Policy Recommendations for the Conception, Planning and Implementation of Environmental Projects as well as for the Involvement of Citizens in Maintaining a Clean Environment in Rural Communities

Editors: Cezar – Petre Simion, Cristina Mihaela Salcă Rotaru

Authors:

Cezar – Petre Simion, Mihai Vrîncuț, Florin Anghel, Daniel Jiroveanu – *Bucharest University of Economic Studies*

Cristina Mihaela Salcă Rotaru, Dana Perniu – *Transilvania University of Brașov*

Cuprins

1. Policy recommendations for the design, planning and implementation of environmental projects

1.1. Transforming the needs/problems of local communities regarding environmental protection into environmental projects

Although in recent decades there has been an increase in the awareness of environmental issues at the level of society and especially of local communities, the number and value of environmental projects still remain relatively small compared to the financing potential of programs financed by the European Union, of those financed from public sources national or from private sources. That is why there is a need for specific policies that take into account the transformation of the needs/problems of local communities regarding the protection of the environment into environmental projects.

The transformation of the needs or problems of local communities regarding the protection of the environment into environmental projects can have as initiators/triggers the local authorities/national authorities/European authorities/companies/NGOs/natural persons and follows the relationship described in figure 1.

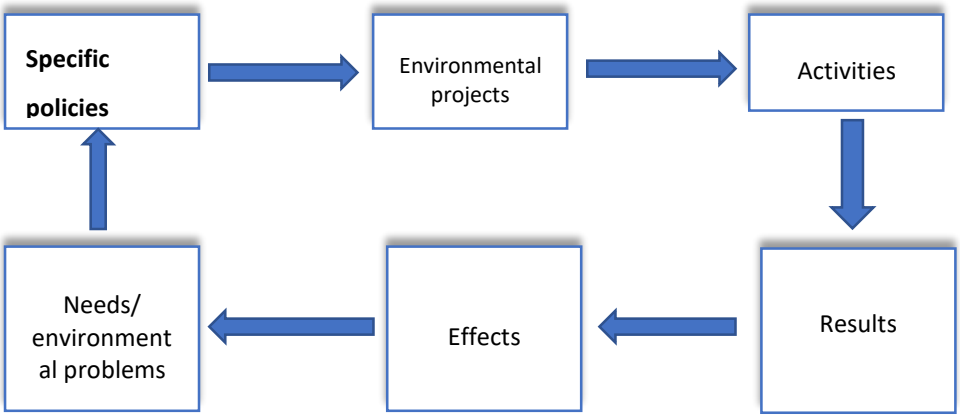

Figure 1. Transformation of environmental needs/problems into environmental projects through specific policies

Local authorities / national authorities / European authorities / companies / NGOs are the actors that generate the specific policies to transform environmental needs/problems into environmental projects through specific policies. The initiation of specific policies in this field, especially at the level of public authorities, has the advantage of transforming the process of carrying out environmental projects from an incidental/non-permanent activity into a cyclical, continuous, iterative and flexible one (adapted to the evolution of the local, regional, national environment or global).

1.2. Consulting stakeholders regarding the design and implementation of environmental projects

The implementation of environmental projects involves the involvement of a multitude of people and organizations. They are involved both in the design phase of the projects and in their implementation, sometimes even decisively influencing their realization. Stakeholders of environmental projects are people or organizations that are directly involved in projects or that can influence their implementation process (PMI, 2013).

Project stakeholders can be primary (key stakeholders) or secondary depending on the relationship they have with the project. Primary stakeholders are those who have a contractual relationship with the project. Among them are most frequently included the management of the organization, the management of the project; the project team, suppliers or project customers. Secondary stakeholders are usually those who do not have contractual relations with the environmental project but who can influence its realization. Among them are consumer associations, producer associations, the media, the local community, non-governmental organizations and other secondary stakeholders (depending on the field/geographical area/type of environmental projects).

Approaching and consulting stakeholders is a process that can be structured in several stages: identification of stakeholders: obtaining information about stakeholders; identification of stakeholders' strengths and weaknesses; elaboration of stakeholder approach strategies; predicting the reaction of stakeholders; implementation of stakeholder approach strategies (Cleland, 1999; Olander, 2006); stakeholder consultation.

a) Identification of stakeholders of environmental projects: it considers the creation of a list of stakeholders of the projects so that the next stages of the projects can be used by the project manager, the project team, the inhabitants of the administrative-territorial unit where the project is carried out, the Ministry of the Environment, of Waters and Forests, the National Agency for Environmental Protection, county agencies for environmental protection, NGOs specialized in environmental protection, mass media, companies in the area where the project is carried out.

The mayor is one of the most important stakeholders involved in the implementation of environmental projects, as he has the following responsibilities according to the Administrative Code (O.U.G. no. 57/2019):

- presents to the local council, in the first quarter of the year, an annual report on the economic, social and environmental status of the administrative-territorial unit;
- participates in the meetings of the local council and arranges the necessary measures for their preparation and running in good conditions;
- elaborates, following public consultations, the draft strategies regarding the economic, social and environmental condition of the administrative-territorial unit;
- ensures the development of urban plans provided for by law, submits them to the approval of the local council and acts to comply with their provisions;
- issues the notices, agreements and authorizations given in its competence by law and other normative acts, after verification and certification by the specialized departments from the point of view of regularity, legality and fulfillment of technical requirements;
- ensures the completion of the works and takes the necessary measures to comply with the provisions of the commitments assumed in the European integration process in the field of environmental protection and water management for the services provided to citizens.

