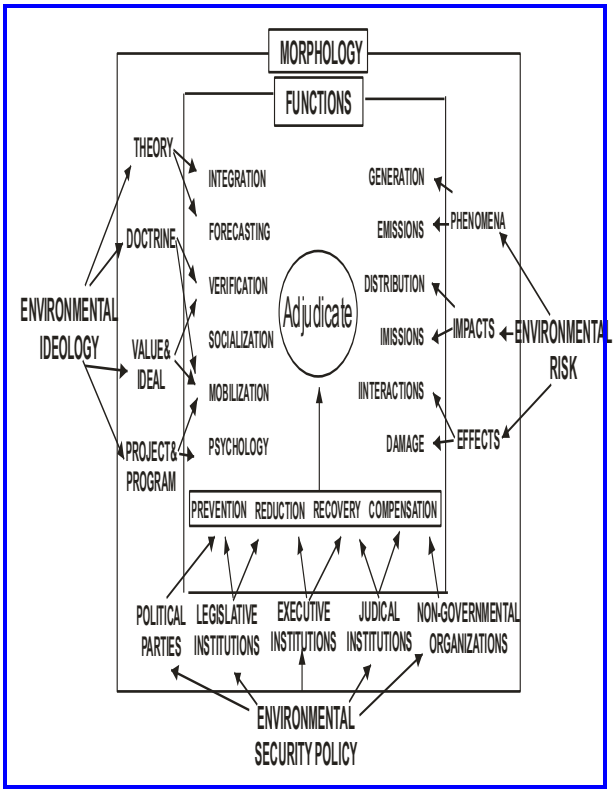

Fig. 1: Morphological-functional analysis in the environmental security policy, the environmental ideology and the risk for the environment

Based on our latest findings, (Vladimirov, 2009; Vladimirov, 2012; Vladimirov, 2014; Todorova, 2014)the morphology of the environmental risk includes three main components (Fig.1). The first is *Environmental Danger Phenomena (EDP)*, the second – *Environmental Danger Impacts (EDI)* and the third-*Environmental Danger Effects (EDE)*.

The Environmental Danger Phenomena (*EDP)* characterizes, infact, the formation of physical, chemical, biological or hybrid factors of the impact on the environment. They can be presented through a system of indicators, encompassing:

1) natural or anthropogenic events, that initiate the risk formation;
2) the processes stemming from the events and creating factors for dangerous occurrences that impact objects within the environment including people;
3) risk factors according to types with their respective characteristic features;
4) the emissions of risk factors in their environment;
5) the environment where the emissions spread;
6) Juxtaposing of the emission characteristics with the limit values of the risk factors;
7) deviation from the norms.

The Environmental Danger Impacts *EDI* on the environment are also defined by a specific system of indicators. It includes:
1) the environment of distribution of the risk factors;
2) the result risk factor for its emission and imission in the environment;
3) imissions of risk factors as a content of the environment;
4) deviation from the imission norms of risk factors;
5) area of distribution of the imissions;
6) objects of impact;
7) contact between the objects and imissions because of the shared space and the objects of distribution;
8) time and cyclic recurrence of the contact.

The Environmental Danger Effects (*EDE)* are the consequences of the impact on certain objects. They can be described in detail by:

1) the type of consequences that can be negative and positive and should not be limited only to the damages on organisms, material damages or economic losses;
2) the level or size of the consequences on certain objects of impact;
3) scope of the consequences reflecting the size of the impact;
4) the recovering ability of the consequences assessed as a probability, as a level of partial or full recovery, as expenses for investment, recovery effect and other analytical characteristics;
5) compensation of the consequences through exchange, insurance expenses, etc.

A detailed analytic and morphological description of the risks for the environment are described in (Vladimirov, 2009; Vladimirov, 2012; Vladimirov, 2014; Todorova, 2014; Tomov, 2005). Conformity model so freal, environmentally dangerous events are used.

Based on the statement set out, seven functions of the risk for the environment can be defined (Fig.1):

1) *Generation*,
2) *Emission*;
3) *Distribution*;
4) *Imissions*;
5) *Interaction*;
6) *Damage*;
7) *Improvement* of the nominal condition.

The applicability of the environmental risk in the environmental security policy together with the environmental ideology-Fig.1. There are five morphological units of the environmental security policy:

I. *Political Parties* have six main tasks:

1) Representation of the interests of social groups. The parties have this function of transforming the diverse and specific needs and requirements of the people. The interests of the community are identified, selected, simplified and combined in one unified system.
2) Communication. Parties act as channels for expression and formulation of ideas, goals and tasks in two directions-upwards, toward the party management, and downwards-toward the lowest social strata. The communication channel is intensive and acts uninterrupted within the competitive party systems where the parties are a means for influencing the public opinion.
3) Establishment and choice of political elite. The parties select and prepare candidates for political posts on all levels of the political hierarchy. The

selection of the candidates is more critical a level than the national or local elections.

4) Socialisation. It goes through: a) a stage of adaptation for the acquirement of social experience and, above all, imitation; b) a stage of identification on which the individuals aspire to distinguish themselves from the others in their society; c) a stage of integration, of inculcation in the social life; d) a stage of working, of using the social experience to influence the environment; e) a "teaching" stage, i.e. a stage to pass the social experience on to the new generation.

5) Development of policies and application of political course. The political party leaders that take part in the political governance, solve problems in the creation, organization and the implementation of the goals of both the society and the state national interests. The parties put forward political directions, take or intend to take active participation in the state policy.

6) Social integration. The parties have certain ideological values in the implementation of the political power. They are subject to affection, loyalty or hostility. This affects the public opinion and the behavior of the voters considerably. The parties are a social indicator. They integrate those social groups that see the respective political party as an exponent of their needs and interests. That is why they entrust them their hopes for solving their social problems.

The six tasks presented above serve as an argument to, first, find an application of the environmental security policy in the parties programs, and second, in the institutions or non-governmental organizations.

II. *Legislative Institutions*.

The formulation of a state national security policy, including the environmental security policy, is a responsibility of the Parliament, the Government and the President of the Republic. With respect to the national security, the Parliament adopts laws, strategies, doctrines and other acts within the scope of its competence. They define the parameters of the environmental security policy. The Parliament assesses its condition and the implementation of the obligations of different institutions. It gives recommendations of the bodies of state authority and government, of the local governments and their organisations.

III. *Executive Institutions*.

The institutions which implement the environmental security policy are the Council of Ministers, the Ministry of Environment and Water, the district and municipal administrations. The state environmental policy is an integral part of economy sectors such as transport, energy, construction, agriculture, tourism, industry, education, etc. and is implemented by the respective bodies of the Executive.

IV. *Judicial Institutions*.

Their presence within the field of this policy is determined by the occurrence of environmental crimes in the last decades. These crimes are committed knowingly or not, they are intentional or unintentional, having implicit or explicit character. The environmental security policy has an impact on the investigation of such criminal offenses, helps in the building of cases and the sentencing of the offenders according to the Bulgarian and/or European Union environmental law.

V. *Non-governmental Organizations*.

According to the Bulgarian legislation, two types of legal entities are foreseen – associations and foundations. The statute under which every association or foundation can exist are also two – a statute of private benefit and a statute of public benefit.

It is our opinion that the functions of the environmental security policy can be summarized in the way shown in Fig.1. First, *Prevention*, as a basic protective act. The aim is not to let the occurrence of events that will affect the environment. The second is *Reduction*, which is the correction of the impact on objects of the environment. The third is *Recovery* of the damages that occurred, which depends on the ability of the objects to recover their properties fully or partially. The fourth one is *Compensation* of the changes in the properties of the objects. The use of all four functions is possible.

The third phaseis to show the interrelation *Risk*←→*Policy*←→*Ideology*. They match with the political decisions *Environmental Policy adjudicate, Environmental Risk* and *Environmental Ideology*.

The formulation of decisions in the field of environmental security has a phenomenological characters in which it depends on the morphology and functions of the three components – *Environmental Risk (ENR), Environmental Policy (ENP)* and *Environmental Ideology (ENI)* (Fig.1). That is why, the famous approaches in the political sciences (Tomov, 2005) behaviorism, limited or universal rationality, or the incrementalism, do not allow a grounded decision to be taken.