The Local Council is also one of the most important stakeholders involved in the implementation of environmental projects because, according to the Administrative Code (O.U.G. no. 57/2019), it has the following responsibilities:

- approves the strategies regarding the economic, social and environmental development of the administrative-territorial unit;

- ensures a favorable environment for the establishment and/or development of businesses, including by capitalizing on the existing heritage, as well as by making new investments that contribute to the fulfillment of regional and local economic development programs;
- ensures the completion of the works and takes the necessary measures to implement and comply with the provisions of the commitments assumed by Romania as a member state of the European Union in the field of environmental protection and water management for the services provided to citizens;
- ensures, according to its competence and under the conditions of the law, the necessary framework for the provision of public services of local interest regarding environmental protection.

The environmental project manager is the most important stakeholder of the project because: he is the main responsible for the realization of the project, for the fulfillment of its objectives and the achievement of the expected results. Project management is the key factor involved in the design and planning of the project, the conclusion of important contracts, the control of the implementation of activities and the achievement of deliverables.

The project team is recruited, selected and developed with an adequate composition so as to ensure the appropriate skills required for the implementation of the project activities, according to the matrix of responsibilities. For the realization of environmental projects, it is important to form teams that function without major conflicts and are focused exclusively on the achievement of objectives.

The residents of the administrative-territorial unit where the environmental project is carried out constitute another important stakeholder, even if they are not always directly involved in the realization of the project. They can influence the project through their favorable or unfavorable attitude towards it, but also through influencing other categories of stakeholders: mayor, General Council, mass media, NGOs, economic agents.

The Ministry of the Environment, Waters and Forests is an important stakeholder as it is responsible for the implementation of the national policy in terms of environmental protection, green economy, biodiversity, protected natural areas, climate change (H.G. no. 16/2020) This

ministry underpins and implements the strategy and the specific regulations for the development and harmonization of these activities. The Ministry of Environment, Water and Forests also manages the most important programs through which environmental projects are financed (http://www.mmediu.ro/categorie/minister/6).

The National Agency for Environmental Protection's mission is to ensure, including through agencies at the county level, a better environment both from the perspective of present and future generations (http://www.anpm.ro/web/guest/acasa). The National Agency for Environmental Protection receives requests to issue environmental consent for important projects and can collect the observations of other interested stakeholders. Within this agency, therefore, activities with an impact on the environment are authorized, strategic planning processes are carried out and normative acts in the field are substantiated.

The Environmental Protection Agencies ensure, according to the Organization and Functioning Regulation, through the departments in the organizational structure, the implementation of environmental protection activities at the county level (ANPM, 2012). These institutions can issue opinions/agreements, authorizations/integrated environmental authorizations, in accordance with the legislative provisions.

NGOs specialized in environmental protection are another stakeholder involved in environmental projects, either as a main stakeholder (partner in the project) or as a secondary stakeholder, with a favorable or unfavorable attitude towards the projects. These NGOs can be involved in networks of specialized organizations, at the local, national and international level, being able to greatly amplify the impact of certain types of environmental projects. Connecting to specialized networks allows these NGOs to access funding for their own projects and to accumulate experience and know-how in their development.

Mass media is a stakeholder that interacts with the project either directly by disseminating information to its target groups, or indirectly by taking information from various stakeholders (local population, companies, local administration organizations). Local media are involved in the implementation of environmental projects, but sometimes also national or international media (when the need to disseminate project results requires it).

The companies in the area where the project is carried out are usually suppliers of materials or services for environmental projects, but also some of their clients if they have the possibility of economic exploitation of the results. Depending on the type of projects, companies operating locally can have the role of contractor, subcontractor, designer, consultant, supplier of materials and raw materials.

b) Obtaining information about stakeholders : is focused on the stakeholders identified in the previous stage. The sources of information can be: web pages; general or specialized forums; mass media (even when it appears as a stakeholder); social networks; their activity reports and other available documents. Information about stakeholders is of two types:

- information of a general nature, regarding the situation in which the stakeholders find themselves (income level, unemployment rate; attitudes, norms, behaviors and values towards environmental issues);
- information that can provide possible clues about the potential attitude of stakeholders regarding the project (previous attitudes towards similar environmental project proposals; own needs related to solving environmental problems).

c) Identification of stakeholders' strengths and weaknesses: the strengths are the elements that are not approachable or are less approachable from the perspective of the project-stakeholder relationship in order to determine a favorable attitude towards the implementation of the project on their part. The weak points are on the contrary, elements that can be addressed more easily so that the attitude of the stakeholders is favorable or at least neutral in relation to the implementation of the project.

d) The development of stakeholder approach strategies, which involves establishing the purpose and objectives of the stakeholder approach, the options to follow regarding their approach and the necessary resources. In certain cases it is also necessary to establish the time sequences in which the stakeholder approach should be carried out. The project management can follow certain standard strategies (exploiting the weak points of the stakeholders) or can adapt the options to the particularities of the project stakeholders.

e) Anticipating the reaction of stakeholders – the approach to stakeholders cannot be limited to just formulating a specific strategy, but must take into account their potential responses/reactions. For a certain category of stakeholders (mayor, local council) the reduction of the unemployment rate as a benefit of an environmental project can be a very convincing approach option, which causes a positive reaction, while for other categories of stakeholders such an effect it can generate at most a neutral reaction in relation to the implementation of the project.

f) Implementation of stakeholder approach strategies – it is carried out following the study of the forecasted reaction of the stakeholders. The implementation of stakeholder approach strategies creates the prerequisites for stakeholder consultation.

g) Consultation of stakeholders – it can be done in several forms: periodic meetings with stakeholders; the participation of some stakeholders in the meetings/meetings of the project team; organizing/scheduling public consultations regarding the need to initiate/implement the project; putting some project documentation or parts of it into public debate.

In the conception/feasibility phase of environmental projects, the consultation of stakeholders can generate new approaches regarding: the technical variants eligible for the realization of the projects; the most appropriate technical-economic design solutions; the solutions chosen to minimize or, as the case may be, maximize the impact on the environment. The involvement and consultation of stakeholders is also necessary during the implementation period, especially in the case of consultants and companies specialized in technical assistance. Certain stakeholders can also be consulted during the exploitation and post-use periods of the projects.