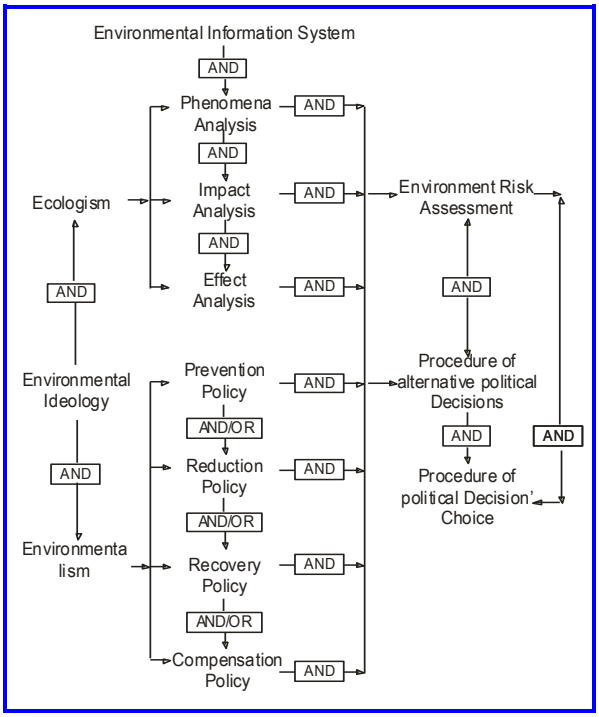

Fig. 2: Algorithm for the composition of alternative decisions in the environmental security policy

The morphological-functional analysis, as presented in Fig. 1. serves as a basis for the creation of algorithm for the justification of alternatives to the political decisions in the field of environmental security. This algorithm is shown on Fig. 2.

The *Environmental Information System* (Fig. 2) is the foundation for determination of alternatives. The next step is the *Environment Risk Assessment*, which is the main theme in a number of our research (Vladimirov, 2009; Vladimirov, 2012; Vladimirov, 2014; Todorova, 2014; Tomov, 2005). Methods for modeling of danger situations and threat are used. The most appropriate ones are the logical-probability models that re-create the causality in the appearance of dangerous events and their transformation into effects or damages for the environment.

The *Environment Risk Assessment* has two cycles. The first consists of defining the risk before its impact through the environmental security policies – *Prevention Policy*, *Reduction Policy*, *Recovery Policy* and *Compensation Policy* (Fig.2). The values of the risk resultant of this assessment are used to rank the problems and tasks for the prevention of the environment.

The *Environment Risk* gives a solid ground for motivating alternative decisions in the field of environmental security. The sequence *Environment Risk- Environmental Policy-Environmental Ideology* is followed through. The alternatives are an aggregation of the risk functions F_{Ri}, policy functions F_{Pj} and ideology functions F_{Ik}, where *i, j, k* change within the limits *i=1-6, j=1-4, k=1-6*– Table 1. The alternatives A_{ijk} are registered in a procession-like way - $A_{R1,P1,I1}$*={Gen-Prev-Int}*, $A_{R2,P1,I2}$*={Emi-Prev-For-Mob}*, etc.They unite the already-used functions of risk, policy and ideology.

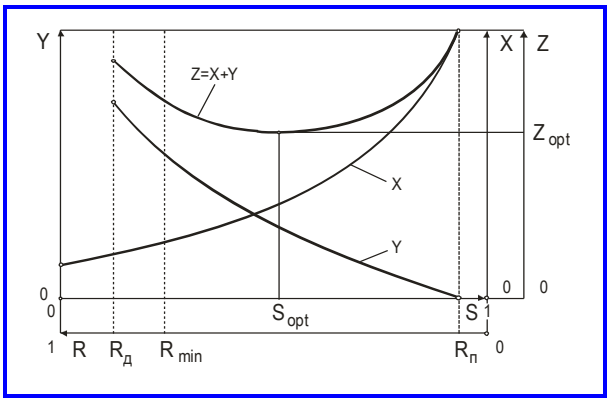

Fig. 3: The dependence of the expenses for environmental security *X*, for recovery and compensation of the damages *Y* and the overheads *Z* on the level of security *S*and the risk *R*[5]- adapted

Every alternative A_{ijk}*={Ri;Pj;Ik}* should be detailed and certain methods and means for the environmental security policy should be proposed (technical, technological, organizational, etc.).