Kiss et al. (2022) propose an approach to the participation of stakeholders in the decision regarding environmental projects that involves the levels presented in the following table.

Table 1. Levels and forms of stakeholders participation in the design and implementation of environmental projects

No.	Levels of participation	Description of the participation level	Forms of participation
1	**Information**	Reports; public presentations; online	Information on new projects, informal education,

		information; web pages; field/local visits/interactions	promotion of future collaborations and awareness of future challenges regarding environmental protection.
2	**Consultation**	Introducing future projects to local community citizens and considering/recording their views/contributions.	The organization of events specifically dedicated to environmental issues, meetings on this topic, email correspondence, interviews, questionnaire-based surveys, citizens' participation in judging committees.
3	**Collaboration**	Presentation of future projects to local community citizens, consideration/recording of their opinions/contributions, their involvement in project implementation	Specialized meetings, interactive workshops, forums dedicated to environmental issues/projects, focus groups, debates in social media networks, activities based on community input.
4	**Co-decision**	Collaboration with citizens in the implementation of environmental solutions/actions/projects	The joint design of some workshops, the participation of citizens from local rural communities in various environmental-themed panels; joint environmental action/policy/project planning groups.
5	**Empowerment**	The intention to build a long-term attachment to environmental issues and to improve the citizen-environment relationship by involving them directly in the actions of local authorities.	Planning advocacy actions, decision-making processes with the direct involvement of citizens from rural communities.

source: adapted from Kiss et al. (2022)

The described levels show what is actually the degree of involvement assumed by rural stakeholders in solving environmental problems through specific projects and adopting decisions in this regard.

1.3. Formation and strengthening of good practices networks for the implementation of environmental projects

Another policy recommendation that should materialize is that represented by the formation and consolidation of networks of good practices in the implementation of environmental projects. The support of networks of good practices for the implementation of environmental projects should be constituted by the associations of territorial administrative units in urban and rural areas. In Romania, such associations of administrative-territorial units can be represented by:

a) Association of Communes in Romania – which includes 2200 communes in Romania from all the counties of the country. The association has in its portfolio a series of projects with European funding carried out in partnership and is involved in the following international networks/organizations:

- *United Cities and Local Governments* – to which more than 1000 localities from 95 countries have joined;
- *The Council of European Municipalities and Regions (CCRE/CEMR)* - the largest association in the field of local government in Europe, with 50 associations representing the interests of over 100,000 local and regional authorities;
- The subsidiarity monitoring network within the European Committee of the Regions;
- The Congress of Local and Regional Authorities of the Council of Europe– Chamber of Local Powers;
- Network of Associations of Local Authorities of South-East Europe (NALAS) – network that has 16 members, including the Association of Municipalities in Romania since 2009;
- Council of Local Authorities from Romania and the Republic of Moldova (CALRRM).

b) Association of Romanian Cities - organization in which 216 territorial administrative units from Romania are represented. Good practices and their transfer constitute one of the most important activities of cities in Romania.

c) Association of Municipalities in Romania – organization that includes all 103 municipalities in Romania and the six sectors in Bucharest. The Association of Municipalities in Romania is in turn integrated into several networks/profile organizations: Federation of Local Authorities from Romania (FALR);

- The Council of European Municipalities and Regions (CEMR);
- The Congress of Local and Regional Authorities of the Council of Europe (CPLRE);
- Association of European Cities and Regions for Culture "Les Rencontres".

The networks of good practices regarding the implementation of environmental projects should also include research institutes/universities from Romania or abroad, but also NGOs or companies that have carried out environmental projects can provide case studies/reports/other good elements practices in this field. The structure of the best practice networks is presented in the following figure.

Figure 2. The structure of networks of good practices regarding the implementation of environmental projects

Networks of good practice, once formed, should form the basis of the transfer of good practice. The members of the network structure can have their own contribution to the establishment of the basis of good practices regarding the implementation of environmental projects. Their involvement takes place in various stages of the projects' life cycle and they may have different views on: how to structure and plan project activities, control the implementation of projects, determine the impact on the environment, how to quantify the effects of projects on local communities.

The role of structuring networks of good practices is essential for identifying the elements that should be harmonized and standardized, especially in the form of environmental project implementation practices.

1.4. Urban-rural know-how transfer

Since in the urban environment the awareness of environmental problems was achieved, as a rule, earlier than in the rural area, in these localities more environmental projects were carried out or with a wider scope. That is why the urban environment, through public authorities/institutions involved, can be a good generator of good practices/model projects that will be the object of the transfer of know-how to local communities in the countryside through policies dedicated to this subject.

Policies regarding the transfer of urban-rural know-how must be carried out by involving knowledge and good transfer networks, especially those that involve both urban and rural organizations. Through them, the environmental projects carried out in the urban area can be presented and taken over by the local communities in the countryside.

The transfer of know-how from the urban to the rural environment can cover several aspects, as shown in the following table.

Table 2. The stages of urban-rural know-how transfer

No.	Stage	Transferable results	Organizations involved
1.	Identifying projects in the urban area that	-Environmental projects;	- City Halls from urban and rural areas;

	can also be implemented in the rural area	- Recycle; - Reduction of pollution; -Decontamination of sites; -Thermal rehabilitation of the built fund.	-Ministry of Environment, Waters and Forests; -Environmental Protection Agencies; -Companies; -NGOs; - Universities; - Research institutes; -Other interested institutions.
2.	Establishing the elements of know-how that can be transferred	- documentation related to project design and supporting documentation (feasibility studies, pre-feasibility studies, impact studies); - progress reports	- City Halls from urban and rural areas; -Companies; -NGOs; - Universities; - Research institutes; - Consultants; -Other interested institutions.
3.	Use of best practice networks for transfer	-studies at the network level; -reports at the network level; - other documents available in the network.	-Association of Communes in Romania; -Asociația Orașelor din – România; - Association of Municipalities in Romania; - Federation of Local Authorities from Romania.

In the implementation of policies regarding the transfer of urban-rural know-how, an important role falls, apart from local authorities, especially to the Ministry of Environment, Water and Forests, which manages the most important programs dedicated to environmental issues. Also, the Environmental Protection Agencies can facilitate the transfer of knowledge and experience in

carrying out environmental projects from urban to rural level in a mixed intra-county and inter-county approach.

1.5. Amplification of program synergies that include environmental projects

The amplification of the synergies of the programs within which environmental projects are financed contributes to the fulfillment of national, European and global objectives in the field of the environment. The most important condition for amplifying synergies is the awareness of the reflection of environmental issues at the level of existing projects/programs, especially in the case of those with national funding. At the national level, several programs are carried out through which environmental projects are financed. Among the most important programs through which environmental projects are financed - from public sources - are:

- Sustainable Development Operational Program 2021-2027;
- National Recovery and Resilience Plan Pillar I Green Transition;
- The program to improve the quality of the environment through the afforestation of degraded agricultural lands, ecological reconstruction and sustainable management of forests;
- The national program for improving the quality of the environment by creating green spaces in localities;
- The program regarding the production of energy from renewable sources: wind, geothermal, solar, biomass, hydro;
- The program regarding education and public awareness regarding environmental protection;
- The program aimed at the protection of water resources, integrated water supply systems, treatment stations, sewerage and purification stations.

Since most of these programs are run at the level of the Ministry of Environment, Water and Forests, policies dedicated to amplifying the synergies of programs that include environmental

projects should be initiated in this institution. Policy initiatives dedicated to amplifying the synergies of programs that include environmental projects could be embodied in:

- Creation of an interministerial body in which all the ministries that are management authorities of the programs through which environmental projects are financed are represented. This intermediary body should make a periodic analysis of how the programs/projects implemented ensure the fulfillment of national/European objectives in the field of the environment and its protection;
- Ensuring project/programme/national strategies/local strategies synergies by including in the documentation required for project financing the need to correlate submitted projects with other environmental programs/projects/strategies;
- The generalization of imposing compliance with principles such as sustainable development or the polluter pays for all project proposals financed through programs run by national or local public authorities/institutions.

The amplification of the synergies of the programs within which environmental projects are financed contributes to the fulfillment of national, European and global objectives in the field of the environment. The most important condition for amplifying synergies is the awareness of the reflection of environmental issues at the level of existing projects/programs, especially in the case of those with national funding.

1.6. Extending environmental impact assessment in the design/design phase of projects and the retrieval of information in specific documentation

For projects that have a significant impact on the environment, environmental approval is required. The environmental impact assessment procedure is carried out according to Directive 014/52/EU of the European Parliament and of the Council of April 16, 2014 amending Directive 2011/92/EU regarding the assessment of the effects of certain public and private projects on the environment. Directive 014/52/EU of the European Parliament and the Council of April 16, 2014 is transposed nationally by Law no. 292/2018 regarding the assessment of the impact of certain public and private projects on the environment.

According to Directive/014/52/EU of the European Parliament and of the Council of April 16, 2014 and Law no. 292/2018 as a result of the environmental impact assessment and consultation of the public and public authorities with responsibilities in the field of environmental protection, the impact assessment report is analyzed on the environment and the decision on the environmental agreement for public or private projects is adopted.

In annex 2 of Law no. 292/2018, the projects for which the need for environmental impact assessment must be established are provided. In this context, we consider it necessary to adopt specific policies that lead over time to the generalization of the impact on the environment for all projects that involve conception/design phases (investment/construction projects). By this, we have in mind not only the potential negative impact but also the positive one that can then be taken up in other specific analyzes (feasibility studies, other specific documentation).

Environmental impact assessment can be used in the cost-benefit analysis of feasibility studies in the part intended for economic analysis (or socio-economic analysis in other approaches). The economic analysis should reveal the project's contribution to the economic and social well-being of the locality or region. This analysis must have a more comprehensive dimension than the financial analysis of the project beneficiary. Unlike the financial analysis, which reveals the performance of the investment regardless of the source of financing, the economic analysis tries, by means of conversion factors for each input (inflow) and output (outflow), to highlight the economic-social costs and benefits not covered by the financial analysis.

The methodology that allows the transfer from the financial to the economic analysis consists of the transformation of the market prices used in the first, into prices or accounting values, which correct the price distortions caused by the imperfections of the market mechanisms, as well as taking into account the externalities that lead to costs and social benefits, which were not taken into account in the financial analysis because they do not generate expenses or monetary income. International practice considers standardized factors for some classes of inputs and outputs, but one can try to define specific factors on a case-by-case basis. The socio-economic analysis has three phases: corrections related to taxes, subsidies, other transfers; corrections determined by externalities;

conversion of market prices into accounting prices to include social costs and benefits (determination of conversion factors).

The results of the environmental impact assessment can be used in the phase of corrections determined by externalities. The objective of this phase is to determine the costs and benefits not taken into account in the financial analysis. Examples would be costs and benefits from environmental impact, time savings in the transport sector, lives saved by projects in the medical sector or those in the road transport infrastructure. Although it can be easy to identify such costs and benefits, they are difficult to evaluate, especially since some costs, such as ecological ones, occur in the long term and hence the difficulty of quantifying and evaluating them. There may be a list of unquantifiable externalities to ease the decision maker's burden. The environmental impact must be properly described and assessed, using qualitative/quantitative methods and multicriteria analysis. If possible, environmental costs could have a conventional accounting representation, even in the form of rough estimates.

1.7. Generalization of the life cycle approach and life cycle costing of projects

The results of the environmental impact analysis can also be used in the life cycle analysis and the life cycle cost analysis of the projects, the applicability of which should be generalized through specific policies. Economic and environmental considerations are not mutually exclusive. The development of projects can be carried out taking into account the impact on the environment.