The effectiveness of every alternative is defined. In order to do that, it should be proceeded to the second cycle, i.e. *Environment Risk Assessment*. The risk $R_{i,j,k}$ for the environment is a criterion for the value and usefulness. A matrix of the alternative risks is prepared (Table 1). It is combined with the matrix of the alternatives A_{ijk}.

The task for reaching a political decision is reduced to the alternatives A_{ijk} and looking for such an alternative where the risk $R_{i,j,k}$ is minimal, close to zero or changes within a permissible range(Fig. 3).

The expenses for environmental security *X* (Fig. 3) include all the expenses for protection appliances and systems, for management, organization, research and analyses, etc. The expenses *Y* encompass compensation of the victims, repair of equipment, facilities, buildings and other losses because of lost production or profits, recovery of losses to counterparties, etc. The overheads *Z* include

the sum of expenses for environmental security and the compensation expenses (Fig. 3). The minimum of these expenses is defined by the optimum expenses and the respective value of the security.

A range for acceptance of the risk $R_{i,j,k}$ can be defined. The main directions are shown on Fig. 3 where a really low risk R_n is given; risk corresponding to the minimum requirements for environmental security R_{min}; acceptable risk R_o; optimum overheads Z_{opt} and S_{opt} – level of environmental security corresponding to the optimum overheads. The choice can be made through linear or non-linear programming, imitational or network modeling, schedule theory, Markov processes, scenario modeling, game theory and other methods, that are applied and described in (Vladimirov, 2009; Vladimirov, 2012; Vladimirov, 2014; Tomov, 2005).

Table 1. Matrix of alternative political decisions *Political Adjudicate* in the field of environmental security

Ideology's Functions	**Political Adjudicate** A_{ijk}				**Risk's Functions**
F_{I1} Integration *Int*	$A_{R1,P1,I1}$={ *Gen-Prev-Int}* $R_{1,1,1}$	... $R_{1,2,1}$	... $R_{1,3,1}$	... $R_{1,4,1}$	F_{R1} Generation *Gen*
F_{I2} Forecasting *For*	$A_{R2,P1,I2}$={*Emi-Prev-For-Mob}* $R_{2,1,2}$	… $R_{2,2,2}$	... $R_{2,3,2}$	... $R_{2,4,2}$	F_{R2} Emissions *Emi*
F_{I3} Verification *Ver*	… $R_{3,1,3}$	… $R_{3,2,3}$	… $R_{3,3,3}$	$A_{R3,P4,I3}$={*Dis-Ver-Mob-Com}* $R_{3,4,3}$	F_{R3} Distribution *Dis*
F_{I4} Socialization *Soc*	... $R_{4,1,2}$	$A_{R2,P1,I2}$={*Imi-Red-Soc-Mob* $R_{4,2,4}$	... $R_{4,3,4}$	... $R_{4,4,4}$	F_{R4} Imissions *Imi*
F_{I5} Mobilization *Mob*	... $R_{5,1,5}$	... $R_{5,2,5}$	*...Inter-Mob-Psy-Rec* $R_{5,3,5}$	... $R_{5,4,5}$	F_{R5} Interactions *Inter*
F_{I6} Psychology *Psy*	... $R_{6,1,6}$	... $R_{6,2,6}$	*...Dam-Rec-Com* $R_{6,3,6}$	... $R_{6,4,6}$	F_{R6} Damage *Dam*
	F_{P1} Prevention *Prev*	F_{P2} Reduction *Red*	F_{P3} Recovery *Rec*	F_{P4} Compensation *Com*	
	Policy' Functions				

CONCLUSION

As a conclusion, we can state that the aim of the present report is reached. A new approach for the motivation of political decisions within the field of environmental security is proposed and reasoned. The basis and the dependencies in the system Environmental security→Environmental ideology → Environmental risk are found.

An algorithm for formation of the system of alternative decisions based on the interaction and influence of the environmental risk and the environmental ideology is compiled. A way to decide on political decisions is proposed, based on two criteria - environmental risk and expenses.

The approach is analytically precise and can be applied for solving national, cross-border and transnational problems.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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