Life cycle cost analysis is a systematic, analytical process of evaluating the modes of action within a project with the objective of choosing the best alternatives for employing the least expensive resources. The chosen mode of action and implementation applies to the entire life cycle of a project. By applying the principles of life cycle cost analysis, it is possible to investigate several projects from which the most cost-effective one must be chosen.

The life cycle cost analysis must be carried out as soon as possible in the project's time frame, because otherwise it loses its impact when making decisions about cost efficiency, not being able to reach a correct alternative approach. Life cycle cost analysis is the methodology for estimating

all the costs of a project throughout its life cycle and fits perfectly with the "cradle to the grave" approach that must characterize design in agreement with the environment.

More precisely, thanks to this approach based on life cycle cost analysis, it is possible to quantify all the environmental costs resulting from the implementation and operation of the projects. Some essential differences between economic and environmental analysis led to a separation of the study of the two aspects. In the specific context of design, this separation is responsible for the absence of a clear vision of the relationships between economic and environmental performance resulting in the development of alternative design methods.

Life cycle design can be defined as a new approach to the systematic reduction and elimination of environmental impact throughout the life cycle, by assessing from the beginning the potential impact throughout the entire design process.

There are a wide range of design strategies for extending the life of a project/system:

- designing for durability;
- designing for reliability;
- creating an adaptable project, which allows continuous improvement of various functions;
- design for repair;
- design for remanufacturing;
- design for reuse;
- designing for recycling;
- designing for dispensaries.

All this leads to the use of a high-performance type of design, namely integrated design, which gives the designer responsibilities throughout the entire life of a project. Dispensability is the characteristic of a product to allow its component materials, which are not recycled, to be legally disposed of without degrading the environment. Taking environmental factors into account from the first stages of the product/project life cycle determines a potential greater environmental benefit and lower recycling costs.

Life cycle cost analysis is an economic evaluation technique that can be used for design alternatives that generate different costs over the life of a project. Lifetime costs are discounted at a certain time and the alternative with the lowest discounted cost is considered the most economical. Life cycle cost analysis is the most suitable tool to reveal if the higher initial cost of an alternative is economically justified by reducing future operating or conversion costs compared to alternatives that assume a lower initial, design and execution cost but assume higher subsequent costs. That is why the real challenge of the methods based on the life cycle cost analysis is the elements that form the total cost structure, in order to be able to obtain correct comparisons between the different design alternatives for a construction of any type.

The greatest benefit of a life cycle cost analysis occurs when it is performed before the actual execution begins, because during the design period the specifications can be changed without generating very high additional costs. When the project has already been completed or when changes occur during the execution period, the impact on costs is much greater. That is why it is very important that the initial life cycle cost structure includes as elements all cost categories with a major impact on the total life cycle cost.

The problem of "life cycle cost" analyzes can only arise when two or more options can be defined for the same project, from which the option with the minimum life cycle cost is chosen. The milestones that define the application of the concept of cost per life cycle of constructions - are: the initial costs related to the investment, the subsequent costs related to operation and maintenance, the analysis period, the milestone date and the updating factors. In order to determine the life cycle cost, it is necessary to take into account some general elements:

- The life cycle cost of the projects represents the sum of the initial expenses (research, design and execution expenses) and the subsequent expenses (expenses for the operation and maintenance of the objective, post-use expenses that can be demolition, decommissioning, reconversion, recycling);
- In order to sum up the costs incurred at different moments of the life cycle, they must be expressed in the same units of measure;

- The time horizon is in most cases considered equivalent to the normal service life of the object or element analyzed. When this time horizon is more distant, the risk that a solution adopted today will no longer be valid increases; in such cases, the analysis can be carried out on shorter time horizons than the normal duration, called the study period.
- In order to add up the costs that give the value of the cost over the life cycle of the projects and that are consumed at different moments of time, it is necessary to apply some updating factors. By applying these factors, the costs are brought to the level of a reference date, usually the year in which the comparison is made.

Specialists in the field have developed a new concept regarding the Life Cycle Engineering of a product or process which has the role of optimizing the stages of the life cycle aiming to balance the gains and losses related to the aspects of making the products, the materials used, the energy consumed, the processing of waste. this sense highlights seven directions of eco-efficiency: reduction of material consumption, reduction of energy consumption, reduction of toxic materials, increase of recyclability of materials, development of renewable resources, sustainable growth.

2. Policy recommendations on citizen involvement in maintaining a clean environment in rural communities

2.1. Informing and raising awareness among citizens in rural communities about the need for a clean environment

The involvement of citizens in preserving a clean environment in rural communities cannot be achieved without specific policies being developed and applied to inform and raise their awareness of the importance of environmental issues. Moreover, certain specialists (Comănescu, 2007) have observed that, although at the national level there is a favorable attitude towards solving environmental problems, the low involvement of the low population in solving them (especially in the process of waste recovery and collection) is among the causes mainly the absence of systematic means of awareness/information regarding the need to preserve/protect the environment and the harmful effects associated with non-compliance with environmental legislation.

That is why, through the joint effort of the national and local authorities, of the NGOs whose object of activity is the protection of the environment but also of the business environment (companies that have activities related to the protection of the environment or that want to take advantage of the existing opportunities in this field) a mix of policies can be implemented and applied with the aim of increasing the level of information of rural citizens regarding the need for a clean environment in local communities.

Among the most important actions that can give content to specific information and awareness policies of citizens in rural communities regarding the need to preserve a clean environment are:

a) Designing and conducting information/awareness campaigns through mass media (publications edited by town halls or with their support, newspapers, local radio and TV stations).

b) The organization of seminars and workshops dedicated to informing members of local communities in the rural environment about the need to preserve a clean environment.

c) Editing and distribution of leaflets, posters, posters on the topic of involving rural citizens in preserving a clean environment

d) Organization of competitions on environmental issues for all age groups (children, young people, adults, etc.) or representative socio-professional categories for local rural communities

e) Creation and use of open educational platforms dedicated to environmental education

f) Using social networks to create and run dedicated information/awareness campaigns

g) Organization of Environmental Information Centers within local communities

2.2 Stimulating the participation of citizens in the adoption of decisions regarding the environment

To be truly involved in keeping a clean environment, citizens must not only be informed, but must also be stimulated through specific policies to participate in the adoption of decisions in this area. The participation of citizens in the adoption of decisions regarding the environment can be done at several levels. Brager, Specht, and Torczyner propose the approach shown in the following table.

Table 3. The degree of local community participation in environmental decisions and their level of control

No.	The level of control by the local community	Participant actions	Examples
1	Very reduced	No action	The community has no participation in the adoption of decisions regarding the environment.
2	Reduced	Receive information	Planning organizations make the decisions and announce them. The local community is notified from the perspective of the need to informally obtain the local community's buy-in.
3	Relatively low	Consulted	Organizations that adopt the decisions seek to obtain support for their implementation. For this, the members of the local community are consulted without, however, feeling obliged to change the decisions/plans regarding environmental protection according to the opinions of the members of the local communities.
4	Medium	Provide counseling	Organizations that adopt environmental decisions at the local level seek to involve local community members in the form of advice in the adoption of decisions.

5	Relatively high	Joint planning	Organizations making decisions/planning environmental actions are willing to modify plans/decisions based on suggestions/observations from local community members.
6	High	Delegation of authority	Organizations present the plans/decisions potentially to be adopted to the local community. They define the boundaries and ask the local community to adopt a series of decisions that will be included in the plans that will be adopted.
7	Very high	Local community control	Locally representative organizations ask the local community to identify issues and make key decisions about their implementation

source: adapted from Brager, Specht and Torczyner (1987)

From the previous table it can be seen that the degree of control increases as the involvement of the local community increases in solving problems and making decisions about the environment. From the perspective of the rural environment, a high degree of control is more difficult to achieve because there are not so many specialists in the field of environmental

protection. On the other hand, contact and communication with the local community is much more direct and easier than in urban areas.

Davidson (1998) proposes several levels of participation of citizens in local communities in decision-making. Starting from his approach, we defined several levels of the involvement of local communities in the adoption of environmental decisions. These are shown in the following table.

Table 4. Levels of citizen involvement in environmental decision-making and specific actions

No.	Levels of involvement	Specific actions	Description/techniques used
1.	Information	Minimal communication	Local authorities (mayor, local council) decide on all matters without consulting the community (except where they have a legal obligation) but the minutes of meetings can be public.
		Limited information	Citizens from the local community are informed only about the aspects that the local authorities consider relevant, not about all the aspects they want to know. Press releases and campaigns, as well as information letters, are used.
		Quality/extensive information	Providing all the information that the local community wants to have or feels they would need. Environmental action plans, other documents substantiating environmental decisions can be presented.
2.	Consultation	Limited consultation	Providing limited information and awaiting response from the local community. Polls and public meetings may be used.
		Extensive consultation	The local authority discusses with members of the local community on

			the directions to follow regarding environmental protection
3.	Participation	Advisory body	Inviting members of the local community to formulate proposals regarding the environment for the City Council to then consider.
		Partnerships	Solving problems in partnership with the local community
		Limited decentralization in decision-making	Allowing local community members to make their own decisions about environmental issues
4.	Empowerment	Delegation of control	Delegating the adoption of decisions for a specific project/field of activity.
		Independent control	Local authorities leave environmental protection decisions to the local community.

source: adaptation after Davidson (1998)

There are a number of factors that can act as barriers/facilitators regarding the involvement and participation of citizens in environmental decision-making. The most important barriers are institutions, power relations and lack of trust. Facilitators include local policies, the legislative framework on environmental protection and the presence of mediators.

The approach of specific citizen involvement policies in maintaining a clean environment depends on the level of participation assumed by the local community, according to the approach presented in the previous table. Citizens' participation in the adoption of decisions regarding the environment can also be done through pressure groups, local aid groups, volunteer services, social movements, advocacy activities, social networks and local development projects with an impact on the protection/conservation of the environment.

2.3 Ecological governance in local rural communities

Achieving ecological governance in local communities requires their involvement in identifying all environmental problems and solving these problems according to their own skills and resources through an effective allocation of responsibilities. Members of local communities are key actors in solving environmental problems because they have an important contribution to sustainable development projects/programs. They are involved in activities that may result in excessive consumption and even depletion of local resources, damage to biodiversity, pollution of terrestrial and aquatic ecosystems or other ecosystems. On the other hand, citizens from local communities are able to influence the activity of socio-economic factors either individually or collectively, especially local local authorities and companies, so that they can pay more attention to the environment in the decision-making process.

The concept of ecological governance has been defined as the process of rehabilitating, cleaning, restoring and beautifying the natural environment in an ecological approach to building civilization, with the aim of achieving ecological civilization. Green governance relies on green technology innovation as a driving force (Niu and Xiao, 2021).

Localizing the concept of Lundqvist (2004), the society-environment relationship shows that the approach to a rational ecological governance through the prism of dedicated policies should be a multidimensional approach. From this perspective, among the policy dimensions specific to the implementation of a rational ecological governance are:

a) *Scale:* the limits of authority and responsibility capable of ensuring a balance between local autonomy and the global imperatives of sustainable development.
b) *The time horizon:* the functioning of institutions should consider a balance between electoral, political and ecological cycles, so as to ensure the sustainability of local development;
c) *Capitalizing on knowledge:* the design of ecological governance at the level of local communities should be carried out so that knowledge about the environment is integrated into the decision-making process and specific policies.

d) *Integration:* local governance in the holistic one, institutionally focused at the global level.

Local ecological governance should, according to the particularization of Lundqvist's (2004) approach, satisfy a number of criteria:

- local ecological governance must be adapted to ecologically relevant limits for local communities;
- local ecological governance should be adapted to natural eco-cycles so that the inter-generational balance of resource consumption is ensured without affecting the norms of social justice proper to the modern approach of the state;
- ecological governance must generate local institutional capacities capable of transforming scientific-rational arguments in favor of sustainable development into policies and decisions assumed collectively and democratically at the local level;
- local ecological governance must ecologically scale the socio-economic activities carried out within the local community.

Compliance with these criteria transforms, through specific policies, the local ecological governance in the rural environment into a management system of rural ecosystems. Rural ecosystem management as defined by Lackey (1998) involved the application of ecological options and constraints to achieve desired social benefits in a spatio-temporally defined geographic area.

Ecological governance at the level of local communities is able to effectively bring socio-economic activities to the ecological scale in an approach to resource consumption that involves minimal coercion and maximum consent from local stakeholders without limiting initiatives leading to resource efficiency.

2.4 Implementation of the concept of "environmental citizenship/ecological citizenship" at the level of local communities

Environmental attitudes and behavior characterize and influence production and consumption choices and therefore largely generate environmental impact. Environmental citizenship is recognized as an important aspect in addressing global environmental issues such as

climate change (Stern et al., 2011; Ockwell et al., 2009), while providing support to pro-environmental organizations and individuals and contributing to public pressure for political action: signing petitions, open letters to politicians and the press (COST 040/17, 2017).

In Dobson's (2010) conception, environmental citizenship refers to pro-environmental behavior, in public and in private, driven by belief in the equity of distribution of environmental goods, in participation and in the co-creation of sustainability policy. Environmental citizenship therefore implies the active participation of citizens in the transition to sustainability.

In the meaning of "European Network for Environmental Citizenship" (ENEC) it includes "the practice of environmental rights and duties, as well as the identification of the underlying structural causes of environmental degradation and environmental problems, the development of the desire and skills for critical and active engagement and civic participation in order to address those structural aspects, causes and act individually and collectively within democratic means, taking into account inter and intragenerational justice" (COST 040/17, 2017). In the vision of the same network dedicated to environmental citizenship "the responsible pro-environmental behavior of citizens who act and participate in society as agents of change in the private and public sphere on a local, national and global scale, through individual and collective actions in the direction of solving environmental problems contemporary, preventing the creation of new environmental problems, achieving sustainability and developing a healthy relationship with nature" (COST 040/17, 2017).

According to the "European Network for Environmental Citizenship" (ENEC) model, there are eight possible outcomes of education for environmental citizenship, applicable inclusively in rural communities, through specific policies:

a) Solving current environmental problems;
b) Prevention of new environmental problems;
c) Achieving sustainability;
d) Developing healthy relationships with nature;
e) Practicing environmental rights and duties;
f) Identifying the structural causes of environmental problems;
g) Obtaining critical and active engagement and civic participation;

h) Promoting inter- and intra-generational justice.

Hadjichambis and Paraskeva-Hadjichambi (2020)extended the ENEC approach by adding the two spheres (public and private) and the two dimensions (collective and individual) to environmental citizenship. The concept of environmental citizenship, as well as the policies/actions it entails, can be scaled locally, nationally and globally.

The scaling of environmental citizenship at the local level, within the local communities in the rural environment, requires the adoption of specific policies for:

- reporting of environmental pollution by the local community, the local business environment and other stakeholders;
- knowledge of the rights and obligations regarding the environment by the members of the local community;
- creating the feeling that environmental problems of local communities are solved by assuming environmental citizenship;
- ensuring equity and environmental conservation/protection actions;
- deduction of local taxes/taxes following the acquisition of environmental citizenship.

Environmental citizenship, as an element of specific policies, is a tool for making the members of the rural community responsible for the environment and creating a favorable attitude to this subject, which guides the action and behavior of local authorities in this field.

2.5 Organizing exchanges of experience between local communities in the rural areas

Exchanges of experience are tools through which members of local communities can become aware of the need for their own involvement in solving environmental problems at the local level. Exchanges of experience can be carried out between members of local communities in Romania or can be extended to interested rural communities in Europe and other areas of the world.

The essence of exchanges of experience is the transfer of good practices and lessons learned between local communities in different countries facing similar environmental problems. Networks/associations already existing at national or international level can be used for the

exchange of experience (Association of Municipalities in Romania; Council of Municipalities and Regions in Europe; Federation of Local Authorities in Romania).

Both on-site visits by members of local rural communities and online meetings through specialized platforms (Zoom, Google Meet, Meet Now, Webex, Microsoft Teams, etc.) can be used to exchange experiences. They have the advantage of having a much lower cost than face-to-face meetings, which will make them more and more used in the future.

The exchange of experience between members of local communities in rural areas can be focused on the following topics:

- environmental policies specific to rural areas;
- application of environmental legislation;
- development of environmental projects in rural areas;
- environmental citizenship;
- ecological governance;
- sustainable development of agriculture;
- sustainability of the forest fund;
- waste management in local rural communities.

At the level of rural communities in Romania, exchanges of experience regarding the sustainable development of agriculture and forestry are particularly important.

The sustainable development of agriculture has its origin in the concept of bioeconomy which takes into account both the real evolution of the socio-economic process, the qualitative changes and the natural factors of the evolution of resources and the problem of the environment. The development of a sustainable agriculture is a long-term process that must be founded today in a vision of perspective taking into account the existing contradictions between needs and sources of capital between producer and consumer prices. Exchanges of experience on sustainable organic agriculture will have to take place in (Cândea, Bran and Cimpoieru, 2006):

- increasing soil fertility by creating balanced crop rotations with preceding and interspersed plants, but also by using organic fertilizers from the closed circuit of agricultural holdings;

- the creation of spring crops to fix nitrogen and avoid erosion;
- the diversification of production that ensures the stabilization of incomes, eliminates major setbacks determined by the evolution of the supply-demand ratio or the reduction of prices for certain agri-food products;
- adapting animal husbandry to local conditions according to the needs of species diversity favoring plant varieties and animal breeds suitable from the point of view of resistance to diseases and pests;
- the use of plant-based phyto sanitary preparations and the organic control of pests without polluting the soil, groundwater and surface water;
- promoting measures specific to biodynamic agriculture;
- sustainable land use in the rural area represented by extensive agriculture, harvesting of forest products, forestry, ecotourism, nurseries, recreation areas.

Considering the current state of the forests in the rural areas or adjacent to them, it is more than necessary to establish and then bring to fruition medium and long-term exchanges of experience in the field of sustainable development of the forest stock. From this perspective, the need to manage the forest stock on a sustainable basis to meet the socioeconomic and ecological needs of current and future generations in local rural communities is evident. The management and use of forests and forested lands must be done at a pace that maintains bioproductivity and reproductive capacity, vitality and potential to fulfill ecological, economic and social functions at the local level. Exchanges of experience regarding the sustainable development of the forest fund should take into account (Cândea, Bran and Cimpoieru, 2006):

- maintaining the integrity of the local forest fund;
- expansion of forested areas by afforestation of abandoned lands of arable areas heavily affected by erosion and landslides;
- maintaining biodiversity and ensuring the stability of the health and multifunctionality of the forest fund;
- increasing the accessibility of the forest fund, including by equipping the forests with transport routes;

- improving the health of the forest stock by perfecting and developing surveillance systems in accordance with national and European regulations;
- the realization and adaptation of crops with fast-growing forest species outside the forest fund to reduce the economic pressure on it;
- sustainable development of the local hunting and fishing stock, especially in the mountain area.

For the exchange of experience, the European non-reimbursable funds can be used, as well as the EEA Financial Mechanism, which finances specific projects. One such example of a project financed from the EEA Financial Mechanism is the "Exchange of experience to increase energy efficiency in the rural environment in the Central Region" project, developed together with partners from Norway.

Exchanges of experience must be carried out from three perspectives:

- of local administration – involving mayors and members of local councils;
- of members of the local community – adult citizens from rural areas;
- of future generations - pupils, students, etc.

The exchange of experience between rural communities from different geographical areas can take place in workshops; editing brochures and other common information materials; symposia; common learning platforms and best practices.

References

Project Management Institute. (2013). *A guide to the project management body of knowledge (PMBOK guide)* (5th ed.). Newtown Square

Cleland, D.I. (1999). *Project Management: Strategic Design and Implementation*, New York: McGrawHill

Olander, S. (2006). *External Stakeholder Management*, PhD Thesis, Lund Univeristy, UK, 2006.

Ordonanță de Urgență nr. 57/2019 din 3 iulie 2019 - Partea I privind Codul administrativ. Publicată în Monitorul Oficial *nr.* 555 din 5 iulie 2019

Hotărâre nr. 43 din 16 ianuarie 2020 privind organizarea şi funcţionarea Ministerului Mediului, Apelor şi Pădurilor

http://www.mmediu.ro/categorie/minister/6

http://www.anpm.ro/web/guest/acasa

ANMP (2012) Regulament de organizare şi funcţionare al Agenţiei pentru Protecţia Mediului

Directiva 014/52/UE a Parlamentului European și a Consiliului din 16 aprilie 2014 de modificare a Directivei 2011/92/UE privind evaluarea efectelor anumitor proiecte publice și private asupra mediului.

Legea nr. 292/2018 privind evaluarea impactului anumitor proiecte publice şi private asupra mediului

ISO 15686:2006,partea 5 – "Life Cycle Costing for buildings and constructed assets"

Comănescu M. (2006) Creşterea responsabilităţii faţă de mediu. *Economie teoretică şi aplicată*. XVII 5(546), pp. 39-52

Kiss, B., Sekulova, F., Hörschelmann, K., Salk, C. F., Takahashi, W., & Wamsler, C. (2022). Citizen participation in the governance of nature-based solutions. *Environmental Policy and Governance*, 32(3), 247– 272.

Brager G., Specht H., Torczyner J.(1987) *Community Organizing: A Holistic Approach*. Columbia University Press, 2nd edition.

Davidson S. (1998) – Spinning the wheel of empowerment. *Planning,* 1262, 14-15

Niu L. , Xiao L. (2021) Ecological environment management system based on artificial intelligence and complex numerical optimization, *Microprocessors and Microsystems*, 80 (3), 103627, 2021

Lundqvist L., J. *Sweden and ecological governance. Straddling the fence.* Manchester University Press, Manchester, 2004

Stern, P.C. (2011). Contributions of psychology to limiting climate change. American Psychologist 66, 303-314

Ockwell, D., Whitmarsh, L. and O'Neill, S. (2009). Reorienting climate change communication for effective mitigation: Forcing people to be green or fostering grass-roots engagement? Science Communication 30, 305-327.

COST 040/17 (2017) *Memorandum of Understanding for the implementation of the COST Action "European Network for Environmental Citizenship"* (ENEC) CA16229, Brussels, 23 June 2017

Dobson, A. (2010). Environmental citizenship and pro-environmental behavior: rapid research and evidence review. London, UK: Keele University

Hadjichambis, A.C.; Paraskeva-Hadjichambi, D. (2020) Education for Environmental Citizenship: The Pedagogical Approach. In *Conceptualizing Environmental Citizenship for 21st Century Education*; Hadjichambis, A.C., Reis, P., Paraskeva-Hadjichambi, D., Eds.; Springer: Cham, Switzerland. 262–292.